The City of Waltham



Invites Interested Parties To propose the best offer and or bid For the service or product herewith described:

IMPROVEMENTS to HILLCROFT PLAYGROUND 25 Hillcroft Road Waltham, MA 02452

The bid opening will be held: 10:00 AM Tuesday December 11, 2018

<u>A pre-bid conference</u>: 10:00 AM on Thursday November 29, 2018 (Meet at 25 Hillcroft Rd., Waltham, MA 02452)

Last day for written questions: 12 Noon Friday November 30, 2018 (to <u>Jpedulla@city.waltham.ma.us</u>)

Table of Contents

DIVISION 00

000200 Notice to Bidders 001000 Instructions to Bidders 003311 Prevailing Wages 041430 Form for General Bid 005000 Agreement 005010 Performance Bond 005020 Payment Bond 005030 General Conditions 005040 Compliance 008210 Permits

DIVISION 01

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TECHNICAL SPECIFICATIONS:

- DIVISIONS 02-06
- DIVISION 11
- DIVISION 12
- DIVISIONS 31-33
- <u>APPENDIX</u>
- DRAWINGS

SECTION 000200 CITY OF WALTHAM MASSACHUSETTS

NOTICE TO BIDDERS

Hillcroft Playground 25 Hillcroft Road

WALTHAM, MASSACHUSETTS

The City of Waltham, Massachusetts invites sealed bids from Contractors for the **Hillcroft Playground Improvements**, 25 Hillcroft Rd., Waltham, Massachusetts. The work at Hillcroft Playground includes careful removal, storage for reuse, transportation off-site, or demolition, of all structures and site features encountered or noted to be removed or abandoned to a minimum of three feet below finished grade, and the removal and disposal of all materials not called for to be reused or salvaged, in accordance with the contract drawings, these specifications, and Engineer's requirements. Provide all labor, equipment, materials and transportation necessary to complete the work. For a more complete description of the project go to the technical specification Divisions 2-6,11, 12, 31-33 sections

<u>PLANS, SPECIFICATIONS</u> and other Contract Documents may be obtained by visiting the City's Web Site at <u>www.city.waltham.ma.us/bids</u>

Copies of Addenda will be e- mailed to the registered Bidders without charge. Addenda will also be posted on the web site above

Sealed <u>GENERAL BIDS</u> for this project will be accepted from eligible bidders at the Purchasing Department, Waltham City Hall, 610 Main Street, Waltham, MA 02452 until 10:00 AM on December 11, 2018, at which place and time they shall be publicly opened, read aloud and recorded for presentation to the Awarding Authority.

A <u>PRE-BID CONFERENCE AND SITE INSPECTION</u> will be held for all interested parties at **10:00 AM on November 29, 2018** at the site of the Hillcroft Playground, 25 Hillcroft Road, Waltham MA 02453. Attendance at this pre-bid conference is strongly recommended but not mandatory for parties submitting a bid. It will be the only opportunity to visit the site prior to the bid opening.

LAST DAY FOR WRITTEN QUESTIONS is at 12 noon November 30, 2018. Questions are to be sent via email only to Jpedulla@city.waltham.ma.us

THE BUDGET for this entire project is NOT TO EXCEED \$1,000,000.00.

Each general bid shall be accompanied by a bid deposit in the form of a bid bond, certified check, or a treasurer's or cashier's check issued by a responsible bank or trust company, payable to the City of Waltham in the amount of five percent (5%) of the value of the bid

Bids shall be made on the basis of the Minimum Wage Rates as determined by the Commissioner of Labor and Industries, Pursuant to the Provisions of Chapter 149, Sections 26 to 27D inclusive of

NOTICE TO BIDDERS 000200 - 1 Massachusetts General Laws, a copy of which is found in the City's Web site at www.city.waltham.ma.us/open-bids .

Bidders' selection procedures and contract award shall be in conformity with the rules of Commonwealth of Massachusetts statute Chapter 30, §39M.

Performance and Labor and Materials payment bonds each in the full amount of the contract price will be required from the successful bidder.

The Awarding Authority reserves the right to reject any or all general bids, if it be in the public interest to do so, and to reject any sub-bid on any sub-trade if it determines that such sub-bid does not represent the sub-bid of a person competent to perform the work as specified or that less than three such sub-bids were received and that the prices are not reasonable for acceptance without further competition.

The successful bidder will be required to furnish a Certificate of Insurance, naming the City of Waltham as an Additional Named Insured with a waiver of subrogation, for General Liability and Vehicle Liability in the amount of \$1,000,000 per occurrence and \$1,000,000 in the aggregate and Worker's Compensation Insurance as prescribed by law.

In accordance with the laws of the Commonwealth of Massachusetts the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

CITY OF WALTHAM

Joseph Pedulla, CPO Purchasing Department City Hall, 610 Main Street Waltham, MA 02452

SECTION 00100 - INSTRUCTION TO BIDDERS

PART 1 - GENERAL

1.01 SCHEDULE OF DATES

- A. Advertisement appears in Central Register, Plans and Specifications ready for Bidders at the Offices of the Waltham Purchasing Agent after 4:30 P.M. on January 14, 2015.
- B. <u>Pre-bid walkthrough and site inspection</u>: November 29, 2018, at 10:00 AM. Meet at 25 Hillcroft Road, Waltham.
- C. <u>Questions</u> and requests for interpretations may be submitted in writing via e-mail ONLY to <u>Jpedulla@city.waltham.ma.us</u> up to **12:00 noon November 30, 2018.**
- D. Addenda will be issued with interpretations as determined by the Purchasing Department only via e-mail and posting on the web site.
- E. <u>General Bids Deadline</u>: 10:00 A.M. on December 11, 2018, in the Purchasing Department, City Hall, 610 Main Street, Waltham, MA 02452, Attn: J. Pedulla, CPO, where the bids will be publicly open and read.

1.02 BIDDING PROCEDURE

- A. Bids for the work are subject to the provisions of General Laws, Chapter 30, § 39M, as amended. Regulations governing the bidding procedures as set forth in the above mentioned amended General Laws must be followed.
- B. In the event of any inconsistencies between any of the provisions of these Contract Documents and of the cited statute, anything herein to the contrary notwithstanding, the provisions of the said statute shall control.
- C. No General Bid received by the Awarding Authority after the time respectively established herein for the opening of General Bids will be considered, regardless of the cause for the delay in the receipt of any such bid.

1.03 WITHDRAWAL OF BIDS

A. Bids may be withdrawn prior to the time respectively established for the opening of General Bids only on written request to the Awarding Authority.

1.04 INTERPRETATION OF CONTRACT DOCUMENTS

A. No oral interpretation will be made to any bidder. All questions or requests for interpretations must be made in writing to the Architect.

- B. Every interpretation made to a bidder will be in the form of an Addendum to the drawings and/or specifications, which will be made available to all persons to whom Contract Documents have been issued.
- C. Failure of the Awarding Authority to send or of any bidder to receive any such Addendum shall not relieve any bidder form obligation under his bid as submitted.
- D. All such Addenda shall become a part of the Contract Documents.

1.05 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

- A. Each bidder may visit the site of the proposed work and fully acquaint himself with conditions as they exist, and may also thoroughly examine the Contract Documents.
 Failure of any bidder to visit the site and acquaint himself with the Contract Documents shall not relieve any bidder from any obligation with respect to his bid.
- B. By submitting a bid, the bidder agrees that the Contract Documents are adequate and that the required result for a full and complete installation can be produced. The successful bidder shall furnish any and all labor, materials, insurance, permits and all other items needed to produce the required result to the satisfaction of the Awarding Authority.

1.06 BID SECURITY

- A. The General Contractor's bid must be accompanied by bid security in the amount of five percent (5%) of the bid.
- B. At the option of the bidder, the security may be bid bond, certified, treasurer's or cashier's check issued by a responsible bank or trust company. No other type of bid security is acceptable.

Bid Bonds shall be issued by a Surety Company qualified to do business under the laws of the Commonwealth of Massachusetts.

- C. Certified, Treasurer's or Cashier's check shall be made payable to the City of Waltham, Massachusetts.
- D. The bid security shall secure the execution of the Contract and the furnishing of a Performance and Payment Bond by the successful General Bidder for 100% of the contract value.
- E. Should any General Bidder to whom an award is made fail to enter into a contract therefore within five (5) days, Saturdays, Sundays and Legal Holidays, excluded, after notice of award has been mailed to him or fail within such time to furnish a Performance Bond and also a Labor and Materials or Payment Bond as required, the amount so received from such General Bidder through his Bid Bond, Certified, Treasurer's or Cashier's check as bid deposit shall become the property of the City of

Waltham, Massachusetts as liquidated damages; provided that the amount of the bid deposit, which becomes the property of the City of Waltham, Massachusetts, shall not in any event exceed the difference between his bid price and the bid price of the next lowest responsible and eligible bidder; and provided further that, in case of death, disability, bona fide clerical error or mechanical error of a substantial nature, or other unforeseen circumstances affecting the General Bidder, his deposit shall be returned to him.

1.07 BID FORM

- A. General Bids shall be submitted on the "FORM FOR GENERAL BID" enclosed. Erasures or other changes must be explained or noted over the signature of the bidder.
- B. Bid forms must be completely filled in. Bids which are incomplete, conditional, or obscure, or which contain additions not called for will be rejected.
- C. General Bidders shall submit one set of executed bid forms to the Awarding Authority.

1.08 SUBMISSION OF BIDS AND BID SECURITIES

A. Each bid submitted by a General Contractor shall be enclosed in a sealed envelope that shall be placed with the bid security in an outer envelope. The outer envelope shall be sealed and clearly marked as follows:

(Firm Name):

General Bid and Bid Security for: Hillcroft Playground

1.09 AWARD OF CONTRACT

- A. The Contract shall be awarded to the lowest responsible and eligible General Bidder on the basis of competitive bids in accordance with the procedure set forth in the provision of Chapter 30, §39M of the General Laws of the Commonwealth of Massachusetts.
- B. If the bidder selected as the General Contractor fails to perform his agreement to execute a contract in accordance with the terms of his General Bid, and furnish a Performance Bond and also a Labor and Materials or Payment Bond, as stated in his General Bid an award shall be made to the next lowest responsible and eligible bidder.
- C. The words "lowest responsible and eligible bidder" shall be the bidder whose name is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work and who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, on the work. Essential information in regard to such qualifications shall be submitted in such form as the Awarding Authority may require.

D. Action on the award will be taken within sixty (60) days, Saturdays, Sundays and Legal Holidays excluded after the opening of the bids.

1.10 SECURITY FOR FAITHFUL PERFORMANCE

- A. The successful bidder must deliver to the Awarding Authority simultaneously with his delivery of the executed contract, an executed Performance Bond, and also a Labor and materials or Payment Bond, each issued by a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of One Hundred Percent (100%) of the Contract Price, as surety for the faithful performance of his contract, and for the payment of all persons performing labor or furnishing materials in connection therewith. Said bonds shall provide that, if the General Contractor fails or refuses to complete the Contract, the Surety Company will be obligated to do so.
- B. Premiums are to be paid by the General Contractor, and are to be included in the Contract Price.

1.11 EQUAL OPPORTUNITY

A. The City of Waltham is an Equal Opportunity employer and will require compliance with the minority business enterprise plan (MBE) on file in the Purchasing Department

1.12 PRE-BID WALK-THRU

A. A pre-bid conference will be held at the site on November 29, 2018 at 10:00 AM. at the Hillcroft Playground, 25 Hillcroft Rd., Waltham, MA. Interested parties are encouraged to attend given that this will be the only time the site is available prior to the submission of bids. Further, prior to the bid opening, potential bidders may not go onto the site any time other than the aforementioned pre-bid conference.

1.13 SITE VISITS

A. Prospective bidders are prohibited from going onto the site prior to the Bid Opening or any time other than the pre-bid walk-thru, as set forth in Section 1.12 above, unless authorized by the Architect in an Addendum to the bid documents.

1.14 CONTRACT DOCUMENTS

A. The Awarding Authority shall make available the bid documents and addenda in the City Web site at <u>www.city.waltham.ma.us/bids</u>. <u>No plans will be mailed</u>.

1.15 EQUALITY

A. Except where otherwise specifically provided to the contrary, the words "or approved equal" are hereby inserted immediately following the name or description of each article, assembly, system, or any component part thereof in the Contract Documents. It

is the Contractor's responsibility to provide all the research and documentation that would prove a product or assembly is "equal". Failure to provide research or documentation does not alleviate the Contractor's responsibility to meet the schedule.

1.16 TAX FREE NUMBER

A. The City of Waltham has a tax-free number.

1.17 SCHEDULE

- A. The work of the Contract shall be **Substantially** Complete in **150 calendar days** after the date of the Notice-to-Proceed. **Final** completion is to be achieved **180 calendar days** after the date of the Notice-to-Proceed.
- 1.18 GENERAL CONDITIONS CHARGES.

General Condition charged to the Payment application for AIA 702 shall be spread over a period of 7 months or 7 Payment application cycles whichever is later

1.19 WEEKLY JOB MEETINGS

A. There will be a weekly job meeting at the site on the same agreed-upon day and time. Time will be provided to discuss and view the progress of the work and to answer questions. The Contractor's job Superintendent and Project Manager shall attend each meeting. The City reserves the right to have job meetings conducted in the location of its choosing.

1.20 PROJECT SUPERINTENDENT

A. The Contractor shall provide the same person as Superintendent for the entire duration of the project. Failure to maintain the same person in this position shall result in a One Thousand Dollar (\$1,000.00) penalty per incident which shall cover the Architect's time to re-orient new personnel.

1.21 AWARD

- A. The Awarding Authority reserves the right to reject any or all bids if it be in the public interest to do so, and to act upon the bids and make its award in any lawful manner.
- 1.22 PREVAILING WAGE SCHEDULE
 - A. Bids shall be made on the basis of the Prevailing Wage Schedule, as determined by the Federal Government and the Commissioner of Labor and Industries, pursuant to the provision of the Massachusetts General Laws. The Prevailing Wage Schedules for this project can be found in the City's web Site at <u>www.city.waltham.ma.us/bids</u>

1.23 CONFLICT OF INTEREST

A. A bidder filing a proposal thereby certifies that the proposal is made in good faith, without fraud, collusion, or connection of any kind with any other bidder for the same work, and that the bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.

1.24 PROCEED ORDERS

A. No bidder is to proceed without a proceed order as set out in the contract.

1.25 INTENTIONALLY LEFT BLANK

1.26 COMPLIANCE WITH MASSACHUSETTS GENERAL LAWS

A. Pursuant to Massachusetts General Laws, Chapter 62C, Section 49A, I certify under the penalty of perjury that I, to the best of my knowledge and belief have filed all state tax returns and paid all the state taxes required under law.

1.27 CONSTRUCTION BARRICADES

- A. The General Contractor shall provide all barricades to enclose the work area to prevent unauthorized access to the site.
 - 1. The barricades shall provide enough room for <u>all</u> construction activities to be performed while separated from pedestrians, students, and staff on site.
 - 2. Safety is the sole responsibility of the Contractor and any barricades necessary to protect the work and the public shall be provided.
 - 3. Provide entrance protection.

1.28 INSURANCE

- A. The contractor shall purchase and maintain, at his expense all insurance required by the Contract. Documents and all insurance required by the applicable laws of Massachusetts, including but not limited to, General Laws, Chapter 146, in connection with all hoisting equipment.
- B. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and from claims for damages because of bodily injury, including death and all property damage including, without limitation, damage to buildings and adjoining the site of construction which might arise from and during operations under this contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them including:
 - 1. Statutory Worker's Compensation and Employer's Liability

The contractor shall provide insurance for the payment of compensation and the furnishing of other benefits under Chapter 152 of the General Laws (socalled Worker's Compensation Act) to all persons to be employed under this contract and shall continue in force such insurance as aforesaid shall be deemed a material breach of this Contract and shall operate as an immediate termination thereof. The contractor shall, without limiting the generality of the foregoing, conform to the provisions of Section 34A of Chapter 149 of the General Laws, which Section is incorporated herein by reference and made a part of hereof.

2. Comprehensive General Liability Insurance

Minimum bodily injury limits of \$ 1,000,000 per person and \$ 1,000,000 per accident, and property damage limits of \$ 500,000 per accident and \$ 1,000,000 aggregate during any 12 month period, shall include the following:

- a. Public liability (bodily injury and property damage)
- b. X.C.U. (explosion, collapse, and underground utilities)
- c. Independent contractor's protective liability.
- d. Products and completed operations.
- e. Save harmless agreement for Owner and Architects set forth in ARTICLE 10.11 of the GENERAL CONDITIONS.
- 3. Comprehensive All Risk Motor Vehicle Liability Insurance

Minimum bodily injury limits of \$ 500,000 per person, \$ 1,000,000 per accident, and property damage limit of \$ 1,000,000 per accident.

4. All Risk Insurance

Covering all Contractors' equipment with a provision for Waiver of Subrogation against the Owner.

- 5. Excess Liability Insurance in Umbrella Form with combined Bodily Injury and Property Damage Limit of \$ 1,000,000.
- 6. <u>City of Waltham shall be a Named Additional Insured for General Liability only</u> with a Waiver of Subrogation on the insurance policy for this project.

1.29 SITE ACCESS

- A. The General Contractor shall gain access to the site via routes approved by the Owner.
 - 1. The General Contractor as part of the bid price will restore all roads, curbs, driveways, walks and grassed or landscaped areas damaged during construction.

1.30 CONSTRUCTION TRAILER

- A. The General Contractor shall locate the construction trailer at locations approved by the Owner.
- B. The General Contractor shall locate all on site stored or staged materials within the enclosed area designated by the Owner.
- 1.31 INTENTIONALLY LEFT BLANK
- 1.32 COMPLETE BID FORMS
 - A. Please Note: Each bidder must <u>fill in all the blanks</u> on all the bid forms, even if the information is "zero dollars" or "not applicable". Also, please acknowledge <u>all</u> Addenda issued by the Awarding Authority
- 2.00 FUNDS APPROPRIATION and LOAN AUTHORIZATION.
 - A <u>THE CONTRACT OBLIGATION ON BEHALF OF THE CITY IS SUBJECT TO PRIOR</u> <u>APPROPRIATION OF MONIES FROM THE GOVERNMENTAL BODY AND AUTHORIZATION</u> BY THE MAYOR.

3.0 CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

A All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor

Signature of Individual or Corporate Name

By:

(Signature of Corporate Officer if applicable)

Title:_____

Social Security Number or Federal Identification Number:

END OF SECTION

SECTION 00331

PREVAILING WAGE SCHEDULE

Please visit the City Web Site at <u>www.city.waltham.ma.us/open-bids</u> for a copy of the schedules

SECTION 0041 43

BID FORM

CITY OF WALTHAM

TO THE PURCHASING AGENT WALTHAM, MASSACHUSETTS 02453

The undersigned, as bidder, hereby declares that he/she has carefully examined the specifications and provisions attached hereto, and that he/she proposes and agrees, if this bid is accepted, that he/she will contract with the CITY OF WALTHAM in the form prescribed for the **IMPROVEMENTS TO HILLCROFT PLATGROUND** during the year 2019, as herein specified and will provide therefore all necessary labor, machinery and equipment, and will perform all work in the manner prescribed and according to the requirements of the Contract Documents.

Accompanying this bid is case, a certified or treasurer's check payable to the CITY OF WALTHAM, or a bid bond in the amount of FIVE PERCENT (5%) OF THE CONTRACTOR'S BID PRICE.

If this bid shall be accepted and the undersigned shall fail to execute the required contract, in accordance with the terms herein set forth, within five days from the date of mailing a notice to the undersigned at the address given below that the contract is ready for signature, the CITY OF WALTHAM may, at its option, determine that this bid shall be null and void, and the aforesaid cash or checks shall become the property of the CITY OF WALTHAM; otherwise the said cash or checks shall be returned to the undersigned.

Bidder acknowledges receipt of the following addenda(s):

Time for **FINAL** completion of the work is **180 days from the actual project start date, weather depending. SUBSTANTIAL** completion of the work is **150 days from the actual project start date, weather depending.**

1. BASE BID: The proposed contract price for the construction of Improvements to Hillcroft Playground without alternatives

is_____dollars

and______ cents (\$______).

2. ADD ALTERNATES:

NOT USED

00 41 43-1 BID FORM

Title
Fax Number

Date

PROOF OF CONTRACTOR'S RESPONSIBILITY

Before a contract will be awarded to any bidder, he/she will be required to furnish evidence satisfactory to the City that he/she has all of the following qualifications:

- A. Ability, equipment, organization, and financial resources sufficient or enable him/her to construct and complete the work successfully within the time required.
- B. Experience during the past three (3) years in the successful completion of similar projects, the magnitude of which shall be not less than one-half (1/2) the work herein specified. In this connection, the attention of the bidder is directed to the "Bidder's Experience" attached hereto, which shall be used in determining the responsibility of the bidder. The City may require additional information is necessary to determine the responsibility of the bidder.

In the event the bidder fails, refuses, or neglects to submit ant require information within the reasonable time stated in any request or fails to qualify as a responsible bidder, his/her bid guaranty shall be forfeited to the use of the owner, not as a penalty, but as liquidated damages.

The determination of whether a bidder is responsible shall rest solely with the City.

BIDDER'S EXPERIENCE

Complete the following Statement of Bidders Qualifications for Sports Field Contractors. List projects of a similar character and scope to the work specified under this contract, which have successfully been completed by during the past three years. Projects must have included the renovation, refurbishment, reconstruction or construction (new) of public, private or institutional sports playing fields and parks/open space facilities.

This information must be furnished by each bidder. A completed project is one that has been accepted and the final payment received from the City or authorized representative.

Statement of Bidders Qualifications Sports Field/Parks Contractor

If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires.

1.0	Name of Bidder	
2.0	Permanent Main Office Address	
3.0	When organized	
4.0	How many years have you been engaged in the contracting business under your present firm	or

5.0 Contracts on hand: (Schedule these showing gross amount of each contract and the appropriate anticipated dates of completion. Include name and address of client and name of person supervising for client.) 6.0 General character of work performed by your company_____ 7.0 Have you ever failed to complete any work awarded to you? If so, why?_____ 8.0 Have you ever defaulted on a contract? If so, where and why?_____ 9.0 List the more important contracts awarded to you and contracts for work similar to this project, stating approximate cost for each and the month and year completed. (Give name and address of client and name of person supervising for client.)_____ 10.0 List your major equipment available for this contract: 11.0 Experience in construction work similar to this project ______ 12.0 Background and experience of the principal members of your organization including the officers Projects you have been low bidder on in last 60 days_____ 13.0

14.0	Credit available: \$	
± 1.0	ci cuit uvuilubici y	

15.0 Bank Reference:_____

16.0 The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the City of Waltham in verification of the recitals comprising this statement of Bidder's Qualifications.

Dated this	day of	, 2018

Name of Bidder

Ву

Title

Bidder's Signature

Date

--- END OF SECTION ---

SECTION 00500

AGREEMENT

CITY OF WALTHAM

ARTICLE 1. This agreement, made this _____ day of _____, 2018 by and between the CITY OF WALTHAM, party of the first part, hereinafter called the CITY, by its MAYOR, and

hereinafter called the CONTRACTOR.

ARTICLE 2. Witnesseth, that the parties to this agreement, each in consideration of the agreement on the part of the others herein contained, do hereby agree, the CITY OF WALTHAM for itself, and said contractor for his heirs, executors, administrators and assigns as follows:

To furnish all equipment, machinery, tools and labor, to furnish and deliver all materials required to be furnished (except as otherwise specified) and deliver in and about the project and to do and perform all work in strict conformity with the provisions of this Contract and of the Notice to Bidders, bid, Project Manual, and Drawings hereto annexed. The said Notice to Bidders, bid, Project Manual, and Drawings are hereby made a part of this contract as fully and to the same effect as if the same had been set forth at length and incorporated in the contracts.

ARTICLE 3. In consideration of the foregoing premises the CITY agrees to pay and the CONTRACTOR agrees to receive as full compensation for everything furnished and done by the CONTRACTOR under this contract, including all work required by not included in the items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work specified, and for well and faithfully completing the work, and the whole thereof, as herein provided, such prices as are set forth in the accompanying bid.

This Agreement entered into as of the day and year first written above.

CITY OF WALTHAM, MASSACHUSETTS

FOR THE CITY

FOR THE COMPANY

Jeannette A. McCarthy, MAYOR, City of Waltham Date: _____

CONTRACTOR (Signature), Date: _____

Company

Address

Luke Stanton, Asst. City Solicitor Date: _____ APPROVED AS TO FORM ONLY

Nick Abruzzi, Recreation Director Date: _____

Joseph Pedulla, Purchasing Agent Date: _____

Paul Centofanti, Auditor Date: _____

I CERTIFY THAT SUFFICIENT FUNDS ARE AVAILABLE FOR THIS CONTRACT

SECTION 00 50 10

PERFORMANCE BOND

CITY OF WALTHAM

as

KNOW ALL MEN BY THESE PRESENT THAT,

principal and _______ as surety, are held and firmly bound unto the CITY OF WALTHAM and to such persons, firms, and corporations, who may furnish materials for or perform labor on the work, construction or improvements contemplated in the Contract hereinafter mentioned, or who may have any suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, in the

SUM OF _______DOLLARS (\$_______) (lawful money of the United States of America) for the payment whereof the Contractor and the Surety of Sureties bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT for the above burden (the Contractor) its

heirs, executors, administrators and assigns, shall faithfully perform the Contract, on his part and during the life of any guaranty or warranty, for defective materials and workmanship required under this Contract, and satisfy all claims and demands incurred for the same; and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of failure so to do, and shall fully reimburse and repay the City all outlay and expense which the City may incur in making good any such default, and shall promptly make payment to all persons supplying labor or materials for use in the prosecution of the work provided for in said Contract; and shall indemnify and save harmless the said City, its officers and agents from any and all suits or claims for injury or damage to persons or property resulting from or arising our of the work done under this Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that (except as to the City) no suit, action or proceeding by reason of any default whatever shall be brought on this Bond after two years from the day on which the final payment under the Contract falls due.

AND PROVIDED, that any alterations which may be made in the terms of the Contract or in the work to be done under it, or any assignment, transfer or subletting of any part of the work, or the giving by the City of any extension of time for the performance of the Contract, or any other forbearance on the part of either the City or the Contractor to the other, shall not in any way release the Contractor and the Surety of Sureties, or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety or Sureties of any such alterations, assignment, transfer, subletting extension or forbearance being hereby waived. This Bond is made for the use and benefit of all persons, firms, and corporations who may furnish materials, or perform any labor for or on account of said work, construction or improvements, or who may have any suits or claims for injury or damage to persons or property resulting from or arising our of the work done under this Contract, and they and each of them are hereby made obligees hereunder the same as if their own proper names were written herein as such, and they and each of them may sue hereon in their own names for their own use and benefit.

And the 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 hereunder, or the Specifications accompanying the same, shall in any way affect its obligations on this Bond, and it does hereby waive notice of any such changes, extension of time, alteration or addition to the terms of the Contract or to the work, or to the Specifications.

IN WITNESS WHEREOF, said Contractor and Surety have hereunto set their respective names this

	day of		, 20	
WITNESSES:				
(CONTRACTOR)	(SEAL)			
NAME (SIGNATURE AND TITLE)	BY			_
ADDRESS(SURETY)			(SEAL)	
NAME	BY			
ADDRESS		BY	(ATTORNEY-IN-FACT)	

POWER OF ATTORNEY

Attorneys-in-fact who sign bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

SECTION 00 50 20

PAYMENT BOND

CITY OF WALTHAM

as

KNOW ALL MEN BY THESE PRESENT THAT,

principal and _______as surety, are held and firmly bound unto the CITY OF WALTHAM and to such persons, firms, and corporations, who may furnish materials for or perform labor on the work, construction or improvements contemplated in the Contract hereinafter mentioned, or who may have any suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, in the

SUM OF ______DOLLARS (\$______) (lawful money of the United States of America) for the payment whereof the Contractor and the Surety of Sureties bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT for the above burden (the Contractor) its

heirs, executors, administrators and assigns, shall faithfully perform the Contract, on his part and during the life of any guaranty or warranty, for defective materials and workmanship required under this Contract, and satisfy all claims and demands incurred for the same; and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of failure so to do, and shall fully reimburse and repay the City all outlay and expense which the City may incur in making good any such default, and shall promptly make payment to all persons supplying labor or materials for use in the prosecution of the work provided for in said Contract; and shall indemnify and save harmless the said City, its officers and agents from any and all suits or claims for injury or damage to persons or property resulting from or arising our of the work done under this Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that (except as to the City) no suit, action or proceeding by reason of any default whatever shall be brought on this Bond after two years from the day on which the final payment under the Contract falls due.

AND PROVIDED, that any alterations which may be made in the terms of the Contract or in the work to be done under it, or any assignment, transfer or subletting of any part of the work, or the giving by the City of any extension of time for the payment of the Contract, or any other forbearance on the part of either the City or the Contractor to the other, shall not in any way release the Contractor and the Surety of Sureties, or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety or Sureties of any such alterations, assignment, transfer, subletting extension or forbearance being hereby waived.

This Bond is made for the use and benefit of all persons, firms, and corporations who may furnish materials, or perform any labor for or on account of said work, construction or improvements, or who

may have any suits or claims for injury or damage to persons or property resulting from or arising our of the work done under this Contract, and they and each of them are hereby made obligees hereunder the same as if their own proper names were written herein as such, and they and each of them may sue hereon in their own names for their own use and benefit.

And the 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 hereunder, or the Specifications accompanying the same, shall in any way affect its obligations on this Bond, and it does hereby waive notice of any such changes, extension of time, alteration or addition to the terms of the Contract or to the work, or to the Specifications.

IN WITNESS WHEREOF, said Contractor and Surety have hereunto set their respective names this

day of		, 20
WITNESSES:		
(CONTRACTOR)	(SEAL)	
NAME (SIGNATURE AND TITLE)	Вү	Y
ADDRESS	(SEAL)	
NAME	Вү	Y
ADDRESS (ATTORNEY-IN-FACT)	Вү	Y

POWER OF ATTORNEY

Attorneys-in-fact who sign bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

SECTION 005030

GENERAL CONDITIONS

1. INFORMATION

All information shall come from the Office of the City Purchasing Agent. The Contractor shall inquire at this office for any information needed. Wherever the words "or equal as approved" are used, it is to be understood that the opinion of the City Purchasing Agent shall govern.

2. <u>SUITS</u>

The Contractor shall assume defense of and shall indemnify and hold the City and its agents harmless from all suits and claims against the City and its sub-contractors arising from the use of any invention, patent right labor or employment, or from any act of omission or neglect of the City, its agents, employees or any subcontractor in performing the work, under this contract.

3. LAWS AND REGULATIONS

The Contractor shall conform to all the applicable rules, regulations, laws and ordinances of the City of Waltham, the Commonwealth of Massachusetts, the United States of America and all agencies having jurisdiction over this contract.

4. PROTECTION OF PROPERTY

The Contractor shall take all proper precautions to protect the City's property from damage and unnecessary inconvenience. Any City property damaged by the Contractor in carrying out the provisions of this contract shall be restored to its original condition, by and at the expense of the Contractor.

5. PROTECTION OF PERSONS

The Contractor shall take all proper precautions to protect persons from injury, unnecessary inconvenience, and shall be responsible for his failure to do so. The Contractor agrees to hold the City harmless from any and all liabilities of every nature and description, which may be suffered through bodily injury, including death, to any person, by reason of negligence of the Contractor, his agents or employees, or any subcontractor.

6. INSURANCE

A. WORKMAN'S COMPENSATION: The Contractor shall provide by insurance for the payment of compensation and furnishing of other benefits under Chapter 152 of the General Laws of the Commonwealth of Massachusetts to all persons to be employed under this contract, the premiums for which shall be paid by the Contractor.

B. COMPREHENSIVE GENERAL LIABILITY

Bodily Injury:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate
Property Damage:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate
C. AUTOMOBILE (VEH	HICLE) LIABILITY
Bodily Injury	\$2,000,000 Each Occurrence

Property Damage	\$1,000,000 Aggregate
D. UMBRELLA POLICY	
General liability	\$2,000,000

Your bid response must include a Certificate of Insurance with the above limits as a minimum. In addition, the Certificate of Insurance must have the following text contained in the bottom left box of the Certificate: <u>"The City of Waltham is a Named Additional Insured for all Insurance".</u> The Certificate of Insurance must be mailed directly to:

Office of the Purchasing Agent Purchasing Department City of Waltham 610 Main Street Waltham, MA 02452

7. LABOR AND MATERIALS BOND

The Contractor agrees to execute and deliver to the City, a Performance Bond and a Labor and Materials Bond equal to 50% of the contract value. This contract shall not be in force until said bond has been delivered and accepted by the City. Bond to be issued by a company licensed by the Commonwealth of Massachusetts.

8. PERSONNEL:

The Contractor shall employ a competent supervisor and all properly licensed personnel necessary to perform the services required in this contract. The City Purchasing Agent shall have the right to require the Contractor to remove and/or replace any of the personnel for nonperformance or for unprofessional behavior. The City Purchasing Agent may require the Contractor to submit a weekly performance record of the areas and of the work performed, on forms approved by the City Purchasing Agent. The Contractor or his supervisor shall be available to inspect such work as required by the City Purchasing Agent.

9. PREVAILING WAGES

The Contractor is required to pay the prevailing wages as determined by the Federal Government and by Chapter 149, Sections 26 and 27D of the Massachusetts General Laws, including the submission of weekly payrolls to the awarding authority. Copies of the Prevailing Wage Schedule is found on line at www.city.waltham.ma.us/bids

10. MATERIALS

The City or its Agent reserves the right to approve or reject any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any rejected supplies, materials or equipment, to the satisfaction of the City or its Agents.

11. TERMINATION OF CONTRACT

This contract may be terminated by the City upon deliverance to the Contractor of a five-day written notice of said termination.

12. CONTRACT OBLIGATIONS

Contract obligations on behalf of the City are subject to an annual appropriation to cover the contract obligation and shall be in force until the date of Final acceptance excluding any guarantee period.

13. BIDDER EXPERIENCE EVALUATION

Each bidder shall submit with his bid, all the information relative to their experience and qualifications in performing the work required under this contract and shall have been in business for a minimum of five (5) years, in order for their bid to be considered.

14. NOT-TO-EXCEED AMOUNT

The bid amount proposed in your company's response is a "not-to- Exceed" amount unless the City makes changes, in writing, to the scope of work to be performed. The Change Order must be signed and approved by the City's Purchasing Agent, City Auditor, Law Department and the Mayor prior to the commencement of the change order work. No work is to begin until the proper approvals have been obtained. A change order will be priced at the unit price. Failure to comply with this procedure will result in the cancellation of the contract and the non-payment of services provided.

16. FINANCIAL STATEMENTS.

The City <u>may</u> require, within five (5) days after the bid opening, a complete and detailed Financial Statement prepared by a Certified Public Account, to determine a bidder's financial stability.

17 BREACH OF CONTRACT/ NON PERFORMANCE

If the Contractor shall provide services in a manner, which is not to the satisfaction of the City, the City may request that the Contractor refurnish services at no additional cost to the City until approved by the City. If the Contractor shall fail to provide services, which are satisfactory to the City, the City in the alternative may make any reasonable purchase or Contract to purchase services in substitution for those due from the Contractor. The City may deduct the cost of any substitute Contract for nonperformance of services together with incidental and consequential damages from the Contract price and shall withhold such damages from sums due or to become due to the Contractor. If the damages sustained by the City exceed sums due or to become due, the Contractor shall pay the difference to the City upon demand. The Contractor shall not be liable for any damages sustained by the City due to the Contractor's failure to furnish services under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurrence of which was a basic assumption under which this Contract was made, including a state of war, embargoes, expropriation of labor strike or any unanticipated federal, state or municipal governmental regulation of order, provided that the Contractor has notified the City in writing of such cause within seven (7) days after its occurrence.

18 RIGHT TO AUDIT

The City of Waltham has the right to review and audit documents related to this contract. This right extends to any subcontractor, supplier or other entity used by the prime contractor to fulfill the obligations under this contract.

19. CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

20. BID OPENING INCLEMENT WEATHER

If, at the time of the originally scheduled bid opening, City Hall is closed to inclement weather or another unforeseeable event, the bid opening will be extended until 2:00 PM on the next normal business day. Bids will be accepted until that date and time.

21 FUNDS APPROPRIATION.

THE CONTRACT OBLIGATION ON BEHALF OF THE CITY IS SUBJECT TO PRIOR APPROPRIATION OF MONIES FROM THE GOVERNMENTAL BODY AND AUTHORIZATION BY THE MAYOR.

22 THE AWARDING AUTHORITY RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS, OR ANY PART OF ANY BID, WHICH IN THE OPINION OF THE AWARDING AUTHORITY, IS IN THE BEST INTERESTS OF THE CITY OF WALTHAM.

General Conditions End of Section 0050300

Section 00 50 40

Compliance

The documents in this section shall bear "wet" Original signatures and returned with your bid

Compliance

The compliance documents in this section must be completed, signed and returned with your bid package.

Purchasing Department

City of Waltham 610 Main Street Waltham, MA 02452

Failure to submit the completed documents will cause the disqualification of the proposal.

Section Index

Check when Complete

Non-collusion form and Tax Compliance form	
Corporation Identification Form	
Certificate of Vote Authorization	
 Certificate of Insurance (showing all limits of WC &GL) 	
Three (3) References	
5% Bid Bond or Certified Check>	
Debarment Certificate	
Prevailing Wage Certificate	
Right-to-know Law	
 OSHA 10 Certificate for all Assigned Employees (MGL ch30, §39M and Ch 149) 	
Before the commencement of the Job, the contractor must provide to the above	e office:

 Performance and Payment Bonds <u>each</u> for 100% of the contract value and naming the City of Waltham

Your Company's Name: ______

Service or Product Bid______

NOTE: Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

NON-COLLUSION FORM AND TAX COMPLIANCE FORM

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity or group of individuals. The undersigned certifies that no representations made by any City officials, employees, entity, or group of individuals other than the Purchasing Agent of the City of Waltham was relied upon in the making of this bid

(Signature of person signing bid or proposal) Date

(Name of business)

Wet Signature Required

TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. c. 62C, & 49A,I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

Signature of person submitting bid or proposal Date

Name of business

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

CERTIFICATE OF VOTE OF AUTHORIZATION

Date:

I ______, Clerk of ______hereby certify that at a meeting of the Board of Directors of said Corporation duly held on the _____day of_____at which time a quorum was present and voting throughout, the following vote was duly passed and is now in full force and effect:

(name) is hereby authorized, directed and empowered for VOTED: That the name and on behalf of this Corporation to sign, seal with the corporate seat, execute, acknowledge and deliver all contracts and other obligations of this Corporation; the execution of any such contract to be valid and binding upon this Corporation for all purposes, and that this vote shall remain in full force and effect unless and until the same has been altered, amended or revoked by a subsequent vote of such directors and a certificate of such later vote attested by the Clerk of this Corporation.

I further certify that ______ is duly elected/appointed ______

of said corporation

SIGNED:

(Corporate Seal)

Clerk of the Corporation:

Print Name: ______

COMMONWEALTH OF MASSACHUSETTS

County of

Then personally appeared the above named and acknowledged the foregoing instrument to be their free act and deed before me,______

Notary Public;

My Commission expires: _____

Date:

CORPORATION IDENTIFICATION

The bidder for the information of the Awarding Authority furnishes the following information.

<u>If a Co</u>	prporation:	
	Incorporated in what	state
	President	
	Treasurer	
	Secretary	
I	Federal ID Number	
<u>lf a fo</u>	reign (out of State) Co	rporation – Are you registered to do business in Massachusetts?
Yes	, No	
lf you	are selected for this v	vork you are required under M.G.L.ch. 30S, 39L to obtain from the
Secret	tary of State, Foreign (Corp. Section, State House, Boston, a certificate stating that you
Corpo	oration is registered, a	nd furnish said certificate to the Awarding Authority prior to the
awarc	1.	
l <u>f a Pa</u>	artnership: (Name all p	partners)
Name	of partner	
Reside	ence	
Name	of partner	
Reside	ence	
lf an li	ndividual	
Name		
Reside	ence	
neora		
lf an li	ndividual doing busing	ess under a firm's name:
Name	of Firm	
Name	of Individual	
Busin	ess Address	
Reside	ence	
Date		
2410		
Name	of Bidder	
Bv		
27	Signature	
	Title	
Busin	ess Address	(POST OFFICE BOX NUMBER NOT ACCEPTABLE)
State	Telephone Number	Today's Date

PROVIDE THREE (3) SERVICE APPROPRIATE REFERENCES

 Company Name: Address: Contact Name: Phone # Type of service/product provided to this Company:

Dollar value of service provided to this Company:

2. Company Name: Address: Contact Name: Phone # Type of service/product provided to this Company:

Dollar value of service provided to this Company:

3. Company Name:

Address: Contact Name: Phone # Type of service/product provided to this Company:

Dollar value of service provided to this Company:

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.

WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided, A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit, on a weekly basis, a copy of his or her weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those reports for three years.

In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work, a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

WEEKLY PAYROLL REPORT FORM

Prime Contractor

Company Name:	Project Name:	Awarding Auth.:	Work Week Ending:	[

-

Subcontractor List Prime Contractor:

Employer Signature:

(G) [A*F] Weekly Total Amount NOTE: Every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. (F) [B+C+D+E] Hourly Total Wage (prev. wage) (E) Supp. Unemp. Employer Contributions Pension <u>(</u>) (C) Health & Welfare Hourly Base Wage (B) Tot. Hrs. Print Name & Title: (A) S 4 Hours Worked F 3 5 N S Work Classification Final Report Employee Name & Address

RIGHT TO KNOW LAW

Any vendor who receives an order or orders resulting from this invitation agrees to submit a Material Safety Data Sheet (MSDS) for each toxic or hazardous substance or mixture containing such substance, pursuant to M.G.L. c. 111F, §§8,9 and 10 and the regulations contained in 441 CMR 21.06 when deliveries are made. The vendor agrees to deliver all containers properly labeled pursuant to M.G.L. c. 111F §7 and regulations contained in 441 CMR 21.05. Failure to furnish MSDS and/or labels on each container may result in civil or criminal penalties, including bid debarment and action to prevent the vendor from selling said substances, or mixtures containing said substances within the Commonwealth. All vendors furnishing substances or mixtures subject to Chapter 111F or M.G.L. are cautioned to obtain and read the laws, rules and regulations referenced above. Copies may be obtained from the State House Bookstore, Secretary of State, State House, Room 117, Boston, MA (617) 727-2834.

Authorized Signature Indicating Compliance with the Right-to-know laws:

Signature

Date

Print Name

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.
DEBARMENT CERTIFICATION

In connection with this bid and all procurement transactions, by signature thereon, the respondent certifies that neither the company nor its principals are suspended, debarred, proposed for debarment, declared ineligible, or voluntarily excluded from the award of contracts, procurement or non procurement programs from the Commonwealth of Massachusetts, the US Federal Government and /or the City of Waltham. "Principals" means officers, directors, owners, partners and persons having primary interest, management or supervisory responsibilities with the business entity. Vendors shall provide immediate written notification to the Purchasing Agent of the City of Waltham at any time during the period of the contract of prior to the contract award if the vendor learns of any changed condition with regards to the debarment of the company or its officers. This certification is a material representation of fact upon which reliance will be placed when making the business award. If at any time it is determined that the vendor knowingly misrepresented this certification, in addition to other legal remedies available to the city of Waltham, the contract will be cancelled and the award revoked.

Company Name			
Address			
City	, State	, Zip Code	
Phone Number (_)		
E-Mail Address			
Signed by Authorize	d Company Representative:		
Print name			,
Date			

10 HOURS OSHA TRAINING CONFIRMATION

Chapter 306 of the Acts of 2004

CONSTRUCTION PROJECTS

AN ACT RELATIVE TO THE HEALTH AND SAFETY ON PUBLIC

The undersigned hereby certifies that all employees to be employed at a worksite for construction, reconstruction, alteration, remodeling, repair, installation, demolition, maintenance or repair of any public work or any public building estimated to cost more than \$10,000.00 have successfully completed a course in construction safety and health approved by the **United States Occupational Safety and Health Administration** that is at least **10 hours** in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first payroll report for each employee and will comply with all laws and regulations applicable to awards of subcontracts subject to section 44F.

Company Name:	
Address:	
Signature:	_
Title:	-
Print Name	-
Date	
See Chapter 306 of the Acts of 2004	

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.

SECTION 00821

PERMITS

PART 1 GENERAL

1.01 CONTRACT DOCUMENTS

A. The general provisions of the Contract, including General and Supplemental Conditions and General Requirements, apply to the work specified in this section.

1.02 PERMITS

- A. The Contractor shall be responsible for obtaining and complying with all permits required of his equipment, work force, or particular operations (such as blasting and fuel storage permits, etc.) in the performance of the Contract. All costs associated with obtaining permits will be included in the price of the work.
- B. If included as part of this project, The Contractor shall be responsible for complying with requirements of the Local Conservation Commission and the Cambridge Watershed
 Protection District. All costs associated with complying with the conditions will be included in the price of the work.
- C. The Contractor shall be responsible for obtaining and complying with the requirements of the Street Opening and Trench Permits required by the City Department of Public Works in the performance of the Contract. All costs associated with complying with the conditions of the permits will be included in the price of the work. All costs associated with obtaining permits will be waived by the City.

END OF SECTION

SPECIFICATIONS

TABLE OF CONTENTS

HILLCROFT PLAYGROUND TECHNICAL SPECIFICATIONS

PREPARED BY WESTON & SAMPSON

DIVISION 02: EXISTING CONDITIONS

- 02 41 13 Selective Site Demolition
- 02 41 13.29 Abandonment of Sewers and Drains

DIVISION 03: CONCRETE

- 03 11 00 Concrete Formwork
- 03 21 00 Concrete Reinforcement
- 03 30 00 Cast-in-Place Concrete

DIVISION 04: MASONRY

04 40 00 Dry-Placed Boulders

DIVISION 05: METALS

05 50 00 Miscellaneous Metals

DIVISION 06: CARPENTRY

06 10 00Rough Carpentry06 20 00Finish Carpentry

DIVISION 11: EQUIPMENT

11 68 13 Playground Equipment

DIVISION 12: FURNISHINGS

12 93 00 Site Furnishings

DIVISION 31: EARTHWORK

- 31 00 00 Earthwork
- 31 05 13.13 Loam Borrow
- 31 05 19.13 Filter Fabrics
- 31 05 19.14 Geotextile Fabrics
- 31 11 00 Clearing and Grubbing
- 31 12 00 Selective Clearing, Invasive Species
- 31 13 13 Tree Pruning and Tree and Stump Removals

- 31 23 19 Dewatering
- 31 25 00 Erosion and Sedimentation Control
- 31 50 00 Support of Excavation

DIVISION 32: EXTERIOR IMPROVEMENTS

- 32 12 16.13 Bituminous Concrete Pavement and Color Sealcoat
- 32 15 40.13 Stabilized Stone Dust Pavement
- 32 18 00 Poured in Place Safety Surfacing
- 32 30 00 Site Improvements
- 32 31 13 Black Vinyl Clad Chain Link Fence
- 32 91 19 Loaming and Seeding
- 32 93 00 Trees, Shrubs, Groundcovers and Landscaping

DIVISION 33: UTILITIES

- 33 05 26.13 Tracer Tape
- 33 39 13 Precast Manholes and Catch Basins
- 33 41 13.22 Corrugated Polyethylene (HDPE) Drainage Pipe
- 33 44 14 Connections to Existing Structures
- 33 49 23 Underground Stormwater Chamber Systems

APPENDICES:

APPENDIX A. City record plans for water, sewer and drain

SECTION 01 57 16

RODENT CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section specifies requirements for rodent control activities by the Contractor at all work and laydown (or staging) areas in connection with this Contract.
- B. The Contractor shall retain the services of a licensed rodent exterminator to conduct an inspection of the work and laydown areas and report on the presence of rodents and take any necessary measures to eliminate existing rodent populations prior to start of work.
- 1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Within ten days after Notice to Proceed, submit to the Engineer a written description of rodent control measures to be used and the areas to be included in the program.
 - B. Provide the name and background of the licensed rodent exterminator retained to provide any necessary rodent eradication measures prior to start of work.

PART 2 - PRODUCTS

2.01 CONTAINERS:

Use metal or heavy-duty plastic refuse containers with tight-fitting lids for disposal of all garbage, or trash associated with food. These containers shall not have openings that allow access by rodents.

PART 3 - EXECUTION

- 3.01 WORK AND LAYDOWN AREAS WITHIN THE CONTRACT AREA:
 - A. Before mobilization begins, obtain written verification from the rodent exterminator that rodent populations have been effectively controlled in areas to be occupied.
 - B. Following site clearing and before demolition, excavation, or construction, inspect work and laydown areas and remove all remaining trash, debris, and weeds.
 - C. Maintain work and laydown areas free of trash, garbage, weeds, and debris. Provide and enforce proper use of refuse containers to ensure that rodents and other pests are not harbored or attracted.
 - D. Designate specific locations as lunch and coffee break areas to prevent random disposal of garbage and trash. Keep those areas free of litter and garbage, and provide refuse containers as described in 2.01 of this section. Keep refuse containers upright with their lids shut tight.

01 57 16-1 RODENT CONTROL

- E. Have all refuse containers emptied daily to maintain site sanitation.
- F. Notify the Engineer within 24 hours whenever rodents (rats or mice) or signs of rodent activity (burrows or droppings) are observed in work or laydown areas. Take appropriate action to locate and control the rodents.

3.02 LAYDOWN AREAS OUTSIDE THE CONTRACT AREA:

- A. Implement pest control at all laydown areas that are not areas of this Contract, but that are used by the Contractor in connection with this Contract. Undertake rodent control at least two weeks prior to use of the area and with time to ensure that the site is free of rodent populations (rats and mice) prior to site occupancy. Maintain the site free of rodents throughout the duration of its use.
- B. Clear laydown areas of trash, debris, and weeds prior to occupancy. Initiate those actions only after rodent populations have been effectively controlled.
- C. Maintain laydown areas free of trash, garbage, weeds, and debris. Provide and enforce proper use of refuse containers to ensure that rodents and other pests are not harbored or attracted.
- D. Dispose of all garbage or trash associated with food in refuse containers with tight-fitting lids as described in 2.01 of this Section. Have refuse containers emptied daily to maintain site sanitation.

END OF SECTION

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.01 SCOPE OF WORK:

- A. Work under this Section shall consist of the careful removal, storage for reuse, transportation off-site, or demolition, of all structures and site features encountered or noted to be removed or abandoned to a minimum of three feet below finished grade, and the removal and disposal of all materials not called for to be reused or salvaged, in accordance with the contract drawings, these specifications, and Engineer's requirements. Provide all labor, equipment, materials and transportation necessary to complete the work.
- B. Items plan referenced to be removed and stored shall be carefully removed and stored on site in a manner and location designated by the Engineer for reinstallation later as shown on the plans or as indicated by the Engineer.
- C. Items plan referenced, or as indicated by the Engineer to be removed and disposed of shall be removed from the site and properly and legally disposed of by the Contractor.
- D. Items indicated on the contract drawings or in the specifications to be removed and salvaged, or other items required to be removed by the Engineer, shall be transported to a municipal storage facility, located within the **City** confines, and unloaded and stacked as required by the Engineer.
- E. Items indicated on the contract drawings or in the specification to be removed and reset shall be carefully removed and reset in the same location as existing according to the specification and details.
- F. The following scope describes the general work/demolition requirements of this Section.
 - 1. Cement concrete and bituminous concrete pavements.
 - 2. Play area and all related concrete footings complete.
 - 3. Play equipment
 - 4. Boulders (salvage for relocation on site)
 - 5. Other features as indicated on the drawings.

1.02 PROTECTION:

A. The Contractor shall assume complete responsibility and liability for the safety and structural integrity of all work and utilities to remain during demolition.

02 41 13-1

- B. Provide safeguards including, but not limited to, warning signs, barricades, temporary fences, warning lights and other items required for protection of personnel and the general public during performance of all work.
- C. All features related to protection shall be maintained until that work has been completed to the point when such safeguards are no longer required.

1.03 SPECIAL REQUIREMENTS:

- A. The Contractor shall salvage items labeled as such and transport these to the **Owner's City Yard** unless these are called for to be reused or required by the Engineer to be disposed of.
- B. Install erosion controls to protect adjacent areas from eroded materials likely to enter wetlands, resource areas, or drainage ways/systems, downstream of areas disturbed by work activities.
- C. Where items to be demolished are located within or adjacent to pavements to remain, the Contractor shall make provisions to protect that pavement to remain. Cut concrete pavement back to score line and cut bituminous concrete pavement back far enough so as not to allow disturbance to base course materials. Pavements damaged as a result of Contractor activities shall be replaced to the extent determined by the Engineer at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 BACKFILL:

- A. The Contractor shall provide suitable backfill as specified under Section 31 23 00 of these Specifications, to fill voids left by removal or abandonment of site features, and shall provide all pipe cap ends, mortar, brick and other material needed to cap off or plug pipes of various sizes and kinds.
- B. Suitable materials shall be used as base course fill and topsoil to the depth as specified herein. Restore disturbed areas with similar materials blended to match the line and grades of adjacent surfaces.

2.02 TEMPORARY FENCE:

- A. The work under these Items shall conform to the relevant provisions of section 644 of the MassDOT standard specifications.
- B. The work shall include temporary installation of chain link fence around the perimeter of the work limits where shown on the plans, and as required by the Engineer, and as Contractor sees fit to protect work.
- C. Temporary fence shall consist of 6 foot high chain link fence anchored into a base that is

both stable and movable to allow access and adjustment as needed. Reclaimed existing fence fabric and materials may be used with the approval of the Engineer. The Contractor shall submit a shop drawing to the Engineer for approval prior to installation.

PART 3 - EXECUTION

3.01 SALVAGEABLE MATERIAL:

A. Frames, grates and other salvageable material shall be carefully removed to minimize damage and stored for later reuse, transport, or removal from site.

3.02 ABANDONED STRUCTURES:

- A. All inlets and outlets shall be plugged with at least eight (8) inches of brick and mortar masonry. Upper portions of masonry structures shall be removed to a depth of three feet. The bottoms of all structures shall be broken to allow drainage, and the structure shall be filled with suitable backfill material placed in six (6) inch layers and thoroughly compacted at each level.
- B. The Engineer shall review work related to abandoned structures before backfilling. Those items not reviewed before backfilling shall be uncovered and backfill procedures observed, at no expense to the Owner.

3.03 ABANDONED PIPES OR CONDUITS:

- A. Plug previously abandoned drainpipes encountered with masonry brick at least eight (8) inches in thickness.
- B. Abandon discontinued water supplies that are encountered during the execution of this contract in accordance with Owner requirements.
- C. Electrical conduits encountered and previously abandoned shall be capped or plugged. END OF SECTION

SECTION 02 41 13.29

ABANDONMENT OF SEWERS AND DRAINS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the abandonment of sewers and drains through various means including furnishing, handling and installation of all concrete and masonry plugs; removal and disposal of manholes, and filling existing pipes with controlled density fill, as shown on the Drawings and specified herein.
- B. The Contractor shall furnish all materials, tools, labor, and equipment to abandon existing sewers, combined sewers, and drains.

1.02 RELATED WORK:

- A. Section 03 11 00, CONCRETE FORMWORK
- 1.03 REFERENCES:

The following standards form a part of this specification, as referenced:

American Society for Testing and Materials (ASTM)

ASTM C32 Specifications for Sewer and Manhole Brick (Made from Clay or shale).

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

The Contractor shall digitally submit its plan for abandoning existing pipe, showing equipment, methods and materials. The plan shall be submitted to and reviewed by the City Engineer before construction.

PART 2 - PRODUCTS

2.01 PLUGS:

- A. Plugs installed at the open ends of the pipe to be abandoned shall be 12-inch thick 3,000psi cement concrete, or 8-inch thick brick masonry as directed. The pipes to be abandoned include all sewer, combined sewer, and drains as specified herein and as shown on the Drawings.
- B. Precast cement concrete plugs that are used shall meet the requirements for 3,000 psi concrete and shall be free of cracks and spalls. Brick masonry plugs shall be made of brick meeting the requirements of ASTM C32, for grade SS, hard brick.

02 41 13.29-1

C. Mortar shall be composed of portland cement, hydrated lime, and sand, and the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense hard-burned brick to 1:3/4 for softer brick. In general, mortar for grade SS brick shall be mixed in the volume proportions of 1:1/2:4-1/2; portland cement to hydrated lime to sand. The cement concrete plug shall be covered with non-shrink grout to prevent leakage at the plug.

2.02 PIPE FILL:

- A. Fill used for the abandonment of sewers, combined sewers, and drains as shown on the drawings shall consist of clean fill, or controlled density fill meeting the requirements included in Section 31 05 13.22 Controlled Density Fill.
- B. Any variance from the specified material shown on the plans or as specified herein for the abandonment of the pipeline shall be subject to the written approval of the Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. PLUGS:
 - 1. Existing sewers or drains shall be plugged with 3,000 psi concrete or with brick masonry, as directed by the Engineer. For non-circular pipes, the largest interior cross sectional dimension shall govern in determining size of abandonment.
 - 2. Plugs shall be of adequate strength to withstand the full soil and groundwater pressure but not less than 5 psi.
 - 3. Open ends of sewer and drain services less than 12-inches in diameter shall be plugged with the appropriate VC plugs or concrete plug as directed by the Engineer. Such plug shall be made watertight with an application around the plug of an approved watertight compound.
 - 4. Masonry plugs shall be at least 8-inches thick and concrete plugs shall be at least 12-inches thick. Pipes entering a manhole or catch basin that are to be abandoned shall have a plug installed that is flush with the interior wall of the structure.
- B. PIPE FILL:
 - 1. Existing sewers or drains 12-inches and larger shall be abandoned and filled with clean fill, or controlled density fill, and plugged, as shown on the Drawings.
 - 2. Existing sewers or drains smaller than 12-inches shall be plugged and abandoned but need not be filled with clean fill or any other material unless otherwise specified by the Engineer.

02 41 13.29-2

3. The method of filling the abandoned pipeline shall fill a minimum of 95 percent of the total annular volume of the pipe.

3.02 REMOVAL AND DISPOSAL OF MANHOLES

A. REMOVAL OF MANHOLES

- 1. Frames and covers will be removed and delivered to the place designated by the Owner.
- 2. After filling the pipes to be abandoned that are entering the manhole as specified above, the Contractor shall remove the cone section of a precast manhole or the top four feet of brick in a brick manhole.
- 3. The Contractor shall place and compact clean fill in the void left by the removal of the manhole.
- 4. The ground or paved surface shall be restored in accordance with the drawings.

B. DISPOSAL OF MANHOLES

1. The Contractor shall dispose of all manhole materials that are to be removed. Unless the Owner designates a site for receiving the removed materials, the Contractor shall dispose of the materials at a site of his own choosing.

END OF SECTION

SECTION 03 11 00

CONCRETE FORMWORK

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section of the specifications covers the furnishing and installation of forms for cast-in-place concrete.

- 1.02 RELATED WORK:
 - A. Section 03 21 00, CONCRETE REINFORCEMENT
 - B. Section 03 30 00, CAST-IN-PLACE CONCRETE

1.03 REFERENCES:

The following standards form a part of this specification:

AMERICAN CONCRETE INSTITUTE (ACI)

- ACI 301 Standard Specifications for Structural Concrete
- ACI 347 Recommended Practices for Concrete Formwork

U.S. ARMY CORPS OF ENGINEERS (CE)

CE 03300 Cast-in-Place Concrete

PART 2 - PRODUCTS

- 2.01 MATERIALS:
 - A. Forms for exterior and interior surfaces which will be exposed to view after the work is completed, whether such surfaces are painted or unpainted, shall be new plywood stock, steel, tempered masonite, or other materials which will provide smooth concrete surfaces without subsequent surface plastering. Plastic or plastic-faced forms shall not be used, except with the prior approval of the Engineer.
 - B. Form ties shall be cone type or equal, with waterstop, which leaves no metal closer than2-inches to finished face of concrete.
 - C. Form release agent shall be a non-staining, non-yellowing, non-toxic liquid free from kerosene and resins of the type recommended by the manufacturer of the forming system being used such as EZ strip by L&M Construction Chemicals, Omaha, NB and "Magic Kote" by Symons Corp., Des Plaines, IL or approved equal.

D. Where steel adjacent to vertical faces of forms cannot be otherwise secured, mortar doughnuts shall be used to prevent steel from lying too close to the finish vertical faces of the concrete.

PART 3 - EXECUTION

3.01 PREPARATION:

Surfaces of forms to be in contact with concrete shall be greased with nonstaining form release compound. Wetting will not be accepted as a substitute. Approval of the Engineer shall be obtained before use of coated materials or liners in lieu of form release compound, except as modified herein.

3.02 CONSTRUCTION:

- A. For concrete surfaces which will be visible after completion of the structure, painted or unpainted, the type and the precise location of form ties, nails joints between form members, and any other features which will leave a visible trace in the finished concrete, will be subject to the approval of the Engineer.
- B. Formwork shall be so constructed, braced, or tied that the formed surfaces of the concrete will be perfectly true, smooth, and to the dimensions shown on the drawings. All forms used for circular sections shall be true arcs as indicated on the drawings. Short chords will not be acceptable. Form line shall present an uninterrupted surface conforming to radii indicated on the drawings.
- C. Forms shall be sufficiently tight to prevent leakage of mortar, and when necessary shall have temporary openings as required for thorough cleaning, and as required for introduction of concrete to avoid excessive free fall. Panels damaged in stripping or otherwise shall not be reused.
- D. Unless otherwise noted on the design drawings, forms shall be filleted and chamfered at all sharp corners, and exposed edges with a 3/4-inch chamfer. Chamfer shall not be used where masonry or other material will subsequently be installed flush with one of the adjacent surfaces of the concrete. Where a wash or slope is indicated on the drawings no additional chamfer is required.

3.03 REMOVAL OF FORMS

A. Except as otherwise specifically authorized by the Engineer, forms shall not be removed before the concrete has attained a strength of at least 30 percent of the ultimate strength prescribed by the design and not before reaching the following number of day-degrees [whichever is the longer]:

Forms for	<u>Day-Degree*</u>
Beams and Slabs	500
Walls and vertical surfaces	200

* Day-Degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily weighted average temperature of 60 deg F equals 300 day-degrees. Temperatures below 50 deg F are not to be considered in determining Day-Degree.

- B. Where beams, girder, columns, walls and similar vertical forms are adequately supported on shores, the side forms may be removed after 24 hours of cumulative curing time provided the side forms support no loads other than the lateral pressure of the plastic concrete. Cumulative curing time represents the sum of time intervals, not necessarily consecutive, during which the temperature of the air surrounding the concrete is above 50 deg. F in accordance with American Concrete Institute standards.
- C. Shoring shall not be removed until the concrete has attained at least 70 percent of the specified strength and sufficient strength to support safely its own weight and the construction live loads upon it.
- D. Forms shall be removed in such a manner as not to impair safety and serviceability of the structure. Concrete exposed by form removal shall have sufficient strength not to be damaged by the removal operation.

END OF SECTION

SECTION 03 21 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section of the specification covers the furnishing and installation of reinforcement for cast-in-place concrete.

1.02 RELATED WORK:

- A. Section 03 11 00, CONCRETE FORMWORK
- B. Section 03 30 00, CAST-IN-PLACE CONCRETE
- 1.03 SYSTEM DESCRIPTION:

Materials and construction shall conform to ACI 318 and ACI 350 unless otherwise noted on the design drawings or modified herein.

- 1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. The Contractor shall furnish the Engineer with complete checked, reinforcing steel shop drawings and bar lists. Shop drawing shall include grade of steel used as well as splice lengths.
 - B. Mill test reports shall accompany drawings. Fabrication shall not commence until the drawings and mill test reports have been released by the Engineer.
 - C. When fiber reinforcement is used, contractor shall submit manufacturer's data confirming that material meets the specification.

1.05 REFERENCES:

A. The following standards form a part of these specifications:

American Concrete Institute (ACI)

- ACI 318 Building Code Requirements for Concrete
- ACI 347 Recommended Practice for Concrete Formwork
- ACI 350 Environmental Engineering Concrete Structures
- ACI SP-66 ACI Detailing Manual

American Society for Testing and Materials (ASTM)

ASTM	A185Sta	andard Specification for Welded Steel Wire Fabric for Concrete Reinforcement
ASTM	A497Sp	ecification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement
ASTM	A6I5	Deformed Billet-Steel Bars for Concrete Reinforcement
ASTM	A775	Epoxy-coated Reinforcing Steel Bars
ASTM	A884	Epoxy-coated Welded Wire Fabric
		American Welding Society (AWS)
AWS :	12.1	Recommended Practices for Welding Reinforcing Steel, Metal

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Steel reinforcing bars shall conform to ASTM A6I5, Grade 60, and A775 if epoxy-coated bars are specified.

Inserts and Connections in Reinforced Concrete Construction

- B. Welded steel wire fabric shall conform to ASTM A185 or ASTM A497 and ASTM A884 if epoxy-coated fabric is specified. Gauge and spacing of wires shall be as indicated on the drawings.
- C. Reinforcing steel shall be detailed in accordance with ACI SP-66 modified as applicable to conform to ACI 350.
- D. Reinforcement shall be accurately formed to the dimensions indicated on the drawings. Bars shall be shipped to the site with bars of the same size and shape, fastened in bundles with securely wired-on metal identification tags listing both size and mark.
- E. Any bar showing cracks after bending shall be discarded.
- F. Steel failing to meet the requirements of this specification or the drawings will be rejected and shall be removed from the site immediately.

2.02 FIBER REINFORCEMENT

When called for on the drawings, concrete engineered reinforcing fibers shall be polypropylene, collated, fibrillated fibers from Fibermesh Co., 4019 Industry Drive, Chattanooga, TN; Forta Corporation, One Hundred Forta Drive, Grove City, PA; or approved equal. Only fibers designed and manufactured specifically for use in concrete from virgin polypropylene and so certified by the manufacturer shall be acceptable.

PART 3 - EXECUTION

3.01 STEEL INSTALLATION:

- Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill and rust scale, dirt, and other coatings (including ice), that reduce or destroy bond.
 When there is a delay in depositing concrete after reinforcement is in place, bars shall be reinspected and cleaned as necessary.
- B. After forms have been oiled, but before concrete is placed, all steel shall be securely wired in the exact position called for, and shall be maintained in that position until all concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Engineer.
- C. Concrete blocks having a minimum bearing area of 2-inches by 2-inches and equal in quality to that specified for the slab, shall be used for supporting reinforcing bars for slabs on grade. Wood blocks, stones, brick chips, etc., shall not be used to support reinforcement.
- D. Metal supports shall be of types that will not penetrate the surface of formwork or slab and which will not show through or stain surfaces that are to be exposed to view, painted or unpainted.
- E. Welding of reinforcing bars will be permitted only where permission of the Engineer has been obtained in advance. Such welding shall be performed only under conditions established by the Engineer, and in accordance with AWS 12.1.
- F. Reinforcement, which is to be exposed for a considerable length of time after having been placed, shall be painted with a heavy coat of cement grout, if required by the Engineer.

3.02 FIBER INSTALLATION:

A. Fibermesh fibers shall be used in concrete as indicated on the drawings or as specified and in strict accordance with the manufacturer's recommendations as to type and amount. The fiber manufacturer or approved distributor shall provide the services of a qualified employee for pre-job meeting and initial job start up.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers all concrete and all related items necessary to place and finish the concrete work.

1.02 RELATED WORK:

- A. Section 03 11 00, CONCRETE FORMWORK
- B. Section 03 21 00, CONCRETE REINFORCEMENT
- C. Section 31 00 00, EARTHWORK
- D. Items furnished under other Sections and installed under this Section include, but are not limited to:

Items embedded in concrete, including anchors, sleeves, floor drains, castings, frames for hatches, angles, nosings, and other miscellaneous metals.

1.03 REFERENCES:

A. The following standards form a part of these specifications:

American Concrete Institute (ACI)

- ACI 30I Structural Concrete for Buildings
- ACI 302 Recommended Practice for Concrete Floor and Slab Construction
- ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and Replacing Concrete
- ACI 305 Recommended Practice for Hot Weather Concreting
- ACI 306 Recommended Practice for Cold Weather Concreting
- ACI 318 Building Code Requirements for Reinforced Concrete
- ACI 347 Recommended Practice for Concrete Formwork
- ACI 350 Code Requirements for Environmental Engineering Concrete Structures

American Society for Testing and Materials (ASTM)

- ASTMC33 Concrete Aggregates
- ASTMC39 Compressive Strength of Cylindrical Concrete Specimens
- ASTM C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- ASTMC87 Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
- ASTMC94 Ready-Mixed Concrete
- ASTM C143 Standard Method for Slumps of Portland Cement Concrete
- ASTMC150 Portland Cement
- ASTM C171 Sheet Materials for Curing Concrete
- ASTMC231 Air Content of Freshly Mixed Concrete by the Pressure Method
- ASTMC260 Air-Entraining Admixtures for Concrete
- ASTMC309 Liquid Membrane-Forming Compounds for Curing Concrete
- ASTM C494 Chemical Admixtures for Concrete
- ASTM D1751 Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- ASTM D1752 Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
- 1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer for review.
 - B. Six copies of the statement of materials constituting the design of mixes which satisfy the specified strength for each size aggregate as required by ASTM C94 shall be submitted to the Engineer within one week following award of the contract.
 - C. Provide one copy of the "Certificate of Delivery" for each load of concrete as it arrives on the site, under the provisions of ASTM C94.

PART 2 - PRODUCTS

2.01 CONCRETE:

A. Concrete conforming to the requirements listed below shall be used where indicated on the drawings. Unless otherwise indicated, concrete used as fill under foundations, and elsewhere approved by the Engineer, shall be the 3,000 psi mix.

Minimum Comp. Strength at 28 days (psi)	Maximum Water/Cement ratio (gallons per bag of cement)*	Cement Factor: 94 lb. Bags per cubic yard minimum**
3000	0.59 (6.9)	5.5
4000	0.48 (5.6)	6.5
5000	0.40 (4.7)	7.4

TABLE

* Based on air-entrained concrete. If non-air-entrained concrete is called for, the listed maximum water/cement ratios may be increased slightly, as approved by the Engineer. The water is the total water in the mix, including free water on the aggregate.

** These are minimum amounts; increase as necessary to meet mix requirements.

- B. Concrete shall conform to ASTM C94. One copy of the Certificate of Delivery required by ASTM C94 shall be delivered to the Engineer immediately upon arrival of each load of concrete at the site. The Contractor shall be responsible for the design of the concrete mixtures.
- C. Standard compression tests of all proposed mixes shall be made by the testing laboratory or other satisfactory evidence shall be presented that the design mixes will attain the minimum strengths listed on the design drawings or called for herein, within the limitations of the ACI Code. No concrete shall be delivered to the job site until the Engineer has approved the design mixes.
- D. All concrete (unless otherwise directed) shall contain an air-entraining agent. Air entrained concrete shall have an air content by volume of 3 to 6 percent for l-l/2-inch aggregate and 4 to 8 percent for 3/4-inch aggregate. The air content shall be the responsibility of the testing laboratory and in accordance with ASTM C23I.
- E. All concrete shall contain a mid-range water reducer to minimize cement and water content of the mix, at the specified slump, in accordance with ASTM C494.
- F. Slump for all concrete shall be from 3-inch to 4-inch, except for concrete using a superplasticizer, when the maximum slump shall be 8-inches. Any concrete having a slump greater than 4-inches (8-inches with superplasticizer) shall be promptly removed from the site.
- G. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixture other than those specified shall be used in concrete without the specific written permission of the Engineer in each case.
- H. No additional water, except for the amount indicated by the design mix shall be added to the concrete without the prior permission of the Engineer.

2.02 CEMENT:

- A. The cement shall be an approved brand of American manufactured Portland Cement, Type IIA conforming to ASTM CI50. The brand name and type of cement proposed for use shall be submitted to the Engineer for approval immediately following award of
- B. contract. Only one color of cement, all of the same manufacture, shall be used for the work.
- C. When the use of high-early-strength Portland cement (Type IIIA) is permitted by the Engineer the same strength requirements shall apply, but the indicated strengths shall be attained in 7 days instead of 28 days.

2.03 ADMIXTURES:

- A. Air entraining agent shall be in accordance with ASTM C260.
- B. Water reducing agent shall be a mid-range water reducer meeting ASTM C494, Type A.
- C. Water reducing agent-retarder shall be in accordance with ASTM C494, Type D.
- D. Superplasticizer agent shall be in accordance with ASTM C494, Type F or Type G and contain no more than 0.1% chloride ions. Product may be plant added or field added based on the best application considering distance, temperature and time.

2.04 AGGREGATES:

- A. Except as otherwise noted, aggregate shall conform to the requirements of ASTM C33.
- B. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33.
- C. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33.
- D. The following designated sizes of aggregate shall be the maximum employed in concrete.

2-inch for mass concrete1½-inch for reinforced sections 18-inch and over in thickness3/4-inch for reinforced and unreinforced sections less than 18-inch thickness.

2.05 WATER:

Water for concrete shall be potable, free from injurious amounts of oil, acid, alkali, organic matter and other deleterious substances.

2.06 GROUT:

Grout shall be mixed in the proportions of one part Portland Cement to 2 parts sand, by volume. Only sufficient water shall be used to enable grout to barely hold its shape when squeezed into a ball in the hand. Aggregate for grout shall conform to the requirements of the reference specification for concrete. Prior approval of the Engineer shall be obtained for the use of proprietary grouts, and the instructions of the Engineer shall be followed in their use.

2.07 CURING MATERIALS:

- A. Curing compound shall be a curing/hardener compound such as Acurion by AntiHydro, Sikaguard Cure/Hard by Sika, Super Diamond Clear by Euclid or approved equal.
- B. Curing paper shall be a fiber-reinforced laminated Kraft bituminous product conforming to the requirements of ASTM CI7I.

2.08 JOINT FILLER:

- A. Preformed joint filler strip shall conform to ASTM DI75I or DI752, having a thickness as indicated on the drawings.
- B. Fillers shall be provided in pieces of the full thickness required. Use of multiple layers of thin pieces to make-up the full thickness will not be permitted.

2.09 JOINT SEALANT:

Joint sealant for construction and control joints shall be a two-part polysulfide base sealant conforming to Thiokol's Building Trade Performance Specification, Class A (self-leveling), Type II (hardness: 35-45 Shore A).

PART 3 - EXECUTION

3.01 GENERAL:

Under no circumstances shall concrete that has set or partially set before placing be used; and no retempering of concrete or grout will be permitted.

3.02 PREPARATION:

- A. Before placing concrete, forms and the space to be occupied by the concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint or other material which would tend to reduce the bond.
- B. Unless otherwise indicated, a moisture barrier shall be used under all slabs placed on the ground in accordance with ACI 302.1R. The moisture barrier shall be fungi-resistant and shall have a vapor permeance rating not exceeding 0.01 perms (Perms [grains/ft^{2*}hr*in. Hg]) per ASTM F1249 or ASTM E96) and 10 mils thickness (49 lbs/MSF). The moisture barrier shall be a high-performance underslab vapor retarder made from polyethylene resins that exceed ASTM E1745, Class A. Sheets shall be

lapped 6-inches at joints and sealed with 2-inch wide tape or as recommended by the manufacturer. The vapor barrier should have all laps, seams, penetrations and terminations sealed and should carry across footings.

- C. When no moisture barrier is used, the earth, concrete, masonry, or other water-permeable material against which concrete is to be placed shall be thoroughly saturated with water immediately before concrete is placed. No concrete shall be placed until the consolidation of the ground and the arrangement and details of forms and reinforcing have been inspected and approved by the Engineer.
- D. When joining fresh concrete to concrete which has attained full set, the latter shall be cleaned by chipping and washing off all dirt and scum and laitance. It then shall be moistened prior to placing new concrete.
- E. Concrete surfaces that act as a seat for structural members (other than those resting on grout) shall be troweled to an extremely flat and level surface. If necessary, such surfaces shall be ground off to achieve the required flatness and level.
- F. Fill concrete on top of concrete shall be placed in the locations indicated on the drawings or designated by the Engineer. Before fill concrete is placed, the following procedures shall be used to prepare surfaces; all dirt, scum and laitance shall be removed by chipping and washing. The clean, roughened base surface shall be saturated with water, but shall have no free water on the surface. A coat of 1:2 cement-sand grout, approximately 1/8-inch thick, shall be well scrubbed into the thoroughly dampened concrete base. The concrete fill shall be placed immediately, before grout has dried or set. Fill concrete shall be brought to the lines and grades shown on the drawings or approved by the Engineer.
- G. Concrete for thrust and anchor blocks shall be placed against undisturbed earth and wooden side forms shall be used to provide satisfactory lines and dimensions. Felt roofing paper shall be placed to protect joints. No concrete shall be placed so as to cover joints, bolts or nuts, or to interfere with the removal of the joints. Minimum bearing areas and dimensions shall be as shown on the drawings.

3.03 MIXING:

- A. Concrete shall be ready-mixed, or transit-mixed, as produced by equipment acceptable to the Engineer. No hand-mixing will be permitted. Adding water in controlled amounts during the mixing cycle shall be done only with the express approval of, and in the presence of the Engineer.
- B. Ready-mix or transit-mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities for the respective conditions as stated on the nameplate. Discharge at the site shall be within 1-1/2 hours after cement was first introduced into the mix. Central mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the pre-mixed concrete is placed in the truck and shall continue without interruption until discharge.

Transit-mixed concrete shall be mixed at mixing speed for at least 10 minutes immediately after charging the truck, followed by agitation without interruption until discharged.

- C. All central plant and rolling stock equipment and methods shall conform to the latest Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association, as well as ACI 304 and ASTM C94.
- D. Attention is called to the importance of dispatching trucks from the batching plant so that they shall arrive at the site of the work just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

3.04 INSTALLATION/APPLICATION/ERECTION:

- A. Placing
 - 1. No concrete shall be placed by pumping methods without the prior written approval of the Engineer. Should the Contractor be allowed to place concrete by pumping methods, procedures, mix design of concrete, and all other precautions shall be in accordance with ACI 304.2R and as approved by the Engineer.
 - 2. Concrete shall be placed in alternate areas, as defined by the construction and control joints indicated on the design drawings. A minimum of 3 days shall elapse between placement of adjacent sections.
 - 3. Segregation of the concrete shall be prevented during handling; should any segregation occur, the concrete shall be remixed before it is placed. Concrete shall be placed in the forms in horizontal layers not over I to 2 feet thick. Concrete shall not be allowed to drop freely more than 4 feet. If the free drop to the point of placement must exceed 4 feet, the Contractor shall obtain the approval of the Engineer for the proposed method of depositing the concrete. The concrete shall not be required to flow over distances greater than 3 feet in any direction in the forms or on the ground, unless otherwise permitted by the Engineer.
 - 4. Unless otherwise noted, the work begun on any day shall be completed in daylight of the same day.
 - 5. "Cold Joints" are to be avoided, but if they occur, they are to be treated as bonded construction joints.
 - 6. Chutes for conveying concrete shall be of U-shaped design and sized to insure a continuous flow of concrete. Flat (coal) chutes shall not be employed. Chutes shall be metal or metal-lined, and each section shall have approximately the same slope. The slope shall not be less than 25 nor more than 45 degrees and shall be such as to prevent segregation of the ingredients. The discharge end of the chute shall be provided with a baffle plate or spout to prevent segregation.

If the discharge end of the chute is more than 5 feet above the surface of the concrete in the forms, a spout shall be used and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. Chutes shall be thoroughly cleaned before and after each run, and the debris and any water shall be discharged outside the forms. Concrete shall not be allowed to flow horizontally more than 5 feet.

- 7. Concrete during and immediately after depositing shall be thoroughly compacted by means of suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be carried on long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spade puddling adjacent to forms to remove included bubbles and honeycomb. This is essential for the top lifts of walls. All vibrators shall travel at least 10,000 rpm and be of adequate capacity. At least one vibrator shall be used for every 10 cubic yards of concrete per hour. In addition, one spare vibrator in operating condition shall be on the site.
- 8. Concrete slabs on the ground shall be well-tamped into place and foundation material shall be wet, tamped, and rolled until thoroughly compacted prior to placing concrete.
- 9. Concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams and planes of weakness within the section. If a section cannot be placed continuously, construction joints may be located at points as provided for in the drawings or approved by the Engineer.
- 10. Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each run, and the water and debris shall not be discharged inside the form.
- B. Concrete Placing During Cold Weather
 - Concrete shall not be placed on frozen ground, and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40°F, or is expected to fall to below 40°F, within 72 hours, and the concrete after placing shall be protected by covering, heat, or both. No accelerant shall be used to prevent freezing.
 - 2. The temperature of concrete surfaces shall not be permitted to drop below 50°F. for at least 7 days after placement of the concrete.
 - 3. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. All

procedures shall be in accordance with provisions of ACI 306.

- C. Concrete Placing During Hot Weather
 - Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. The Contractor shall make every effort to minimize delays that will result in excessive mixing of the concrete after arrival on the job.
 - 2. During periods of excessively hot weather (90°F, or above) ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 90°F, when ready for placement will not be acceptable, and will be rejected.
 - 3. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. The record shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.
- D. Pipes And Embedded Metals
 - 1. Special care shall be taken to bring the concrete into solid contact with pipes and iron work embedded in the walls and floors, particularly underneath and around all pipes where a head of water exists, making watertight joints.
 - 2. In general, such embedded items are not shown on the structural design drawings. Design drawings of the other trades shall be consulted for their location and details.
 - 3. Anchor bolt location, size and details shall be verified with the equipment manufacturer's certified drawings before installation.
 - 4. Anchor bolts, reglets, sleeves, edge angles and similar embedded items will be provided, delivered to the site under other Sections of the specification, for installation under this Section.
 - 5. Where edge angles, etc., have nuts welded on to receive machine screws, the threads of the nuts shall be protected from concrete, and the concrete shall be excluded from the space to be occupied by the screw, by the use of wood plugs or other effective means.
 - 6. Inserts required for hanging mechanical and electrical items shall be provided and installed in the forms under the mechanical and electrical sections of the specification.

- 7. Should the Contractor be allowed to leave openings in the concrete for pipes or ironwork, to await the arrival of items that would delay the prosecution of the work, the openings shall be subject to the approval of the Engineer. Appropriate construction joints shall be provided. In filling any such openings with concrete, a mixture of I: I-I/2 : 3 shall be used and a watertight bond shall be secured between the old and new concrete.
- 8. In bolting miscellaneous items to concrete after the concrete has set, expansion bolts of an approved pattern and type shall be used. The Contractor shall submit to the Engineer, for approval, the types of expansion bolts. Expansion bolts shall not be used until they are approved.

E. Curing

- 1. Concrete curing shall be performed as specified in ACI 30I and as stated herein. All curing procedures shall have prior approval of the Engineer.
- 2. Concrete Floors

Concrete floors which are to receive paint, concrete fill, mortar setting beds, grout fill, or any other subsequent finish shall be cured by one of the following procedures immediately after completion of placement and finishing:

- a. Ponding or continuous sprinkling.
- b. Application of absorptive mats or fabric kept continuously wet.
- c. Application of sand kept continuously wet.
- d. Application of waterproof sheet materials conforming to ASTM CI7I.
- e. Application of curing compounds conforming to ASTM C309, if it can be demonstrated to the Engineer's satisfaction that the compound is applicable and that it will not prevent bonding of the subsequent finish to be received. Compound shall be placed at a rate of 200 square feet per gallon, in two applications perpendicular to each other.
- 3. Curing procedure shall be continued for at least 7 days.
 - a. Moisture loss from surface placed against metal or wood forms shall be minimized by keeping forms wet until removal.
 - b. Curing shall be continued for at least 7 days. When forms are removed during the curing period, surfaces shall be cured by spraying or by the use of a curing compound as previously specified.
 - c. Surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary, 1/2-inch thick plywood sheets shall be used to protect the exposed surface.

- F. Bracing And Supports
 - 1. All concrete members shall be adequately and safely supported and braced until the permanent supports and braces are installed.
 - 2. Backfilling against exterior walls shall not be done until supporting slabs are in place and have attained 70 percent of design strength, otherwise walls shall be braced against earth lateral pressure, using a system approved by the Engineer.
 - 3. Backfilling against retaining walls shall not commence until the wall concrete has reached its 28-day strength.
- G. Removing Forms And Supports
 - Removal of forms shall take place in accordance with ACI 347, Section 3.6. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of day-degrees or attained 50 percent strength. (Day-degrees equals the total of number of days times the average daily air temperature at the surface of concrete. For example, 5 days at a daily average temperature of 60°F. equals 300 day-degrees.)

<u>Location</u>	Day-Degrees
Beams and Slabs	500
Walls and Vertical Surfa	aces 200

2. Shores under beams and slabs shall not be removed until the concrete has attained at least 70 percent of the specified cylinder strength and also sufficient strength to support safely its own weight and the construction loads upon it.

H. Patching

- 1. Defective concrete and honeycombed areas as determined by the Engineer shall be chipped down reasonably square and at least one-inch deep to sound concrete by means of hand chisels or pneumatic chipping hammers. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly imbedded in the parent concrete, subject to Engineer's final inspection. If honeycomb exists around reinforcement, chip to provide a clear space at least 1-inch wide all around the steel. For areas less than 1-1/2 inches deep, the patch may be made following the procedure for filling form tie holes, described in the subsection below, using adequately dry (non-trowelable) mixtures to avoid sagging. Thicker repairs will require build-up in 1-inch layers on successive days. Unless otherwise indicated, thicker repairs shall be made with Vertipatch mortar mixture blended with Acryl-Set, both by Master Builders, Inc., Cleveland, Ohio, or approved equal.
- 2. For concrete areas exposed to serious abrasion and/or impact forces, the

	Small Patches		Large Formed Patches	
Material	Volumes	Weights	Volumes	Weights
Cement	1.0	1.0	1.0	1.0
Metal Aggregate	0.15	0.25	0.2	0.33
Sand	1.5	1.5	1.5	1.0
Pea Gravel			1.5	1.5

Engineer may order the use of grout with a non-shrink metallic aggregate (Embeco by Master Builders, Inc.; Ironite by Fox Industries, Madison, IL; or approved equal) as an additive in the proportions listed below:

I. Finishing Of Formed Surfaces

- 1. All concrete that is to be left exposed to view shall be scraped to remove projecting imperfections left by voids in the forms.
- 2. In addition to scraping, exterior exposed concrete shall be covered with a cement-base plaster mix. The mix shall consist of Thoroseal Plastic Mix and Acryl 60, as manufactured by Standard Drywall Products, Miami, FL, or approved equal. It shall be mixed and applied in accordance with the manufacturer's recommendations.
- 3. In addition to scraping, interior concrete surfaces which will be exposed to view and concrete surfaces which are to be prepared and painted as specified in Section 09 90 00, PAINTING, shall receive a smooth rubbed finish, in accordance with ACI 301 and as described below.
- 4. To permit satisfactory finishing, forms shall be removed from the vertical faces of the concrete as early as is possible without damaging the surface.
 Immediately after stripping forms, any fins or projections left by the forms shall be chipped off, and the surfaces rubbed smooth.
- 5. Form tie holes and other voids and faults shall be patched. Voids shall be cleaned out, roughened, thoroughly wetted, coated with neat cement paste, and filled with mortar of cement and sand in the same proportions, materials, and color as used in the concrete. The surface of the patch shall be flush with the surrounding surface after finishing operations are complete. Surface shall be kept continuously damp until patches are firm enough to be rubbed without damage.
- 6. Rubbing shall be performed while the surface is wet using a carborundum or cement sand brick, to achieve a smooth uniform, even textured finish. Patched and chipped areas shall be blended to match as closely as possible the appearance of the rest of the surface. No cement wash or plastering will be permitted, and no mortar shall be used except as required above.
- 7. Where finishing is performed before the end of the curing period, concrete shall

under no circumstances be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

J. Concrete Floor Finishing Requirements

Unless designated otherwise, concrete floors shall have a troweled finish as specified in Section II.7 of ACI 30I. Troweled finishes shall conform to the requirements of "Class A Tolerances," Section II.9 as specified in ACI 30I.

- K. Testing
 - 1. The Contractor shall provide all field testing and inspection services, and shall pay for all such services. The Engineer shall approve the testing laboratory and shall inform the Contractor when samples are to be taken for testing. The Contractor shall forward all test results to the Engineer as soon as they are available.
 - a. The Testing Laboratory shall conform to the requirements of ASTM E-329 as modified in **780 CMR R1 in the MA State Building Code**. The State Board of Building Regulations and Standards shall license them.
 - 2. At least one slump test shall be performed from each truckload of concrete. The sample for slump shall be taken from the middle third of a truckload. Air content tests shall be made at the discretion of the Engineer. If the measured slump or air content falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed the requirements of the specification and shall be immediately removed from the jobsite to be discarded.
 - 3. The Contractor shall advise the Engineer of his readiness to proceed with concrete placement at least one working day prior to each placement. The Engineer will inspect the preparations for concrete, including the preparation of previously placed concrete, the reinforcing, and the alignment and tightness of formwork. No placement shall be made without the prior approval of the Engineer.
 - 4. A minimum of four standard compression test cylinders shall be made and tested for **each 100 cubic yards or fraction thereof** for each type and design strength of concrete from each day's placement of concrete. One cylinder shall be tested at 7 days and two cylinders at 28 days. The fourth cylinder from each set shall be kept until the 28 day test report on the second and third cylinders in the same set has been received. The Engineer reserves the right to require test cylinders to be made for each truckload of concrete if the nature of the project or project experience indicates such additional tests are required for proper control of concrete quality; **such tests will be at the Contractor's expense.**
 - 5. The strength level shall be considered satisfactory so long as the averages of all

sets of three consecutive strength test results equal or exceed the specified strength f'c, and no individual strength test (average of two cylinders) result falls below the specified strength f'c by more than 500 psi.

- 6. In the event the average compressive strength of the two 28 day cylinders do not achieve the required level, the Engineer may elect to test the fourth cylinder immediately or test it after 56 days.
- L. Failure To Meet Requirements
 - 1. The Engineer shall have the right to reject concrete represented by low strength tests or to agree to further testing of the concrete. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specification. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected or additional tests shall be conducted shall be final. All direct and indirect costs associated with further curing and testing of the concrete shall be at the Contractor's expense. All costs associated with removing rejected concrete, placing new concrete, and conducting tests on new concrete shall be at the Contractor's expense.
 - 2. If the Engineer agrees to consider further curing and/or testing of the concrete before making a final decision, the Contractor shall submit a detailed plan to the Engineer, including proposed criteria for acceptance of the concrete. The plan may include additional curing of the concrete, drilling and testing of cores, load testing of the structure, or a combination.
 - 3. If additional curing is permitted before further inspection and testing, the Contractor shall provide any necessary materials and labor to further cure the suspect concrete.
 - 4. If drilling and testing of cores is permitted, the Contractor shall be responsible for obtaining the cores, including provision of ladders, scaffolding, and such incidental equipment as may be required. If additional curing is permitted, cores shall be drilled after the curing period, and shall be in accordance with ASTM Methods C39 and C42. The Contractor shall repair all core holes to the satisfaction of the Engineer.
 - 5. The burden of proof, including, but not limited to the work of cutting and testing the cores, inspection, evaluation, engineering, repair of the holes, or removal and replacement of the concrete in question, and all associated costs therefor, shall be at the expense of the Contractor.
 - 6. If load testing of the concrete is permitted, and if not otherwise indicated, slabs or beams under load test shall be loaded with their own weights plus a superimposed load of 2 times the design live load. The load shall be applied uniformly over the portion being tested in the approved manner and left in position for 24 hours. The structure shall be considered satisfactory if deflection "D" in feet, at end of 24-hour period, does not exceed the following value:

D equals 0.001 (L x L)/t

in which "L" is span in feet, "t" is depth of slab, or beam in inches. If deflection exceeds "D" in the above formula, the concrete shall be considered faulty unless within 24 hours after removal of the load, the slab, or beam under test recovers at least 75 percent of the observed deflection.

- 7. If the suspect concrete still fails to meet specification requirements, the Engineer shall have the right to reject the concrete, have it removed and replaced, in accordance with paragraph 5 above, or to require mechanical strengthening of the concrete to satisfy project requirements. The Contractor shall submit a removal and replacement plan for review by the Engineer.
- M. Test For Watertightness
 - 1. All concrete shall be watertight against leakage or groundwater infiltration. Special care shall be taken in the construction joints and any noticeable leakage or seepage causing wet spots on the concrete walls or slabs shall be repaired by and at the expense of the Contractor and by methods approved by the Engineer. See Section 03 15 13, WATERSTOPS.
 - 2. All liquid holding concrete structures shall be tested for leakage before backfilling and after the concrete has attained the specified minimum 28-day design strength, as indicated by test cylinders.
 - 3. The structure shall be filled with water to the overflow level, allowed to stand for at least 24-hours, and refilled to overflow to begin the test. After 72 hours, the liquid loss per 24 hour period shall be determined, either by measuring the amount required to refill the tank to overflow, by measuring the drop in water level, or by an equivalent procedure approved by the Engineer. Evaporative losses shall be calculated and deducted from the measured loss to determine net liquid loss (leakage). If the leakage per 24-hour period exceeds the allowable, the structure shall be repaired and retested until the leakage falls within the allowable limit.
 - 4. For structures designed to hold water, one twentieth of one percent leakage will be allowed during a 24-hour period. No leakage (zero leakage) will be permitted for structures designed to hold liquid chemicals or fuels.
 - 5. The Contractor shall pay all costs (including water) incurred in the testing for watertightness.
 - 6. The Engineer shall be given a minimum notice of 48 hours prior to commencement of the leakage test.

END OF SECTION
04 40 00

DRY-PLACED BOULDERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Documents, as listed in the Table of Contents, and applicable parts of Division 1, General Requirements shall be included in and made a part of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 SCOPE OF WORK

- A. The work in this section shall consist of retrieving, loading, and hauling supplemental granite blocks from the MassDOT Yard in Saugus, Massachusetts. MassDOT will provide access to the yard. The Contractor is responsible for providing flatbed trucks, a loader, straps, chains and slings, labor, and fuel to arrive at the MassDOT yard at an agreed upon time, work with Owner's Representative to select granite blocks from the piles, load them onto the flatbed truck, transport them to the project site, off load them on site, stockpile if necessary, and install them in their final location in accordance with the Contract Drawings. The work includes, but is not limited to, the following boulder types:
 - 1. Rectangular Boulders

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 31 00 00, EARTHWORK

1.04 EXAMINATION OF CONDITIONS

- A. The Contractor shall fully inform himself of existing conditions of the site before submitting his bid, and shall be fully responsible for carrying out all site work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed because actual conditions inconsistent with those assumed.
- 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'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 therein.

1.05 SCHEDULING

A. The Contractor shall submit to the Owner's Representative, for approval by the Owner, a progress schedule for all work as specified herein.

1.06 QUALITY ASSURANCE

- A. Materials and methods of construction shall comply with the following standards:
 - 1. ASTM: American Society for Testing and Materials
 - 2. AASHTO American Association of State Highway and Transportation Officials (tests or specifications). AASHTO or AASHO
 - 3. Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges.
- B. Qualifications of Workers: Use adequate numbers of skilled workers who are trained in the necessary crafts and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this Section.
- C. Layout: After staking out the work, and before beginning final construction, obtain the Owner's Representative's approval for layout. Contractor shall make adjustments as determined by the Owner's Representative. Owner's Representative may make adjustments to layout as is required to meet existing and proposed conditions without additional cost to the contract price.

1.07 SUBMITTALS

A. Samples of all new materials proposed for the project shall be submitted to the Owner's Representative for review. Size of the samples shall be as approved by the Owner's Representative.

PART 2 - MATERIALS

2.01 BOULDERS

- A. Approximately two (2) weeks prior to anticipated transport, the Contractor shall notify the Owner's Representative to field select each boulder to be reused. The Contractor shall coordinate with the Owner's Representative such that she/he is present while blocks are loaded onto trucks. Rough-cut boulders shall be of an approved size and shape with dimensions as noted below, in the amounts shown on the drawings:
 - 1. Rectangular boulders dimensions shall be approximately 24-36-inches high by 12-24-inches wide by 36-60-inches long.

- B. The Contractor should expect to handle each stone a minimum of three times: 1) to move from current location into classification piles, 2) to mock up in final location to ensure fit, and 3) to install in final location. In most cases it is expected that steps two and three are combined and fitting can be done in place, but the Contractor must be aware the project calls for dealing with boulders that will need to be carefully placed for best fit.
- C. Boulders shall contain no sharp corners or angular projections, to a fifteen (15) degree angle maximum, and shall be field approved by the Owner's Representative.
- D. The Contractor shall notify the Owner's Representative when site preparation is complete. Spacing and location of the boulders shall be as shown on the plans or as required by the Owner's Representative. Preliminary placement of boulders shall be "dry" (without mortar). The Contractor shall adjust the boulder placement as required by the Owner's Representative. After the arrangement of boulders is approved by the Owner's Representative, the Contractor shall set the boulders into grade on a compacted gravel base as necessary to set the boulders in a stable position and to prevent future removal or displacement of the boulders.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor is also responsible for retrieving, loading, and hauling stockpiled granite blocks and installing them in their final location in accordance with the Contract Drawings.
- B. The installer shall examine previous work, related work, and conditions under which this work is to be performed and notify the Contractor in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means installer accepts substrates, subgrades, previous work, and conditions.

END OF SECTION

SECTION 05 50 00

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers all miscellaneous metal items required for the work, except as specified elsewhere.
- B. All miscellaneous metalwork shall be fabricated as detailed or approved and shall be installed complete with all necessary anchors, anchor bolts, eye bolts, guides, bolts and other accessories.
- C. The work of this Section shall consist of all site improvements and related items as indicated on the Drawings and/or as specified herein and includes, but is not limited to, the following:
 - 1. Steel Edge

1.02 QUALITY ASSURANCE:

- A. The drawings show the character and extent of the work required, but do not attempt to show all methods, materials, and details of construction, fastening, etc. Supplementary parts customarily necessary to complete an item, though such parts are not definitely shown or specified, shall be included as part of the item.
- B. Details of construction of the various items shall be submitted on the shop drawings.
 High quality construction with a neat, finished, and workmanlike appearance will be required.
- C. The size and spacing of screws, connectors, anchors, and similar items, and the size and dimensions of metal items stated herein shall apply in general; specific sizes and spacing of fasteners and dimensions of metal items listed on the drawings shall take precedence.
- D. Items supplied hereunder which are required to be built into the concrete, masonry, etc., shall be delivered to the site at locations as required by the Owner or Owner's Representative, and as required by the overall construction schedule.
- E. Manufacturers of other products comparable in quality and type to those specified will be acceptable if satisfactory data on past performance and other required information is furnished by the Contractor, and if approved by the Owner's Representative.
- F. Color galvanized system shall be guaranteed by manufacturer for 15 years.
- G. Contractor shall submit an affidavit to Owner's Representative that materials used are protected from or will not be subject to galvanic action.

1.03 REFERENCES:

A. The following standards from a part of these specifications, and indicate the minimum standards required:

American Institute of Steel Construction (AISC)

AISC	Specification for Structural Steel Buildings			
American Society for Testing and Materials (ASTM)				
ASTM A36	Structural Steel			
ASTM A53	Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless			
ASTM A123	Zinc (Hot-Dip-Galvanized) Coatings on Iron and Steel Products			
ASTM A153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware			
ASTM A239	Test for Uniformity of Coating by the Preece Test (Copper Sulfate Dip) on Zinc-Coated (Galvanized) Iron or Steel Articles			
ASTM A307	Carbon Steel Externally and Internally Threaded Standard Fasteners			
ASTM A366	Steel, Carbon, Cold-Rolled Sheet, Commercial Quality			
ASTM A525	Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements			
ASTM A569	Steel Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip, Commercial Quality			
ASTM B221	Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes			
ASTM B308	Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded			
ASTM C478	Precast Reinforced Concrete Manhole Sections			

American Welding Society (AWS)

- AWS D1.1 Structural Welding Code Steel
- 1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. At least thirty days prior to intended use, the Contractor shall provide the following samples and submittals for approval in conformance with requirements this specification. Do not order materials until Landscape Architect's approval of samples, certifications or test results have been attained. Delivered materials shall closely match the approved

05 50 00 - 2

samples.

- 1. Shop Drawings: Submit digital copies of each detailed shop drawings for each item required to be fabricated or installed under work of this Section. Include plans, sections, and details as required to show completely materials, layout, jointing, clearances and connections for all items required. Shop drawings for handrails at stairs requiring accurate dimensional relationships to as-built construction shall be prepared following a review and confirmation of as-built measurements and conditions for areas scheduled to receive miscellaneous metal items. Submit shop drawings for the following:
 - a. Steel Edge
- 2. Material Samples: Submit samples for each material for the following:
 - a. Steel Edge submit one (1) sample
- 3. Manufacturer's Literature: Submit three (3) copies each of manufacturer's material descriptions and installation instructions for the following:
 - a. Non-shrink cement grout
 - b. Sealant
- 4. Finishing Schedule: Submit a complete schedule outlining all items to be color finished under work of this Section together with a breakdown of surface preparation techniques and primer and color finish materials to be applied.
- B. The shop drawings shall be complete and checked, showing sizes, layout, method of assembly, fastenings, anchorage or connection with other work, finish, and coatings, etc.
 Shop drawings for aluminum work shall indicate alloys, temper and finish to be used.
- C. The Contractor shall certify that all dimensions are correct prior to fabrication.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. STEEL EDGING
 - Steel edging shall be ¼" x 4" with steel spikes as manufactured by Sure-loc Edging, 494 E. 64th Street, Holland, MI 49423 or approved equal. Color shall be black.

PART 3 - EXECUTION

3.01 GALVANIZING:

- A. Hot-Dip Galvanizing:
 - 1. Provide a coating for iron and steel fabrication applied by the hot-dip process. The galvanizing bath shall contain .05-.09% nickel. Immediately before galvanizing, the steel shall be immersed in a bath of zinc ammonium chloride. The use of the wet kettle process is prohibited. Comply with ASTM A-123 for fabricated products and ASTM A-153 for hardware. Provide thickness of galvanizing specified in referenced standards. Provide coating by Duncan galvanizing or approved equal.
- B. Factory-Applied Primer Over Hot-Dip Galvanizing:
 - Provide a factory-applied polyamide epoxy coating primer, 2.0 mils dry film thickness minimum. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations or mechanically abrade to create a uniform surface profile of 1.0 – 2.0 mils, and as recommended by coating manufacturer. Provide primer coating by Duncan Galvanizing, Tnemec Co. or approved equal.
- C. Factory Finish Over Primer And Hot-Dip Galvanizing:
 - 1. Provide a factory-applied polyurethane color coating, 2.5 mils dry film thickness minimum. Apply coating at the galvanizer's plant or coating shop, immediately after application of the prime coat, in a controlled environment meeting applicable regulations, and as recommended by the coating manufacturer. Provide finish coating by Duncan Galvanizing, Tnemec Co. or approved equal.
- D. Items noted as "color galvanized" shall have an architecturally compatible factory finish formulated to be applied over galvanized members, suitable for use in harsh environments, and applied by the galvanizer at the factory or coating shop.
- E. The Contractor shall be responsible for determining if any fabricated items are not suitable to be hot-dip galvanized and shall notify the Owner's Representative in writing.
- F. Surfaces of metal to be galvanized shall be free from all dirt, grease, rust and moisture.
 Burrs and sharp projections shall be removed from edges, holes, etc., before galvanizing.
 Fabricated items shall be galvanized after fabrication.

3.02 WELDING OF STEEL:

Welding of steel shall be done in accordance with the AWS Code. Welds shall be continuous along entire line of contact, except where plug welding is noted. Exposed welds shall be ground smooth.

3.03 FABRICATION AND ERECTION:

A. Metalwork shall be complete, with all necessary bolts, nuts, washers, anchors, plates, fastenings, and other fittings. To the extent possible, holes for attachment of blocking, clip angles, etc. shall be shop punched. Where shop punching is impracticable, holes

shall be field drilled. Burned holes will not be permitted.

- B. Material shall be straight, accurately fabricated with joints neatly framed, square, and well-riveted, bolted, or welded.
- C. Metalwork to receive hardware shall have all cutouts and attachments accurately made using the hardware itself or templates where necessary.
- D. Metalwork shall be accurately set and secured in position, with lines plumb and level and surfaces flush and square, or as otherwise required to conform to the structure as shown on the drawings.
- E. Wherever possible, all metalwork shall be built into the masonry work and shall have sufficient anchors, well- fastened. Anchors shall be welded to steelwork and shall be staggered where attached to structural shapes. Metal- work impracticable to set before masonry is built shall be anchored to it with approved expansion bolts set in solid masonry units or in concrete.
- F. Miscellaneous metalwork shall be plainly marked to indicate its location in the structure.

3.04 PAINTING:

- A. DESCRIPTION:
 - 1. This Section specifies requirements for furnishing and applying shop-applied paint on designated steel panels and vertical posts which are exposed to view and is hot-dipped galvanized.
 - 2. Definition: Paint is defined as liquid coating applied to the substrate surface by means of conventional air spray, airless spray, brush, or roller which dries or cures to a hard surface, and includes the words paint, primer, undercoat, sealer, enamel, emulsion, coating, varnish, stain, and words of similar import.

B. QUALITY CONTROL:

- 1. Requirements of Regulatory Agencies: Provide and apply materials complying with environmental requirements of authority having jurisdiction.
- 2. Tolerances: Apply coating of specified dry film thickness (DFT) where thickness shall be absolute minimum coverage at any point of measurement.
- 3. Provide certificates listing materials used in coating systems and certify compliance with standards designated and with requirements of this Section.
- C. COLOR SELECTION:
 - In accordance with requirements of Section 01 33 00 of these Specifications, submit min. 3-inch x 5-inch color chips in accordance with material or finish schedule for selection of colors of each item designated to be painted. This

selection will be for final finish coating only.

- 2. Colors shall be as selected by the Owner's Representative after award of the Contract, as specified in this Section.
- 3. Provide finish coat color matching accepted color sample within industry tolerances and identified as specified.
- 4. Mock-up Surfaces or Areas: Sample item may be designated as control for color, texture, and application for each paint system with accepted item used as criteria for acceptance for similar items, which shall match accepted mock-ups.
- D. PRODUCT DELIVERY, STORAGE, AND HANDLING:
 - 1. Deliver paint materials to galvanizer with label or product data sheet affixed to the manufacturer's containers showing manufacturer's name, type of paint, stock number, batch number, label analysis of solids and vehicle, reducing instructions, thinning instructions, drying and recoat time, application instructions with recommended methods, environmental restrictions, MSDS sheets, and Paint Identification Number (PI-xxx) assigned in Material Schedule of this Section.
 - 2. Remove permanently from premises containers without labels or illegibly defaced labels.
 - 3. Store paint materials in an accepted location reserved only for such materials and related equipment in compliance with applicable health and fire regulations of authorities having jurisdiction and in accordance with recommendations of accepted manufacturers.
 - 4. Any containers showing damage to the extent that spillage of contents is visible shall be rejected and removed permanently from the site.
- E. ENVIRONMENTAL REQUIREMENTS:
 - 1. Apply all primers and paints under conditions within the following tolerances:
 - a. Air Temperature: Minimum 40EF to maximum 90EF.
 - b. Surface Temperature: Minimum 40EF to maximum 100EF.
 - c. Relative Humidity: Maximum 85 percent.
 - 2. Maintain surface dry and free from dust, dirt, oil, grease, or other contaminants.
 - 3. Keep environment free of airborne dust and dirt until paint is dry.
 - 4. To accelerate cure and maximize adherence, immediately following application, thoroughly cure coating using a curing facility capable of reaching 130EF with a 05 50 00 6

sustained capability of 100EF.

- 5. To ensure compliance with this Specification, monitor all temperature and humidity levels continuously with a recording hydrothermograph with printed record available for review by Owner at any time during the Project.
- 6. Comply with all applicable federal, state, local, OSHA, EPA, and fire regulations for both spray and curing facilities.
- 7. Heat cure booth using an indirect thermostat controlled gas-fired, forced hot-air blower; do not use infra-red type curing equipment.
- F. MATERIALS:
 - 1. Provide materials identified and specified in the following table and as required for systems scheduled in this Section.

<u>Paint Coat</u>	Description	<u>Rate (DFT)</u>
Prime Coat	Polyamide Epoxy Prime Coat	3 to 6 mils
Top Coat	High Build Aliphatic Polyurethane, color pigmented, two-component, VOC 3.5 lbs. per gal., volume solids min. 58%	3 to 5 mils

2. Provide thinners, driers, and color pigments manufactured, furnished, or approved by accepted manufacturers for use with their product.

G. SURFACE PREPARATION:

1. Hot-dip galvanized surfaces to be painted in accordance with applicable standards. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations or mechanically abrade to create a uniform surface profile of 1.0-2.0 mils.

H. APPLICATION:

- 1. Apply all coating material of this Section, except hot-dip galvanizing, by the galvanizer in strict conformance to requirements as specified in this Section.
- 2. Curing: Between galvanizing and application of coating materials of this Section, apply coating in minimum 0 hours to maximum 12 hours after galvanizing has been applied.
- I. FIELD QUALITY CONTROL INSPECTION:
 - 1. Measure representative areas for DFT.
 - If thickness of coating does not comply with DFT requirements, apply additional 05 50 00 - 7

applications of coating to attain specified DFT at no additional cost to the Owner.

- 3. Where characteristics of coating prohibit recoating, remove and replace unacceptable coating.
- 4. Where application of coating exceeds DFT and is considered detrimental to quality of Project, remove and recoat to specified DFT at no additional cost to the Owner.
- 5. Where measurement of DFT is impractical or impossible, determine the amount of coating necessary from manufacturer's published spreading rate calculated to specified DFT.
- 6. The manufacturer's stock and batch number shall be compared with the assigned Paint Identification Number (PI-xxx), with the color sample submitted for finished surfaces, and with mock-up for finished surfaced in accordance with requirements of this Section.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers tools, equipment, labor, and materials necessary to perform rough carpentry work complete and miscellaneous carpentry items not specified elsewhere including fasteners and supports.
- B. Nails, screws, bolts, anchors, brackets, and other hardware for fastening and securing items provided under this section of the specification shall be furnished under this section.

1.02 RELATED WORK:

- A. Section 03 30 00, CAST-IN-PLACE CONCRETE
- 1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Three sets of certificates of wood treatment upon delivery of treated wood product. Treated wood product shall bear appropriate American Wood Preservers Bureau (AWPB) quality mark.

1.04 DELIVERY:

Lumber, plywood, and other wood material shall be delivered to the job dry, and shall be protected from injury, dirt, dampness, and extreme changes of temperature and humidity at all times.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. LUMBER:
 - 1. The grades of all materials under this section shall be defined by the rules of the recognized associations of lumber manufacturers producing the material specified, but the maximum defects and blemishes permissible in any specified grades shall not exceed the limitations of the American Lumber Standards.
 - 2. Lumber shall bear the grade and trademark of the association under whose rules it is produced, and a mark of mill identification. Lumber shall be of sound stock, thoroughly seasoned, kiln dried to a moisture content not exceeding 15 percent.

- 3. Exposed surfaces of wood which are to be painted shall be free from defects or blemishes that will show after the second coat of paint is applied.
- 4. All lumber for nailers, furring, and blocking shall be seasoned No. 1 Dimension of Common pine, fir, or spruce, S4S.
- 5. Materials not specifically listed shall be of an accepted grade dictated by good practice.

B. WOOD PRESERVATION TREATMENT:

- 1. All framing exposed to weather shall be pressure treated with a pentachlorophenol preservative solution. The pentachlorophenol shall meet the requirements of the American Wood-Preserver's Association, AWPA Standard P-8, "Standards for Oil-Borne Preservatives." The solvent carrier shall meet the requirements of AWPA Standard P-9 "Standard for Hydrocarbon Solvents for Oil-Borne Preservatives." The preservative solution shall be equivalent to five percent of pure pentachlorophenol.
- 2. The treatment shall be applied in accordance with AWPA Standard C-2 (lumber, timber, etc.), C-9 (plywood) or C-28 (lumber treated before laminating). Penetration of pentachlorophenol shall be determined using the penta check method, Section 5, AWPA Standard A-3. Retention of pentachlorophenol shall be a minimum of 0.40 pounds per cubic foot of wood for in ground exposures. The treating company shall furnish a notarized certificate of treatment that indicates all pertinent details of the treatment.
- 3. Before the preservative treatment is applied, the lumber to be treated shall be sawed to exact lengths required, and bored ready for use in the work so far as practicable, in order to reduce to a minimum cutting or boring of lumber after treatment. Only lumber of the same kind and approximately the same size and seasoning shall be treated in any one charge. All surfaces of treated lumber cut after treatment shall receive two heavy brush coats of pentachlorophenol solution before the lumber is placed in the work.
- C. WOOD FIRE RETARDANT TREATMENT:
 - 1. Exposed wood blocking and sheeting shall receive fire-retardant treatment conforming to American Wood Preservers Association, AWPA Standard C20 for lumber and AWPA C27 for plywood.
 - 2. Fire retardant treated lumber shall bear UL label and shall have UL Fire-Hazard Classification "FR-S", when tested in accordance with ASTM E84.

PART 3 - EXECUTION

3.01 CONSTRUCTION:

A. Work shall be erected plumb, true and square.

- B. Coordinate delivery and erection of prefabricated components. Field applied items shall be installed in accordance with good trade practices. Cutting and carpentry for other trades shall be performed. Cut ends of lumber previously treated with preservative specified shall be brush coated with the same material.
- D. Minimum length of nails shall be twice the thickness of wood being fastened and in accordance with the Massachusetts code requirements for wood frame construction.
- E. Furring, blocking, nailers, and similar items shall be provided wherever required for the support, proper erection, fastening, or installation of carpentry or other materials, and as shown on the drawings.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers furnishing tools, equipment, labor and materials necessary to perform finish carpentry work (exterior) complete, and miscellaneous carpentry items not specified elsewhere including fasteners and supports.
- B. Metal fasteners, plates, brackets, and accessories connected directly into woodwork shall be a part of this section of the specification. Nails, screws, bolts, anchors, brackets, and other similar hardware for fastening and securing woodwork and other items provided under this section of the specification shall be furnished under this section.

1.02 RELATED WORK:

- A. Section 06 10 00, ROUGH CARPENTRY
- 1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Six sets of manufacturer's literature of the materials of this section shall be submitted to the Engineer for review.
 - B. Three sets of samples of paneling shall be submitted to the Engineer for selection of colors.
 - C. Three sets of certificate of wood treatment upon delivery of treated wood product. Treated wood product shall bear appropriate American Wood Preservers Bureau (AWPB) quality mark.

1.04 DELIVERY AND STORAGE:

Finish carpentry material shall be delivered by others to the jobsite. Contractor is responsible for acceptance of delivery and safe storage of all finish carpentry materials until installation. Materials shall be protected from injury, dirt, dampness and extreme changes of temperature and humidity at all times.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. The grades of all materials under this section shall be defined by the rules of the recognized associations of lumber manufacturers producing the material specified, but

the maximum defects and blemishes permissible in any specified grades shall not exceed the limitations of the American Lumber Standards. Materials not specifically listed shall be of an accepted grade dictated by good practice.

- B. Lumber shall bear the grade and trademark of the association under whose rules it is produced, and a mark of mill identification. Finished woodwork shall be of sound stock, thoroughly seasoned, kiln dried to a moisture content not exceeding 12 percent.
- C. Finish carpentry and millwork, in general, shall comply with the following sections, as applicable, of the Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program as published by the Architectural Woodwork Institutes for Material and Work of "Custom Grade":

Section I00 Lumber

PART 3 - EXECUTION

- 3.01 CONSTRUCTION:
 - A. Work shall be erected plumb, true and square. Finish work shall be accurately mitered or butted to meet in straight hairline joints, in accordance with the best commercial practice.
 - B. Finish nails shall be used on all exposed trim. Stainless steel pre-drilled screws shall be used on all exterior finish decking. Screw and nail patterns shall be straight, consistent and evenly spaced throughout and marked by chalk line prior to installation.
 - C. Minimum length of nails shall be twice the thickness of wood being fastened. Nail heads in finished work shall be sunk neatly with a nail set.
 - D. Work abutting masonry or other finish materials shall be scribed and fitted as tightly to abutting material as is possible without damaging it.

END OF SECTION

SECTION 11 68 13

PLAYGROUND EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Under the Base Bid, the Contractor is responsible for preparing all base materials, subgrades all playground areas as well as adjacent site features. **The playground** equipment shall be provided by Owner for contractor to install.
- B. The Owner will furnish all play equipment for installation by the Contractor.
 - 1. The Contractor shall coordinate with the Owner concerning the scheduling and delivery of play equipment.
 - 2. The Contractor shall be responsible for receipt, unloading, inspection of and storage of all Owner furnished play equipment from the time of delivery.
- C. Refer to the back of this section for manufacturer's data.

1.02 REFERENCE STANDARDS AND SPECIFICATIONS

- A. Playground equipment design, layout, and installation shall comply with the following standards and guidelines as applicable.
 - 1. CPSC Consumer Product Safety Commission Guidelines for Playground Safety, latest edition.
 - ASTM American Society for Testing and Materials, Designation: F 1487, Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, latest edition.
 - 3. ANSI American National Standards Institute.
 - 4. AASHTO American Association of State Highway and Transportation Officials (tests of specifications).
 - 5. MAAB Massachusetts Architectural Access Board
- B. Requirements not specifically set forth herein, but required by the agencies listed in above shall be understood to be a requirement of this contract since these standards of quality and safety are established as the industry standard(s). Any conflicts between the agency standards and the contract documents shall be brought to the attention of the Owner's Representative, and unless otherwise required in writing, the agency standards shall be the minimum requirement to be followed.

1.03 SHOP DRAWINGS

- A. Prior to installing the play equipment as required by the Contract Documents, the following shall be submitted to the Project Representative for review and approval:
 - 1. Certified product data, shop and fabrication drawings showing all important details of construction and dimensions showing the equipment, arrangement, footing spacing and lengths. Shop drawings shall stipulate and certify to compliance with all CPSC and ASTM standards and guidelines as applicable.
 - 2. Descriptive literature and technical specifications for all play equipment installations.
 - 3. Warranty certificates for all applicable play equipment features, components, hardware, finishes and other applicable items.
 - 4. In the event that it is impossible to conform to certain details of this specification due to differing manufacturing techniques or conventions, submit complete summary of all non-compliant components or elements.

1.04 SAMPLES

- A. Submit the following samples in accordance with the provisions of the GENERAL CONDITIONS.
 - 1. Submit samples and descriptive literature of <u>all items specified</u> in this Section, including treatments, finishes, colors, and test information.

1.05 QUALIFICATIONS

A. Installer shall have a minimum of five (5) years experience with a minimum of fifteen (15) playground installations. References will be required.

PART 2 - MATERIALS

2.01 PLAYGROUND EQUIPMENT

 Play Equipment furnished by the Owner and to be installed by the Contractor shall be manufactured by Landscape Structures, Inc. as represented by Brian Iofalla, M.E. O'Brien & Sons, Inc., 93 West Street, Medfield, MA 02052, 800-835-0056, or approved equal and Kompan Playgrounds, 930 Broadway, Tacoma, WA 984902 (800) 426-9788 or approved equal.

Landscape Structures play equipment shall be as follows:

	Qty.	Model Number	Description		
5-12 Custom Play Structure					
Climbers	1	156450A	Swiggle Stix		
	1	156449A	Helix Net		
	1	176081A	Canyon Climber		
	1	178957B	Snake Climber w/Vibe Handholds		
	1	178962A	SpaceWalk Climber w/Vibe Handholds		
	1	179013A	Pod Climber w/Vibe Handhold		
	1	179018A	Logo Climber w/Vibe Handholds		
	1	179019B	Lollipop Climber w/Vibe Handholds		
	1	179022A	Sunbeam Climber w/Vibe Handhold		
	1	156448A	O-Zone		
	1	179188A	Evos 2 Arch w/3-5 Attach Points		
	1	156452A	Wobble Pod		
	3	156454A	E-Pod		
	1	202823A	Gyro Twister Spinner		
Overhead Events	1	165533A	Bow Ladder Connector		
	1	156462A	Ring Tangle		
Slides	1	131437A	Wave Poly Slide		
	1	130390A	Double Swoosh Slide		
Panels	1	179043A	Bubble Vibe Panel		
	1	179044A	Color Splash Vibe Panel		
	1	179045A	Fun Mirror Vibe Panel		
	2	179046A	Hole Vibe Panel		
	1	179051A	Optigear Vibe Panel		
	1	179052A	Rain Sound Wheel Vibe Panel		
Decks	4	121948A	Kick Plate 8" Rise		
	1	121949A	Tri-Deck Kick Plate 8" Rise		
	1	152907B	Deck Link w/Barriers Steel end panels 2 Steps		
	1	152911A	Curved Transfer Module Left		
	6	111231A	Triangular Tenderdeck		
	2	122197A	90* Triangular Tenderdeck		
	1	178710A	Hexagon Tenderdeck		
Posts		111404F	108"Alum Post		
		111404E	116"Alum Post		
		111404D	124" Aluminum Post		
		111404B	140"Alum Post		
		111404A	148"Alum Post		
		179595P	196"Steel Post For Vibe Roof		
		1795950	204"Steel Post For Vibe Roof		
Roofs	5	179594A	Vibe Roof		

Motion & More Fun				
	1	152179A	Saddle Spinner	
	1	155077A	Stand-Up Spinner	
Freestanding play				
	1	200677A	Wee Planet Climber	
	3	168100A	Sensory Play Center Wall	
	2	168101A	Sensory Play Center Wall End	
	1	168104A	Optigear Panel	
	1	168662A	Marble Panel	
	1	168666A	Bongo/Xylofun Panel	
		168661A	Sensory Play Station Plate	
Swings	2	174018A	Belt Seat ProGuard Chains for 8' Beam Height	
	2	176038A	Full Bucket Seat ProGuard Chains for 8' Beam Height	
	1	221292A	5" Arch Swing Frame 8' Beam Height Only	
			5" Arch Swing Frame Additional Bay 8' Beam Height	
	1	221293A	Only	

Kompan Playground play equipment shall be as follows:

	Qty.	Model Number	Description
Vehicles & Ships	1	GSP008	Mars Rover Spring Ride
Supernova,			
Carousels &	1	GXY960	Supernova
Spinners			

2.02 RESILIENT SAFETY SURFACE

A. The resilient safety surface shall meet the requirements as specified in Section 32 18 00 of the Specifications.

2.03 CAST IN PLACE CONCRETE

A. Concrete for the footings will be cast in place cement concrete as specified in Section 03 30 00 of the Specifications. Top of concrete footings shall be twelve (12) inches minimum below finished grade.

2.04 MAINTENANCE KIT

A. The Contractor shall provide the City with a maintenance kit that is to include twenty (20) replacement hardware covers / caps for each play structure, any special tools required for replacement of parts, one (1) gallon of graffiti removal / cleaning solutions as recommended by the manufacturer, one (1) gallon of touch-up paint for each color of painted metal, a manual that includes all installation and maintenance instruction provided by the manufacturer.

B. All maintenance parts are to be delivered to the location specified by the owner.

PART 3 - EXECUTION

- 3.01 The Contractor shall assemble the specified equipment under the supervision of an approved Supervisor per the manufacturer's instructions, the contract drawings and these Specifications.
- 3.02 The Contractor shall locate the structures to the lines and grades specified in the drawings in these Specifications and per the specifications of the manufacturer of the equipment. Adjust all equipment to suit site gradients; no sloping platforms, tracks, or members intended to be horizontal shall be accepted.
- 3.03 The excavation for the footings shall be done as specified in Section 31 23 00 EXCAVATION BORROW AND BACKFILL of these Specifications and according to the Contract Drawing details.
- 3.04 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.
- 3.05 The concrete shall be poured around the supporting pieces of the equipment to the grades detailed. The concrete shall be poured and cured per Section 03300 of these Specifications. Slope tops of footings to drain; set bottom of vertical members into gravel base to ensure drainage; do not encase bottom in concrete.
- 3.06 After the specified cure period of the concrete has passed the bracing may be removed.
- 3.07 The fills and surfaces shall then be placed and brought to the grades shown in the Contract Drawings and in accordance with Section 31 23 00 EXCAVATION BORROW AND BACKFILL of these Specifications.
- PART 4 GUARANTEE AND ACCEPTANCE/LIABILITY
- 4.01 All operating parts and structural elements of the play equipment and safety surface shall be guaranteed against failure or defect during normal use and operation for the entire warrantee period as established by the manufacturer.
- 4.02 Any defective elements shall be replaced in part or whole by the Contractor at no cost to the Owner.
- 4.03 The Contractor and the manufacturer shall hold the Owner and Owner's Representative 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.
- 4.04 The Contractor is responsible for securing a Certified Playground Safety Inspector to ensure ASTM and SPSC compliance. A certificate of compliance will be issued to the Owner prior to final inspection.

END OF SECTION

GSP0008 Mars Rover









Elevated Activities: 0	Accessible Elevated Activities	Accessible Ground Level Activities	Accessible Ground Level Play Types
Present	0	1	1
Required	0	1	1

The Mars Rover can drive the astronauts anywhere they want to go while exploring the moon, Mars or even Jupiter. The Mars Rover has spring inserts which gives children a spring-rider experience. The Mars Rover has lots of space for multiple children at once, many different activities and several manipulative and tactile elements to stimulate them - offering endless hours of fun and excitement. A great element for a playground with a space theme.

Product Line	Themed play
Category	Vehicle and Ships
Age from	2 - 5
Max. fall height (CM)	70
Total height (CM)	123
Safety Zone	17.6 m2

















ASTM

GATHERING

ROCKING PRETENDING

EXPERIMENTING







* = Highest designated play surface.
 ** = Total height of product.

Weight/heaviest parts	kg.	Installation (Manpower)	Persons
Concrete required	NaN m3	Installation (Hours)	Hours
Foundation amount/footing	NaN	Excavation	NaN m3



Highest designated play surface and space required are according to ASTM F1487. Equipment must be installed over resilient surfacing appropriate to the safety guidelines in your area. Product development is an ongoing process. We reserve the right to make modifications on all our products. This product may not be mirrored, scaled or altered in any way. Safety zones must be retained for proper placement of equipment. If any changes are required, please contact your KOMPAN representative at 1.800.426.9788.

To verify product ceritifcation, visit www.ipema.org

GXY960 SUPERNOVA







Use your strength and hold your balance! This seems to be the best way to describe the kind of play that takes place on the Supernova. A single child can engage in exploring its possibilities, but together with a whole group of children, this play item expresses its real potential. The large, slanting ring is set in motion by the children. Turning, spinning, balancing or just enjoying the ride are among the countless play options of the Supernova.

Product Line	Traditional play		
Category	Supernova, carousels & spinners		
Age from	5 - 12		
Max. fall height (CM)72			
Total height (CM)	72		
Safety Zone	45 m2		



ASTM







* = Highest designated play surface.
 ** = Total height of product.

Weight/heaviest parts	kg.	Installation (Manpower)	Persons
Concrete required	NaN m3	Installation (Hours)	Hours
Foundation amount/footing	NaN	Excavation	NaN m3



Highest designated play surface and space required are according to ASTM F1487. Equipment must be installed over resilient surfacing appropriate to the safety guidelines in your area. Product development is an ongoing process. We reserve the right to make modifications on all our products. This product may not be mirrored, scaled or altered in any way. Safety zones must be retained for proper placement of equipment. If any changes are required, please contact your KOMPAN representative at 1.800.426.9788.

To verify product ceritifcation,

KOMPAN INC. 821 Grand Avenue Parkway Pflugerville, TX 78660 Phone: 1 (800) 426-9788 USSales@kompan.com | www.kompan.us KOMPAN FSC License No. FSC-C023002 / www.fsc.org The mark of responsible forestry





	LIMIT OF WORK
un comon un comon e e e e e e e e e e e e e e e e e e e	
ELEVATED PLAY COMPONENTS 0 ELEVATED COMPONENTS ACCESSIBLE BY RAMP 0 <u>REQUIRED</u> 0 ELEVATED COMPONENTS ACCESSIBLE BY TRANSFER 0 <u>REQUIRED</u> 0 ACCESSIBLE GROUND LEVEL COMPONENTS SHOWN 3 <u>REQUIRED</u> 0 DIFFERENT TYPES OF GROUND LEVEL COMPONENTS 2 <u>REQUIRED</u> 2	
HILLCROFT PARK Waltham, Ma	M.E. O'BRIEN & SONS, INC. BRIAN IAFOLLA



Installation Specifications

110070 is the Site Plan Not an Install doc.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

> 3-1-94 11002200





13



PlayBooster® Tee Clamp Assembly

J:\SPECS\110\11002200.P65

Parts List

Part#	Description	Qty
105327-01	5" Half Clamp, Specify Color	2
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100351-00	³ / ₈ " Tee Nut, SST	4
100610-00	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, SST	2

Specifications

Tee/Beam:	356 alloy treated to T-6 hardness and welded to 5" aluminum beams or mechanically fastened to 5" steel beams. Finish: Powdercoat, color specified.
Half Clamps:	Cast aluminum. Finish: Powdercoat, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).
Installation Time: Weight:	Approx. $1/_2$ man hour 2 lbs.

Installation Instructions

- 1) Locate and mark center of clamp location on 5" pipe.
- 2) With beam in position, fasten 5" half clamps to tee clamp using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/Pin and tee nuts as shown. Tighten cap screws evenly.
- 3) **IMPORTANT:** Install drive rivets in half clamps by drilling holes in clamps and into 5" pipe using a ¹/₄" or "F"(only) drill bit. Insert rivet in hole, and hammer rivet pin in until it is flush with head.

115176 is a hard surface label

Not an Install doc.

M landscape structures®



SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487)

> 3-29-01 12194700



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Document #12194700
M landscape structures™ SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487, SECTION 9.)



6-1-95



Document #10972201



Installation Instructions

Before Starting, Read the General Construction Guidelines, Installation Hints, All Typical Detail Sheets and Specific Installation Instructions for Each Component Labeled on Your Plan.

- 1) Dig footing holes spaced as shown on the plan and spec sheets. Refer to the Typical Concrete Footing Spec Sheet.
- 2) Note the post lengths as shown on the plan and set in their appropriate footing holes. The post length is indicated on the finished grade sticker on each post.
- 3) Mark the appropriate posts for the deck heights you are installing and attach decks to posts at marked height. Refer to the appropriate deck spec sheet for installation.
- After all the posts are at proper heights and plumb, and the decks are at proper height and level, pour the concrete footings per the Typical Concrete Footing Spec Sheet.
- 5) Continue installing enclosures and components and pour concrete footings as you progress, making sure everything is plumb and level.
- 6) When installation is complete, install Drive Rivets in all clamps per the Typical Offset Hanger Clamp Spec Sheet.
- 7) Install protective surfacing under and around all equipment before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

> 10-3-97 12382100





PlayBooster 114261 Offset Hanger Clamp Assembly

J:\SPECS\123\12382100.P65

Parts List

Part#	Description	Qty
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	2
100351-00	³ / ₈ " Tee Nut, SST	2
100610-00	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	1
105327-01	5" Half Clamp, Specify Color	1
113729-00	Offset Hanger Clamp, Specify Color	1
100203-00	⁵ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	1

Specifications

Clamp:	Cast aluminum. Finish: Powdercoat, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	Approx. $1/_4$ man hour

Weight: 3 lbs.

Installation Instructions

- 1) Locate and mark position of clamp on 5" post.
- 2) Position clamp in proper direction and assemble with 3/8" x 1 1/8" BHCS w/pin and 3/8" tee nuts as shown and lightly tighten. Position rail against clamp and screw in 5/8" x 2 1/4" BHCS w/pin until rail bottoms out on clamp. Final tighten all fasteners.
- 3) IMPORTANT: Drill through hole in 5" half clamp and into 5" post with a ¹/₄" or "F" (only) drill bit, insert rivet in hole and hammer rivet pin in until it is flush with head.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

) 6



General Rules For Use Of Drive Rivets

- Rivets are used as "Insurance" to keep clamps from sliding down the posts. In many cases this "Insurance" is achieved in other ways; i.e. Panels that attach to the deck face.
- Refer to the Spec Sheet Parts List and follow Installation Instructions for each component.
- Decks and Overhead Events always need rivets.
- Any component fastened to the Deck does not need rivets.

Benefits of not installing unnecessary rivets: saves time, it makes clamp adjustments as well as the removal of clamps for replacement or adding phases much easier, and you will have fewer damaged clamps or posts due to poor installation techniques.



M landscape structures®



1) Drive Center Pin of Rivet Straight into Post Using ¹/₈" Diameter Punch and Hammer.

2) Unbolt BHCS w/Pin and Tee Nuts from Clamp Using Tamperproof Hex Wrench. Remove Offset Hanger Clamp. Lightly Tap on Half Clamp with Hammer Until Head of Drive Rivet Pulls Away From Half Clamp.

3) Pull Out Drive Rivet Using Claw End of Hammer.



- Claw Hammer
- 1/8" Diameter Steel Punch
- Tamperproof Hex Wrench

Drive Rivet Removal

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120688 is a danger keep off sign

Not an Install doc.

120688 is a danger keep off sign

Not an Install doc.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487)

> 8-25-00 10970900



Minimum 1.2 Cubic Feet of Concrete Required per Support.



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Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM

1-1-01

PlayBooster Installation

- 1) Before starting installation, study your *PlayBooster* plan drawing and all installation instructions carefully for location of posts, deck heights, components and safety enclosures. Make sure slides are oriented away from the afternoon sun and that the structure is visible (easily supervised) and accessible.
- 2) Clear an area large enough for your *PlayBooster* and at least the required minimum use zone around it, as shown on your plan drawing. The subsurface must be well drained. If the soil does not drain naturally it must be tiled or sloped at $\frac{1}{8}$ " to $\frac{1}{4}$ " per foot to a storm sewer or a "French Drain". If your *PlayBooster* is over 30' in length it is recommended to install more than one "French Drain" or similar system to allow drainage from the center of the play area and decrease the overall slope. If this is not possible, the structure may need to be "stepped" to take up the grade change.
- 3) Overhead Obstructions: Overhead obstructions within the use zones of playground equipment that are not part of the play structure (for example, tree limbs) shall be at least 84 in. (2130 mm) above each designated play surface or 84 in. (2130 mm) above the pivot point of swings. All overhead utility line clearances above the use zone areas shall comply with all local, state, and national codes, such as the National Electical Safety Code.
- 4) Locate all mainstructure post footing holes according to the dimensions shown on your *PlayBooster* plan. This can be accomplished by laying a deck on the ground and measuring from it; by laying out a base line string grid or using a builders transit. This step is very important and worth taking extra time to be precise. Location of component footings such as slide supports can be done at a later time.
- 5) Refer to the Typical Concrete Footing installation sheet. Dig holes to the proper width and depth as shown. (Only dig enough holes for one day's construction. Do not leave holes open over night.) Pour crushed rock in each hole level with each other and at least 4" deep as shown. This can be easily accomplished either with a builders transit or by laying out hole locations with a string grid, leveling the grid, and measuring down from the grid for each footing. Tamp the crushed rock down until compacted and at proper level. This step is important to ensure all posts will be at the proper height relative to each other, and it greatly simplifies installation. If the soils are loose or unstable, larger diameter holes may be necessary. Check with a local engineer if in doubt.
- 6) Start with the lowest deck and work your way to the highest deck following instructions on the installation sheets for typical post/deck assembly. Install barriers and roofs as located on the plan for stability.
- 7) After the posts are at proper heights and plumb, and the decks are at proper height and level, pour the concrete footings per the Typical Concrete Footing Detail.
- 8) During construction, the site and all the material on it must be secured when unattended to prevent children from playing on them. Do not leave decks with unprotected openings when unattended-use temporary barricades if necessary.
- 9) Install all other play components per the installation instructions. After all components and enclosures are properly attached, pour the remaining concrete footings per the Typical Concrete Footing Detail.
- 10) Install protective surfacing material.
- 11) Attach play hardware such as 'D' rings and swing seats last, *after* protective surfacing is in place and footings have cured at least 3 days.
- 12) Carefully and thoroughly inspect the entire *PlayBooster* to be sure all fastening hardware is tight. According to ASTM F1487, section 6.2 sharp points, edges and protrusions; any exposed bolt ends should not protrude beyond the face of the nut more than two (2) threads. This condition is not planned, but may exist in some applications because materials and finishes will vary. To remedy this situation, add a second nut or washer(s), extras have been added to the spare parts kit. See illustrations on reverse side of this sheet. Children should not be allowed on the structure until this inspection is complete.
- 13) Before children are allowed on the structure, the site must be cleaned and free of all construction debris and packaging material. Do not burn on the site.



General Construction Guidelines

Sheet 1 of 2

7

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Tools Required

Tools required for installation are an auger, or other equipment for digging 14" diameter footing holes; shovels, rubber mallet, drill (with 1/4", 7/16", 9/16", 11/16" and 3/8" drill bits), tape measure, hex keys or allen wrenches, level, 3/8" socket set, hammer, open end wrench set, screw driver, for surface mount a hammer drill, 3/8" and 1/2" masonry bits and transit or string line to aid in layout. Some washable felt tip pens are also useful for marking clamp locations.

Materials Required

All *PlayBooster* materials are supplied except concrete for footings, protective surfacing material, and curbing or edging material. With the exception of the special wrenches required (for the pinned hex fasteners) no other tools are supplied.

Recycling

Many of our packaging materials can be recycled, please take the time to separate and deliver them to a recycler. Thank You.

Installation Times

Installation times, as noted on the back of the installation sheets, are *approximate* and will vary depending on soil conditions, installer's equipment and ability. Times indicated *do not* include unloading or unpacking equipment. The man hours given are for one person installing (unless otherwise noted). Cut time in half for two people.

Technical Services

If you have any questions or concerns about the installation of your structure, call our Technical Services Department at: *1-800-328-0035* (7:30 - 5:30p.m. CST/M-F).



Illustrations For Note 10, (Reverse Side Of This Sheet)



F1487.)



- 1.) Determine the highest accessible part by definition.
- 2.) Determine the type of surfacing material desired:
 - Unitary Bound rubber type materials for the accessible areas.
 - *Loose-fill* Sand, wood chips, etc. for non-accessible areas.
- 3.) Select a material that has a Critical Height value of at least the height of the highest accessible part.
 - According to the CPSC, Critical Height is defined as the maximum height from which the instrumented metal headform, upon impact, yields both a peak deceleration of no more than 200 G's and a HIC value of no more than 1,000 when tested in accordance with the procedure described in the ASTM Test Method F1292.
 - Request independent laboratory test results showing the critical height of each product per the above procedures for commercially available products. The CPSC has tested some common loose-fill materials that are commonly not tested as a protective surfacing. (See back page.)
- 4.) Cover the designated use zone with the desired materials. If a different type of material is used for the accessible route of travel, make sure the surfaces are maintained flush.

Selecting Protective Surfacing for Your Playground Sheet 2 of 2 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 (763) 972-3391 1-888-LSI-INST (1-888-574-4678) FAX (763) 972-31851 2-3

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Document #13412800

- SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)



Critical	Hoights	(in Foot)
Gillicai	пенупь	(III FEEL)

		ompres Depth	Compressed Depth *	
Material	6"	9"	12"	9"
* Wood Mulch	7'	10'	11'	10'
* Double Shredded Bark Mulch		10'	11'	7'
* Uniform Wood Chips	6'	7'	12'	6'
* Fine Sand	5'	5'	9'	5'
* Coarse Sand	5'	5'	6'	4'
* Fine Gravel	6'	7'	10'	6'
* Medium Gravel	5'	5'	6'	5'

NA = Not Available

- * **NOTE:** Compressed depths most accurately depict conditions on a playground.
- * An approximation of the maximum fall height from which a life-threatening head injury would not be expected to occur, based on tests in which a headform yielded both a peak deceleration of less than 200 G's and a HIC of less than 1000 upon impact.
- * Handbook for *Public Playground Safety*, published by the U.S. Consumer Products Safety Commission, Section 10, Table 2, page 21.

Critical Heights

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487)

> 3-14-01 12026200



PlayBooster[®]

Arches

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1



"How to distribute your hardware Headache Free"

We have received feedback from you, our customers, that the most common delay in completing your playground installation is lost or misplaced hardware.

Some of our most successful installations have used a "checkout" system with one person appointed to distribute the various hardware packages. Installation sheets are provided for each component that indicate hardware packages/items required to assemble that component. Refer to these sheets to determine which hardware items to request from the designated "check-out" person.

HELPFUL HINTS:

Read installation sheets.

Be sure to use the correct length hardware as specified on the installation sheets.

Be sure to use clamps in the correct location as indicated on the installation sheets.



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Part Number Label

Example

SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487)

13871600

Post Specifications: Post length shall vary depending upon the intended use and shall be a minimum of 42" above the deck height. All posts shall be powdercoated to specified color. All posts shall have a "finished grade marker" positioned on the post iden-tifying the 34" bury line (or 44" bury line for posts for 96" decks) required for correct installation and the top of the loose fill pro-tective surfacing. Top caps for posts shall be aluminum die cast from 369.1 alloy and powdercoated to match the post color. All caps shall be factory installed and secured in place with (3) self sealing rivets. A molded low density polyethylene cap, with drain holes, shall be pressed onto the bottom end of the post to increase the footing area.

Steel Posts: All steel PlayBooster posts are manufactured from 5" O.D. tubing with a wall thickness of .120" and shall be galva-nized after rolling and shall have both the I.D.and the cut ends sprayed with a corrosion resistant coating.

tured from 6005-T5 extruded tubing conforming to ASTM B-221. Posts shall have a 5" outside diameter with a .125" wall thickness







Warning

Your playground may include equipment containing moving parts. Moving parts are more vulnerable to wear, mis-use and abuse than other non-moving parts. It is critical these parts be inspected and maintained according to our recommendations.

As the owner, it is your responsibility to perform preventative maintenance and record your findings. Failure to do so may create a hazard and cause serious injury or death.





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According to the U.S. Consumer Product Safety Commission (CPSC) nearly 70% of all playground injuries are caused by falls to the surface.

PLEASE INSTALL AND MAINTAIN ADEQUATE PROTECTIVE SURFACING UNDER AND AROUND YOUR PLAYSTRUCTURE!

Never let children play on the equipment before protective surfacing is installed.

Consult the CPSC's Handbook for Public Playground Safety, the ASTM F1487 Standard or your Landscape Structures representative for more information.



PS/PB/FP/Evos/Weevos

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7/12/2/6/5



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7/12/2/6/5



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HELPFUL HINTS:

Read installation sheets.

Be sure to use the correct length hardware as specified on the installation sheets.

Be sure to use clamps in the correct location as indicated on the installation sheets.





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7/12/2/6/5

120688 is a danger keep off sign

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110070 is the Site Plan Not an Install doc.





Part Number Label

Example

SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

15889500

Arch Specifications: Arch height and width shall vary depending upon the intended use and shall be shipped in 4 sections for each arch. All arch sections shall be powdercoated to specified color. All arches shall have a "finished grade marker" positioned on the arches identifying the 42" bury line required for correct installation and the top of the loose fill protective surfacing. A molded low density polyethylene cap, with drain holes, shall be pressed onto the bottom end of the lower arch section to increase the footing area.

Steel Arches: All *Evos* arches are manufactured from 5" O.D. steel tubing with a wall thickness of .120" and shall be galvanized after rolling and shall have both the I.D.and the cut ends sprayed with a corrosion resistant coating.







SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

Evos[™] Installation

- 1) Before starting installation, study your *Evos* plan drawing and all installation instructions carefully for location of arches, outriggers and components. Make sure gliders are oriented away from the afternoon sun and that the structure is visible (easily supervised) and accessible.
- 2) Clear an area large enough for your *Evos* and at least the required minimum use zone around it, as shown on your plan drawing. The subsurface must be well drained. If the soil does not drain naturally it must be tiled or sloped at 1/8" to 1/4" per foot to a storm sewer or a "French Drain". If your *Evos* is over 30' in length it is recommended to install more than one "French Drain" or similar system to allow drainage from the center of the play area and decrease the overall slope.
- 3) Overhead Obstructions: Overhead obstructions within the use zones of playground equipment that are not part of the play structure (for example, tree limbs) shall be at least 84 in. (2130 mm) above each designated play surface or 84 in. (2130 mm) above the pivot point of swings. All overhead utility line clearances above the use zone areas shall comply with all local, state, and national codes, such as the National Electical Safety Code.
- 4) Locate all mainstructure arch footing holes according to the dimensions shown on your *Evos* plan. This can be accomplished by laying out a base line string grid or using a builders transit. This step is very important and worth taking extra time to be precise. Location of outrigger footings such as glider supports can be done at a later time.
- 5) Refer to the *Evos* Typical Concrete Footing installation sheet. Dig holes to the proper width and depth as shown. (Only dig enough holes for one day's construction. Do not leave holes open over night.) Pour crushed rock in each hole *level with each other* and at least 4" deep as shown. This can be easily accomplished either with a builders transit or by laying out hole locations with a string grid, leveling the grid, and measuring down from the grid for each footing. Tamp the crushed rock down until compacted and at proper level. This step is important to ensure all arches will be at the proper height relative to each other, and it greatly simplifies installation. If the soils are loose or unstable, larger diameter holes may be necessary. Check with a local engineer if in doubt.
- 6) Start with arches 1 & 2, then arch 4, followed by arch 3, following instructions on the installation sheet. Install outriggers and components as located on the plan for stability.
- 7) After the arches, outriggers and components are at proper heights and plumb, pour the concrete footings per the *Evos* Typical Concrete Footing Detail.
- 8) During construction, the site and all the material on it must be secured when unattended to prevent children from playing on them. When unattended, use temporary barricades if necessary.
- 9) Install protective surfacing material.
- 10) Carefully and thoroughly inspect the entire *Evos* to be sure all fastening hardware is tight. According to ASTM F1487, section 6.2 sharp points, edges and protrusions; any exposed bolt ends should not protrude beyond the face of the nut more than two (2) threads. This condition is not planned, but may exist in some applications because materials and finishes will vary. To remedy this situation, add a second nut or washer(s), extras have been added to the spare parts kit. See illustrations on reverse side of this sheet. Children should not be allowed on the structure until this inspection is complete.
- 11) Before children are allowed on the structure, the site must be cleaned and free of all construction debris and packaging material. Do not burn on the site.



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Tools Required

Tools required for installation are an auger, or other equipment for digging 14", 18" and 24" diameter footing holes; shovels, rubber mallet, drill (with 1/4" drill bits), tape measure, hex keys or allen wrenches, level, 3/8" socket set, hammer, open end wrench set, screw driver, and transit or string line to aid in layout. Some washable felt tip pens are also useful for marking clamp locations.

Materials Required

All *Evos* materials are supplied except concrete for footings, protective surfacing material, and curbing or edging material. With the exception of the special wrenches required (for the pinned hex fasteners) no other tools are supplied.

Recycling

Many of our packaging materials can be recycled, please take the time to separate and deliver them to a recycler. Thank You.

Installation Times

Installation times, as noted on the back of the installation sheets, are *approximate* and will vary depending on soil conditions, installer's equipment and ability. Times indicated *do not* include unloading or unpacking equipment. The man hours given are for one person installing (unless otherwise noted). Cut time in half for two people.

Technical Services

If you have any questions or concerns about the installation of your structure, call our Technical Services Department at: *1-800-328-0035* (7:30 - 5:30p.m. CST/M-F).

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Installation

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- SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

SELECTING PROTECTIVE SURFACING FOR YOUR PLAYGROUND

- 1.) Determine the highest accessible part by definition.
- 2.) Determine the type of surfacing material desired:
 - Unitary Bound rubber type materials for the accessible areas.
 - Loose-fill Sand, wood chips, etc. for non-accessible areas.
- 3.) Select a material that has a Critical Height value of at least the height of the highest accessible part.
 - According to the CPSC, Critical Height is defined as the maximum height from which the instrumented metal headform, upon impact, yields both a peak deceleration of no more than 200 G's and a HIC value of no more than 1,000 when tested in accordance with the procedure described in the ASTM Test Method F1292.
 - Request independent laboratory test results showing the critical height of each product per the above procedures for commercially available products. The CPSC has tested some common loosefill materials that are commonly not tested as a protective surfacing. (See back page.)
- 4.) Cover the designated use zone with the desired materials. If a different type of material is used for the accessible route of travel, make sure the surfaces are maintained flush.

	Unc	ompres Depth	ssed	Compressed Depth *
Material	6"	9"	12"	9"
* Wood Mulch	7'	10'	11'	10'
* Double Shredded Bark Mulch	6'	10'	11'	7'
* Uniform Wood Chips	6'	7'	12'	6'
* Fine Sand	5'	5'	9'	5'
* Coarse Sand	5'	5'	6'	4'
* Fine Gravel	6'	7'	10'	6'
* Medium Gravel	5'	5'	6'	5'

Critical Heights (in Feet)

NA = Not Available

- * **NOTE:** Compressed depths most accurately depict conditions on a playground.
- * An approximation of the maximum fall height from which a life-threatening head injury would not be expected to occur, based on tests in which a headform yielded both a peak deceleration of less than 200 G's and a HIC of less than 1000 upon impact.
- * Handbook for Public Playground Safety, published by the U.S. Consumer Products Safety Commission, Section 10, Table 2, page 21.

Evos[™]

Protective Surfacing 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 -LSI-INST (1-888-574-4678) FAX (763) 972-31851

Sheet 2 of 2

Document #15883200

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Recycling of packaging materials

Did you know that most of the packaging materials you receive on a Landscape Structures order are recyclable? Do you reuse or recycle everything you can from your playground sites? We're making it easier for you to do the right thing and keep these materials out of landfills!

FOAM/SCRIM SHEETS

Landscape Structures has partnered with our supplier to recycle foam/scrim material, the grey and white sheets that are layered between the large painted parts. This material is not usually accepted at general recycling facilities but this supplier will re-use it in their manufacturing of new packaging materials. It's easy! Just put the foam/scrim from your installation site in a box and ship it to the facility closest to you.

Here is a list of participating facilities throughout the U.S.:

Foam/Scrim Products Only

Pregis Plant 159 N San Antonio Ave. Pomona, CA 91767

Pregis Plant 8201 W Elowin Ct. Visalia, CA 93291

Pregis Plant 7574 Presidents Dr. Orlando, FL 32809

Pregis Plant 1411 Pidco Dr. Plymouth, IN 46563

Pregis Plant 300 Harris Rd. Wurtland, KY 41144 Pregis Plant 3825 N Main St. Granite Falls, NC 28630

Pregis Plant 18 Peck Ave. Glens Falls, NY 12801

Pregis Plant 3500 S Highway 287 Corsicana, TX 75109

Pregis Plant 310 Old Station Rd. Wenatchee, WA 98801 Foam/Scrim, Plastic Banding, Shrink Wrap Anchor Facility 480 Broadway St. St Paul, MN 55101

Anchor Facility 1501 Swasey Rd. Hudson, WI 54016

Don't stop here! Most of the other packaging materials can also be recycled, reused or repurposed.

- CORRUGATED CARDBOARD: Boxes can be broken down and recycled at a local recycler, or reused for other storage.
- SHRINK WRAP: Contact your local plastic recycler and ask if they accept polyethylene plastic.
- PLASTIC BANDING: Contact your local plastic recycler and ask if they accept polypropylene.

If you have suggestions for recycling, reusing or repurposing other materials, please email them to: info@playlsi.com. Just one more way Landscape Structures is building healthy, sustainable communities.



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Did you know that most of the packaging materials you receive on a Landscape Structures order are recyclable? Do you reuse or recycle everything you can from your playground sites? We're making it easier for you to do the right thing and keep these materials out of landfills!

FOAM/SCRIM SHEETS

Landscape Structures has partnered with our supplier to recycle foam/scrim material, the grey and white sheets that are layered between the large painted parts. This material is not usually accepted at general recycling facilities but this supplier will re-use it in their manufacturing of new packaging materials. It's easy! Just put the foam/scrim from your installation site in a box and ship it to the facility closest to you.

Here is a list of participating facilities throughout the U.S.:

Foam/Scrim Products Only

Pregis Plant 159 N San Antonio Ave. Pomona, CA 91767

Pregis Plant 8201 W Elowin Ct. Visalia, CA 93291

Pregis Plant 7574 Presidents Dr. Orlando, FL 32809

Pregis Plant 1411 Pidco Dr. Plymouth, IN 46563

Pregis Plant 300 Harris Rd. Wurtland, KY 41144 Pregis Plant 3825 N Main St. Granite Falls, NC 28630

Pregis Plant 18 Peck Ave. Glens Falls, NY 12801

Pregis Plant 3500 S Highway 287 Corsicana, TX 75109

Pregis Plant 310 Old Station Rd. Wenatchee, WA 98801 Foam/Scrim, Plastic Banding, Shrink Wrap Anchor Facility 480 Broadway St. St Paul, MN 55101

Anchor Facility 1501 Swasey Rd. Hudson, WI 54016

Don't stop here! Most of the other packaging materials can also be recycled, reused or repurposed.

- CORRUGATED CARDBOARD: Boxes can be broken down and recycled at a local recycler, or reused for other storage.
- SHRINK WRAP: Contact your local plastic recycler and ask if they accept polyethylene plastic.
- PLASTIC BANDING: Contact your local plastic recycler and ask if they accept polypropylene.

If you have suggestions for recycling, reusing or repurposing other materials, please email them to: info@playlsi.com. Just one more way Landscape Structures is building healthy, sustainable communities.



182212 is an entanglement label

Not an Install doc.

182213 is a hot surface label

Not an Install doc.

landscape structures

Look for compliance to the following guidelines and standards whenever you install playground equipment. It's your assurance that the products you install meet the most rigorous safety and quality assurance standards.

Landscape Structures is a member in good standing of **IPEMA**, the International Play Equipment Manufacturers Association. IPEMA is a memberdriven, international trade organization that represents and promotes an open market for manufacturers of play equipment.



In the interest of playground safety, IPEMA provides a Third Party Certification Service whereby a designated independent laboratory validates a participant's certification of conformance to ASTM F1487, Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, except sections 7.1.1, 10 and 12.6.1; CAN/CSA Z614, Children's Playspaces and Equipment Standards, except clauses 9.8, 10 and 11; or both. The use of the corresponding logo in the Landscape Structures Inc. catalog signifies that Landscape Structures Inc. has received written validation from the independent laboratory that the product(s) associated with the use of the logo conforms with the requirements of the indicated standards. Check the IPEMA website (www.ipema.org) to confirm product certification. The use zone and fall height requirements in this publication are shown to ASTM standards. The requirements for other standards may be different. According to the CSA, playground maintenance and inspection is a continuous and integral part of budgetary costs. The cost of inspection and maintenance shall be considered and incorporated into the budget at the time of design, purchase equipment and installation (11.1.1 Budgeting).

International Play Equipment Manufacturers Association 4305 N. Sixth St. Suite A

The Consumer Product Safety Commission

(CPSC) is a governmental organization that provides technical safety guidelines for designing, constructing, operating and maintaining public playgrounds.

U.S. Consumer Product Safety Commission 4330 East West Hwy. Bethesda, MD 20814 www.cpsc.gov

The American Society for Testing and Materials (ASTM) is a scientific and technical organization that is a major developer of standards for testing different types of materials. In 1993, the ASTM published "Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use," designation F1487-93. ASTM is more technical than the CPSC. ASTM revised its old standard and published a new standard in 1995, 1998, 2001, 2005, 2007 and again in 2011.

American Society for Testing and Materials 100 Barr Harbor Dr. P.O. Box C700 West Conshohocken, PA 19428 www.astm.org



The Canadian Standards Association

Nearly all equipment developed by Landscape Structures is certified to meet CAN/CSA-Z614-07, the Children's Playspaces and Equipment Standard, through IPEMA.

The European Standard was developed by the European Committee for Standardization. The majority of Landscape Structures products have been designed to be TUV certified by a third-party validator to EN 1176: 2008, the European Standard for Playground Equipment.



ISO 9001:2008 has a process-orientated structure, is customer focused and emphasizes continuous improvement in quality.



ISO 14001:2004 drives us toward operating in a



Harrisburg, PA 17110 www.ipema.org manner that is environmentally conscious. elines & Standards Gi PS/PB/FP/Evos/Weevos 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 (763) 972-3391 1-888-LSI-INST (1-888-574-4678) FAX (763) 972-3185

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

10971300





PlayBooster[®] Rail/Handloop Assembly

Parts List

Part#	Description	Qty.
108542	Handloon Specify Color	1
100108	3/ " x 1 1/ " PHCS w/Din SST	1
100198	⁵ / ₈ X 1 ⁷ / ₈ DHCS W/Pill, SS1	4
100203	$3/_8 \times 2^{-1}/_4$ BHCS w/Pin, SS1	2
100351	$3/_8$ " Tee Nut, SST	4
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, SST	2
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
111276	Rail Assembly	1
108569	Rail, Specify Color	1
100198	³ / ₈ " x 1 ⁻¹ / ₈ " BHCS w/Pin, SST	4
100203	⁵ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	2
100351	³ / ₈ " Tee Nut, SST	4
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, SST	2
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2

Specifications

Handloop:	Weldment comprised of 1.125" O.D. 11 GA (.120") steel tubing with 203 or 303 stainless steel inserts, with $\frac{5}{8}$ " internal thread. Finish: TenderTuff TM , color specified.
Rail:	Weldment comprised of 1.125" O.D. 11 GA (.120") steel tubing with 203 or 303 stainless steel inserts, with $5/_8$ " internal thread. Finish: TenderTuff TM , color specified.
Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield®, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Approx. ³ / ₄ man hour 111275-00 (One) 11 lbs. 111276-00 (One) 11 lbs.

Installation Instructions

- 1) Mark locations of clamps on posts per dimensions on front of sheet.
- 2) Attach offset clamps to ends of rails/handloops using $\frac{5}{8}$ " x 2 $\frac{1}{4}$ " BHCS w/pin.
- Position rail/handloop on marked position on posts and attach using 5" half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Assembly Sheet.
- 4) Install drive rivets in half clamps per the Typical Offset Hanger Clamp Assembly Sheet.
- 5) Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)



Part No. 156850-00-000 Part No. 166815-00-000



Part No. 156847-00-000 Part No. 156845-00-000

INSTRUCTIONS:

Surface must be clean and dry prior to applying sticker. Peel backing sheet away from back of sticker and place sticker in position. Using backing sheet, rub over face of sticker to burnish down into place. Choose a location visible to adults in a conspicuous location on product. Stickers work best on painted parts. Where possible, avoid placing on rotationally-molded plastic parts, TenderTuff-coated parts or where children may step and wear off sticker. This applies to both Freestanding Play items and Composite Playstructures. Apply sticker adjacent to or visible from the primary entrance to the structure. Apply 4'-5' above the surface. Apply at least (1) one to every structure and (2) two to large Composite Playstructures.



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Eco #0100082 Document #20151300 replaces #18306600. Added (3) warning labels.





PB/PS/FP/Evos®/Weevos® 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-860 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185 all Help





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)



Part No. 156850-00-000 Part No. 166815-00-000



Part No. 156847-00-000

Part No. 156845-00-000

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Common Parts & Fasteners

Button Head Cap Screws BHCS w/Pin

Carriage Bolts



			Recommended		
		Sizes	Mat'l	Torq	ue
Part #	Inches	mm e	or Grade	Ft./lbs	Kgm
137277 131849 223807 132626 192071 100195	1/4" x 3/8" 5/16" x 1/2" 5/16" x 3/4" 5/16" x 7/8" 3/8" x 5/8"	(6,4 x 9,5) (7,9 x 12,7 (7,9 x 19,0) (7,9 x 22,2) M 8 x 24 mm (9,5 x 15,9	SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT	10 10 10 10 10 15	1.4 1.4 1.4 1.4 1.4 2
100196 100198 113027 100171 123224	3/8" x 7/8" 3/8" x 1 1/8" 3/8" x 1 3/8" 3/8" x 1 3/8" 3/8" x 1 1/2" 3/8" x 1 11/16	(9,5 x 22,2 (9,5 x 28,6 (9,5 x 34,9 (9,5 x 38,1 (9,5 x 42,9) (9,5 x 42,9)) SST-PAT) SST-PAT) SST-PAT) SST-PAT SST-PAT	15 15 15 15 15	2 2 2 2 2
100173 100199 100174 100175 100176 100168	3/8" x 2" 3/8" x 2 1/4" 3/8" x 2 1/2" 3/8" x 2 3/4" 3/8" x 3" 3/8" x 3 1/4"	(9,5 x 50,8 (9,5 x 57,2 (9,5 x 63,5 (9,5 x 69,9 (9,5 x 76,2 (9,5 x 82,6) SST-PAT) SST-PAT) SST-PAT) SST-PAT) SST-PAT) SST-PAT	15 15 15 15 15 15	2 2 2 2 2 2 2 2
100200 124460 100201 127551	3/8" x 3 1/2" 3/8" x 3 3/4" 5/8" x 1 1/2" 5/8" x 1 1/2"	(9,5 x 88,9 (9,5 x 95,2 (15,9 x 38, (15,9 x 38, ANTI-SEIZ) SST-PAT) SST-PAT 1)SST-PAT 1) SST-PAT 1) SST-	15 15 50 50	2 2 7 7
100203	5/8" x 2 1/4"	(15,9 x 57,	2)SST-PAT	50	7

Hex Cap Screws

Cont #	Si Jacker	izes	Re Mat'l	ecomm Torq	nended lue
Part #	Inches	mm	or Grade	Ft./1	bs Kgm
100206 100208 100209 135682 135683 100214 121499 100216 131862	3/8" x 1" 3/8" x 1 1/2" 3/8" x 1 3/4" 3/8" x 3 1/8" 3/8" x 4 5/8" 3/8" x 5" 7/16" x 1 3/4' 1/2" x 1 1/4" 1/2" x 2 1/4"	(9,5 x 25,4) (9,5 x 38,1) (9,5 x 44,4) (9,5 x 79,3) (9,5 x 117,5) (9,5 x 127) ' (11,1 x 114,3) (12,7 x 31,7) (12,7 x 57,1)	SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT) SST-PAT SST-PAT SST-PAT	15 15 15 15 15 15 20	2 2 2 2 2 2 2 2 2 2 2 2.8



]	Recomme	ended
	Sizes		Mat'l	Torqu	ie
Part #	Inches	mm	or Grade	Ft./lbs	Kgm
100135 100147 116017 100148	5/16" x 1 1/4" 3/8" x 1 1/4" 3/8" x 1 1/2" 3/8" x 1 3/4"	(7,9 x 31,8 (9,5 x 31,8 (9,5 x 38,1 (9,5 x 44,5) SST-PAT) SST-PAT) SST-PAT) SST-PAT	5 15 15 15	0.7 2 2 2

Flat Head Cap Screws (FHCS)



			Recommended			
	Sizes		Mat'l	Torque		
Part #	Inches	mm	or Grade	Ft./lbs Kgm		
148686	3/8" x 3/4"	(9,5 x 19,0)5) SST-PAT	13 1.8		
100252*	3/8" x 1 1/4"	(9,5 x 31,8	3) SST-PAT	13 1.8		
151421	3/8" x 1 1/2"	(9,5 x 38,1) SST-PAT	13 1.8		
148765	3/8" x 3 1/2"	(9,5 x 88,9) SST-PAT	13 1.8		
130824*	1/2" x 2 1/4"	(12,5 x 57	,2) SST	20 2.8		

NOTE: These are recommended torque applications per fastener size. When fasteners are used with plastic or wood products, the torque specifications will be excessive and we recommend that the installer apply some caution when tightening the fasteners. Plastic or wood products should begin to deform slightly. Fasteners indicated with -"Pat" includes a locking patch type material and should cure for 72 hours for maximum strength.

Common Parts/Torque Chart 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

Sheet 1 of 3

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PS/PB/Evos/Weevos

Document #22576000




M landscape structures





SST SST

SST

(12,7) (15,9)

(28,6)

1/2"

5/8"

1 1/8"

100363

100366

123737

0.536 1.262 0.688 1.750

1.140 1.750

Curved Spring Washer



SAE Flat Washers



	Sizes		Mat'l or Grade			
Part #	Inches	mm	or Grude	I.D. O.D.		
100364 223956 100365 113550 129500	1/4" 5/16" 3/8" 1/2" 5/8"	(6,35) (7,92) (9,5) (12,7) (15,9)	SST SST SST SST SST	$\begin{array}{cccc} 0.281 & 0.625 \\ 0.344 & 0.688 \\ 0.411 & 0.816 \\ 0.531 & 1.062 \\ 0.686 & 1.342 \end{array}$		





Tee Nut (PlayBooster Clamps)















HOW TO DETERMINE BOLT LENGTHS



Rule: Measurements should be based on the part of the screw that penetrates the surface.





Common Parts & Fasteners

Button Head Cap Screws BHCS w/Pin

Carriage Bolts



			R	lecomme	ended
		Sizes	Mat'l	Torq	ue
Part #	Inches	mm o	or Grade	Ft./lbs	Kgm
137277 131849 223807 132626 192071 100195	1/4" x 3/8" 5/16" x 1/2" 5/16" x 3/4" 5/16" x 7/8" 3/8" x 5/8"	(6,4 x 9,5) (7,9 x 12,7 (7,9 x 19,0) (7,9 x 22,2) M 8 x 24 mm (9,5 x 15,9	SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT	10 10 10 10 10 15	1.4 1.4 1.4 1.4 1.4 2
100196 100198 113027 100171 123224	3/8" x 7/8" 3/8" x 1 1/8" 3/8" x 1 3/8" 3/8" x 1 3/8" 3/8" x 1 1/2" 3/8" x 1 11/16	(9,5 x 22,2 (9,5 x 28,6 (9,5 x 34,9 (9,5 x 38,1 (9,5 x 42,9)) SST-PAT) SST-PAT) SST-PAT) SST-PAT SST-PAT	15 15 15 15 15	2 2 2 2
100173 100199 100174 100175 100176 100168	3/8" x 2" 3/8" x 2 1/4" 3/8" x 2 1/2" 3/8" x 2 3/4" 3/8" x 3" 3/8" x 3 1/4"	(9,5 x 50,8 (9,5 x 57,2 (9,5 x 63,5 (9,5 x 69,9 (9,5 x 76,2 (9,5 x 82 6) SST-PAT) SST-PAT) SST-PAT) SST-PAT) SST-PAT) SST-PAT	15 15 15 15 15 15	2 2 2 2 2 2 2 2
100200 124460 100201 127551	3/8" x 3 1/2" 3/8" x 3 3/4" 5/8" x 1 1/2" 5/8" x 1 1/2"	(9,5 x 88,9 (9,5 x 95,2 (15,9 x 38, (15,9 x 38, ANTI-SEIZ) SST-PAT) SST-PAT 1)SST-PAT 1) SST-PAT 1) SST-	15 15 50 50	2 2 7 7
100203	5/8" x 2 1/4"	(15,9 x 57,	2)SST-PAT	50	7

Hex Cap Screws

(Si	izes	Re Mat'l	ecomm Torq	nended jue
Part #	Inches	mm	or Grade	Ft./I	lbs Kgm
100206 100208 100209 135682 135683 100214 121499 100216 131862	3/8" x 1" 3/8" x 1 1/2" 3/8" x 1 3/4" 3/8" x 3 1/8" 3/8" x 4 5/8" 3/8" x 5" 7/16" x 1 3/4" 1/2" x 1 1/4" 1/2" x 2 1/4"	(9,5 x 25,4) (9,5 x 38,1) (9,5 x 44,4) (9,5 x 79,3) (9,5 x 117,5) (9,5 x 127) (11,1 x 114,3) (12,7 x 31,7) (12,7 x 57,1)	SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT) SST-PAT SST-PAT	15 15 15 15 15 15 15 20	2 2 2 2 2 2 2 2 2 2 2 2.8

	S:] Ma41	Recomme	ended
Part #	Inches	zes mm (or Grade	Ft./lbs	Kgm
100135 100147 116017 100148	5/16" x 1 1/4" 3/8" x 1 1/4" 3/8" x 1 1/2" 3/8" x 1 3/4"	(7,9 x 31,8) (9,5 x 31,8) (9,5 x 38,1) (9,5 x 44,5)) SST-PAT) SST-PAT) SST-PAT) SST-PAT	5 15 15 15	0.7 2 2 2

Flat Head Cap Screws (FHCS)



			R	ecommended	
	Si	zes	Mat'l	Torque	
Part #	Inches	mm	or Grade	Ft./lbs Kgm	
148686 100252* 151421 148765 130824*	3/8" x 3/4" 3/8" x 1 1/4" 3/8" x 1 1/2" 3/8" x 3 1/2" 1/2" x 2 1/4"	(9,5 x 19,0 (9,5 x 31,8 (9,5 x 38,1 (9,5 x 88,9 (12,5 x 57,	5) SST-PAT) SST-PAT) SST-PAT) SST-PAT 2) SST	13 1.8 13 1.8 13 1.8 13 1.8 13 1.8 20 2.8	

NOTE: These are recommended torque applications per fastener size. When fasteners are used with plastic or wood products, the torque specifications will be excessive and we recommend that the installer apply some caution when tightening the fasteners. Plastic or wood products should begin to deform slightly. Fasteners indicated with -"Pat" includes a locking patch type material and should cure for 72 hours for maximum strength.

Common Parts/Torque Chart 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

Sheet 1 of 3

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Document #22576000





M landscape structures





SST SST

SST

(12,7) (15,9)

(28,6)

1/2"

5/8"

1 1/8"

100363

100366

123737

0.536 1.262 0.688 1.750

1.140 1.750

Curved Spring Washer



SAE Flat Washers



	Sizes		Mat'l or Grade			
Part #	Inches	mm	or Grude	I.D. O.D.		
100364 223956 100365 113550 129500	1/4" 5/16" 3/8" 1/2" 5/8"	(6,35) (7,92) (9,5) (12,7) (15,9)	SST SST SST SST SST	$\begin{array}{cccc} 0.281 & 0.625 \\ 0.344 & 0.688 \\ 0.411 & 0.816 \\ 0.531 & 1.062 \\ 0.686 & 1.342 \end{array}$		





Tee Nut (PlayBooster Clamps)















HOW TO DETERMINE BOLT LENGTHS



Rule: Measurements should be based on the part of the screw that penetrates the surface.





Common Parts & Fasteners

Button Head Cap Screws BHCS w/Pin

Carriage Bolts



			R	lecomme	ended
		Sizes	Mat'l	Torq	ue
Part #	Inches	mm o	or Grade	Ft./lbs	Kgm
137277 131849 223807 132626 192071 100195	1/4" x 3/8" 5/16" x 1/2" 5/16" x 3/4" 5/16" x 7/8" 3/8" x 5/8"	(6,4 x 9,5) (7,9 x 12,7 (7,9 x 19,0) (7,9 x 22,2) M 8 x 24 mm (9,5 x 15,9	SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT	10 10 10 10 10 15	1.4 1.4 1.4 1.4 1.4 2
100196 100198 113027 100171 123224	3/8" x 7/8" 3/8" x 1 1/8" 3/8" x 1 3/8" 3/8" x 1 3/8" 3/8" x 1 1/2" 3/8" x 1 11/16	(9,5 x 22,2 (9,5 x 28,6 (9,5 x 34,9 (9,5 x 38,1 (9,5 x 42,9)) SST-PAT) SST-PAT) SST-PAT) SST-PAT SST-PAT	15 15 15 15 15	2 2 2 2
100173 100199 100174 100175 100176 100168	3/8" x 2" 3/8" x 2 1/4" 3/8" x 2 1/2" 3/8" x 2 3/4" 3/8" x 3" 3/8" x 3 1/4"	(9,5 x 50,8 (9,5 x 57,2 (9,5 x 63,5 (9,5 x 69,9 (9,5 x 76,2 (9,5 x 82 6) SST-PAT) SST-PAT) SST-PAT) SST-PAT) SST-PAT) SST-PAT	15 15 15 15 15 15	2 2 2 2 2 2 2 2
100200 124460 100201 127551	3/8" x 3 1/2" 3/8" x 3 3/4" 5/8" x 1 1/2" 5/8" x 1 1/2"	(9,5 x 88,9 (9,5 x 95,2 (15,9 x 38, (15,9 x 38, ANTI-SEIZ) SST-PAT) SST-PAT 1)SST-PAT 1) SST-PAT 1) SST-	15 15 50 50	2 2 7 7
100203	5/8" x 2 1/4"	(15,9 x 57,	2)SST-PAT	50	7

Hex Cap Screws

(Si	izes	Re Mat'l	ecomm Torq	nended jue
Part #	Inches	mm	or Grade	Ft./I	lbs Kgm
100206 100208 100209 135682 135683 100214 121499 100216 131862	3/8" x 1" 3/8" x 1 1/2" 3/8" x 1 3/4" 3/8" x 3 1/8" 3/8" x 4 5/8" 3/8" x 5" 7/16" x 1 3/4" 1/2" x 1 1/4" 1/2" x 2 1/4"	(9,5 x 25,4) (9,5 x 38,1) (9,5 x 44,4) (9,5 x 79,3) (9,5 x 117,5) (9,5 x 127) (11,1 x 114,3) (12,7 x 31,7) (12,7 x 57,1)	SST-PAT SST-PAT SST-PAT SST-PAT SST-PAT) SST-PAT SST-PAT	15 15 15 15 15 15 15 20	2 2 2 2 2 2 2 2 2 2 2 2.8

	C :] Ma41	Recomme	ended
Part #	Inches	zes mm (or Grade	Ft./lbs	Kgm
100135 100147 116017 100148	5/16" x 1 1/4" 3/8" x 1 1/4" 3/8" x 1 1/2" 3/8" x 1 3/4"	(7,9 x 31,8) (9,5 x 31,8) (9,5 x 38,1) (9,5 x 44,5)) SST-PAT) SST-PAT) SST-PAT) SST-PAT	5 15 15 15	0.7 2 2 2

Flat Head Cap Screws (FHCS)



			R	ecommended	
	Si	zes	Mat'l	Torque	
Part #	Inches	mm	or Grade	Ft./lbs Kgm	
148686 100252* 151421 148765 130824*	3/8" x 3/4" 3/8" x 1 1/4" 3/8" x 1 1/2" 3/8" x 3 1/2" 1/2" x 2 1/4"	(9,5 x 19,0 (9,5 x 31,8 (9,5 x 38,1 (9,5 x 88,9 (12,5 x 57,	5) SST-PAT) SST-PAT) SST-PAT) SST-PAT 2) SST	13 1.8 13 1.8 13 1.8 13 1.8 13 1.8 20 2.8	

NOTE: These are recommended torque applications per fastener size. When fasteners are used with plastic or wood products, the torque specifications will be excessive and we recommend that the installer apply some caution when tightening the fasteners. Plastic or wood products should begin to deform slightly. Fasteners indicated with -"Pat" includes a locking patch type material and should cure for 72 hours for maximum strength.

Common Parts/Torque Chart 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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M landscape structures





SST SST

SST

(12,7) (15,9)

(28,6)

1/2"

5/8"

1 1/8"

100363

100366

123737

0.536 1.262 0.688 1.750

1.140 1.750

Curved Spring Washer



SAE Flat Washers



	Sizes		Mat'l or Grade			
Part #	Inches	mm	or Grude	I.D. O.D.		
100364 223956 100365 113550 129500	1/4" 5/16" 3/8" 1/2" 5/8"	(6,35) (7,92) (9,5) (12,7) (15,9)	SST SST SST SST SST	$\begin{array}{cccc} 0.281 & 0.625 \\ 0.344 & 0.688 \\ 0.411 & 0.816 \\ 0.531 & 1.062 \\ 0.686 & 1.342 \end{array}$		





Tee Nut (PlayBooster Clamps)















HOW TO DETERMINE BOLT LENGTHS



Rule: Measurements should be based on the part of the screw that penetrates the surface.



M landscape structures® SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

179891a



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— SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

179891b

DETAIL DIRECT BURY WITH POUR-IN-PLACE SURFACING

landscape structures[®]



DETAIL DIRECT BURY WITH POUR-IN-PLACE SURFACING (PEA GRAVEL)





Parts List

Part#	Description	Qty.
155157	Pod Climb Across, Specify Color	1
177938	60 ⁷ / _s " Long Pod Cable #1 Assembly	6
178984	56 ⁷ / _s " Long Pod Cable #2 Assembly	1
177932	Pod Bolt Plate, Specify Color	7
178586	1 ⁵ / ₁₆ " O.D. x 1 ⁵ / ₈ " Long AL. Spacer	7
190780	18 ⁹ / ₁₆ " Long (15 Links) Chain	3
196888	21 ³ / ₄ " Long (17 Links) Chain	1
196889	23" Long (18 Links) Chain	1
196890	24 ¹ / ₄ " Long (19 Links) Chain	1
196891	25 ¹ / ₂ " Long (20 Links) Chain	1
156203	Pod Climb Across Support, Specify Color	1
164367	Footer, Specify Color	7
156699	Ball Clamp, Specify Color	2
156700	Ball Retainer, Specify Color	2
154460	Pod, Specify Color	7
180147	Swiggle Stix Hardware Package	1
100196	³ / _o " x ⁷ / _o " BHCS w/Pin, SST	21
100198	³ / _o " x 1 ^{°1} / _o " BHCS w/Pin, SST	4
100201	⁵ / ₈ " x 1 ¹ / ₂ " BHCS w/Pin, SST	4
100292	$\frac{3}{8}$ x 1 $\frac{1}{4}$ BHCS w/Pin Limited Thread, SST	14
100365	³ / _g " SAE Flat Washer, SST	21
100611	$\frac{1}{4}$ " x $\frac{3}{8}$ " Drive Rivet, AL/SST	1
157704	⁷ / ₁₆ " x 2" BHCS w/Pin Limited Thread, SST	7
138915	Bolt Link, SST	14
157224	.439" I.D. x 1.156" Bushing, SST	7
156962	⁵ / ₈ " O.D. x ¹ / ₂ " Bushing, SST	7
127179	5/ " O.D. x 3/ " Bushing, SST	14
162729	Connecting Plug	14
100290	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin Limited Thread, SST	7

Specifications

1

Cable Assembly:	(Cable) Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypro- pylene core. (Cable Connectors) 6061-T6 alumi- num.	
Pod:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	
Chain:	Steel ¹ / ₄ " (6,35 mm) straight link chain, 3,150 lb (1428,82 kilograms) working load limit. Finish: ProGuard.	1
Pod Bolt Plate:	Weldment consists of ${}^{3/}_{16}$ " (4,75 mm) HRPO steel plate and ${}^{3/}_{8}$ " (9,53 mm) thick SST plate. Finish: ProShield [®] , color specified.	(
Ball Clamp/ Ball Retainer:	Cast from 356-T6 aluminum. Finish: ProShield, color specified.	
Pod Climb Across:	Weldment comprised of 2.375" (60,33 mm) O.D. RS20 (.095"105") (2,41 mm-2,67 mm) wall gal- vanized steel tubing, $\frac{3}{7_8}$ " (9,53 mm) thick stainless steel plate, and 1 $\frac{7}{8}$ " (47,63 mm) steel ball. Finish: ProShield, color specified.	
Support:	Fabricated from 2.375" (60,33 mm) O.D. RS20 (.095"105") (2,41 mm-2,67 mm) wall galvanized steel tubing. Finish: ProShield, color specified.	
Footer:	Weldment comprised of 1.660" (42,16 mm) O.D.	

RS20 (.120" - .130") (3,05 mm-3,30 mm) wall galvanized steel tubing and $\frac{3}{16}$ " (4,75 mm) HRPO sheet steel. ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Installation Time:	Approx. 4 $^{1}/_{2}$ man hours
Concrete Req.:	Approx. 10.25 cu. ft.
Area Req.:	6' (1,83 m) minimum use zone
Weight:	151 lbs.
Fall Height:	36" (910 mm)

Installation Instructions

- 1) (Direct Bury) Refer to the Site Plan for footing locations.
- 2) Attach ball retainers to 5" clamps using ⁵/₈" x 1 ¹/₂" BHCS w/pin. Fasten pod climb across to ball retainers using, ball clamps and ³/₈" x 1 ¹/₈" BHCS w/pin. Refer to the Ball Clamp Attachment Detail. NOTE: 5" Clamps may need to be turned, or moved up or down to connect and position pod climb across properly. Check to make sure pod climb across is level, if not adjust 5" clamps. Retighten 5" clamp fasteners when pod climb across is in proper position.
- 3) Slide support into pod climb across sleeve. Drill through hole in sleeve and into support with a $\frac{1}{4}$ or "F" (only) drill bit. Insert $\frac{1}{4}$ x $\frac{3}{8}$ rivet into hole and hammer rivet pin in until it is flush with head. Refer to the Support Attachment Detail.
- 4) Attach pod cable assemblies to pod climb across tabs using .439" I.D. x 1.156" bushings, connecting plugs and ⁷/₁₆" x 2" BHCS w/pin limited thread bolts. Refer to the Pod Cable Attachment Detail. NOTE: *Pod cable assemblies are numbered #1 and #2, and must be attached to pod climb across as shown.*
- 5) Feed cables through 1⁵/₁₆" O.D. x 1⁵/₈" long spacers and holes in pods. Attach pod bolt plates to cables, using ³/₈" x ⁷/₈" BHCS w/pin limited thread bolts and ⁵/₈" O.D. x ³/₈" bushings. Refer to the Pod Attachment Detail.
- 6) Attach pod bolt plates to pods, using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers. Refer to the Pod Attachment Detail.
- 7) Attach chains to pod bolt plates, using bolt links, ³/₈" x 1 ¹/₄" BHCS w/ pin limited thread bolts and ⁵/₈" O.D. x ³/₈" bushings. Refer to the Pod Attachment Detail. NOTE: Chains are different lengths, and must be attached to pod bolt plates as shown.
- 8) Attach footers to chains, using bolt links, $\frac{5}{8}$ O.D. x $\frac{1}{2}$ bushings, and $\frac{3}{8}$ x 1 $\frac{1}{4}$ BHCS w/pin limited thread bolts, as shown. Refer to the Footer Attachment Detail.
 - With support plumb and pod cable assemblies positioned properly, pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure.

(Direct Bury With Pour-In Place Surfacing) Cut 7 lengths of concrete form tubes (not supplied) long enough to set on top of concrete footings and be level with top of concrete slab. Concrete form tubes should be 8"-10" in diameter. Disconnect bolt links from pod bolt plates. Place concrete form tubes over chains and footers. Connect bolt links to pod bolt paltes. Fill concrete form tubes with pea gravel, sand or sub grade. Pour concrete slab. After concrete slab has cured, pour surfacing. **NOTE:** *When pouring surfacing leave a 1"-3" diameter opening around chains. Refer to the DirectBury Pour-In-Place Surfacing Detail.*

10) Install protective surfacing before users are allowed to play on the structure.



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	150	6448	O-Zone [®] Cl	imber		Sheet 2 of 3
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601 7TH STREET SOUTH, DELA

Evos[®]

SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Parl/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

161704b

SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

161704c

UUUL landscape structures





Evos® 156448 O-Zone® Climber 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

structures

Evos[®] 156448 O-Zone[®] Climber

Parts List

Part#	Description Q)ty.
154458	O-Zone Ring, Specify Color	.7
176231	O-Zone Cable 1A & 7A, 20"	.2
176232	O-Zone Cable 1B, 36 ⁵ / ₈ "	. 1
176233	O-Zone Cable 1C, 2C & 7C, 44 ⁵ / ₈ "	.3
176234	O-Zone Cable 2A & 6A, 29"	.2
176235	O-Zone Cable 2B & 5C, 38 ⁷ / ₈ "	.2
176236	O-Zone Cable 3A & 5A, 41"	. 2
176237	O-Zone Cable 3B, $34 \frac{1}{4}$ "	. 1
176238	O-Zone Cable 3C, $39\frac{5}{8}$ "	. 1
176239	O-Zone Cable 4A, 53"	. 1
176240	O-Zone Cable 4B, $24^{3}/_{4}$ "	. 1
176241	O-Zone Cable 4C, 30 ⁵ / ₁₆ "	. 1
176243	O-Zone Cable 5B, $35 \frac{3}{4}$. 1
176244	O-Zone Cable 6B, 43 ¹ / ₂ "	. 1
176245	O-Zone Cable 6C, 45 $5/\sqrt[6]{s}$ "	. 1
176246	O-Zone Cable 7B, 42 ⁷ / ₈ "	. 1
164367	Footer, Specify Color	.7
164009	O-Zone Ring Cap, Specify Color	21
192515	O-Zone Hardware Package	. 1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	84
100292	$\frac{3}{8}$ x 1 $\frac{1}{4}$ BHCS w/Pin Limited Thread, SST	.7
157704	^{7/} ₁₆ " x 2" BHCS w/Pin Limited Thread, SST	35
138915	Bolt Link, SST	.7
157224	.439" I.D. x 1.156" Bushing, SST	35
156962	⁵ / ₈ " O.D. x ¹ / ₂ " Bushing, SST	.7
100290	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin Limited Thread, SST	.7
162729	Connecting Plug	70
100365	³ / ₈ " SAE Flat Washer, SST	84

Specifications

Ring:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Cable A:	Made of tightly woven polyester-wrapped, six-strand- ed galvanized-steel cable with a polypropylene core. (Cable Connector) 6061-T6 aluminum. Finish: ProShield [®] , black in color. (Footing Connector) Fabricated from 1.250" O.D. 6061-T6 aluminum.
Cable B & C:	Made of tightly woven polyester-wrapped, six-strand- ed galvanized-steel cable with a polypropylene core. (Cable Connector) 6061-T6 aluminum. Finish: ProShield, black in color.
Ring Caps:	Fabricated from sand-cast alloy 356. Finish: Pro-Shield, color specified.
Footer:	Weldment comprised of 1.660" O.D. RS20 (.085"095" Wall) galvanized steel tubing and $3/_{16}$ " HRPO sheet steel. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Concrete Req.: Area Req.: Weight: Fall Height:	Approx. 5 man hours Approx. 9 cu. ft. 6' (1830 mm) minimum use zone 186 lbs. 88" (2240 mm)

Installation Instructions

- (Direct Bury) Refer to the Site Plan for footing locations. 1)
- 2) Attach ring caps to rings, using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers. Refer to the Ring Cap/Cable Attachment Detail.
- Attach Cable "A" with footing connector to ring cap tab located below 3) logo, using .439" I.D. x 1.156" bushings, connecting plugs and $\frac{7}{16}$ x 2" BHCS w/pin limited thread bolt. Attach cables "B" & "C" to remaining ring cap tabs as shown, using .439" I.D. x 1.156" bushings, connecting plugs and 7/16" x 2" BHCS w/pin limited thread bolts. Refer to the Ring Cap/ Cable Attachment Detail. NOTE: Cables are tagged 1A, 1B, 1C, 2A, 2B, 2C etc. Cable "A" is attached below logo, as shown.
- 4) Starting at the wide end of the arches, attach ring #1 to arch tabs using .439" I.D. x 1.156" bushings, connecting plugs and 7/16" x 2" BHCS w/pin limited thread bolt. NOTE: Make sure Cables "B" & "C" are attached to the correct arches. Cable "B" attaches to arch #2, Cable "C" attaches to arch #1.
- 5) Attach bolt links to footer connectors, using 3/8" x 7/8" BHCS w/pin limited thread bolts.
- Attach footers to footer connectors, using $\frac{5}{8}$ " O.D. x $\frac{1}{2}$ " bushings, 6) and 3/8" x 1 1/4" BHCS w/pin limited thread bolts, as shown. Refer to Footer Attachment Details.
- 7) Pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure. NOTE: Cables attached to footers should be taut and plumb.

(Direct Bury With Pour-In Place Surfacing) Cut 7 lengths of concrete form tubes (not supplied) long enough to set on top of concrete footings and be level with top of concrete slab. Concrete form tubes should be 8"-10" in diameter. Disconnect cables from bolt links. Place concrete form tubes over cables and footers. Connect cables to bolt links. Fill concrete form tubes with pea gravel, sand or sub grade. Pour concrete slab. After concrete slab has cured, pour surfacing. NOTE: When pouring surfacing leave a 1"-3" diameter opening around cables. Refer to the DirectBury Pour-In-Place Surfacing Detail.

8) Install protective surfacing before users are allowed to play on the structure

> Sheet 3 of 3 Document #19251400 205

Specifications are subject to change without notice



structures

Parts List

Part#	Description	Qty.
202572	Helix Net Assembly, Black	1
156213	Footer, Specify Color	2
166271	5" Clamp "A", Specify Color	2
166276	5" Clamp "O", Specify Color	1
166275	5" Clamp "E", Specify Color	1
156428	Short Helix Net Railing, Specify Color	1
156429	Long Helix Net Railing, Specify Color	1
156699	Ball Clamp, Specify Color	4
156700	Ball Retainer, Specify Color	4
127551	⁵ / ₈ " x 1 ¹ / ₂ " BHCS w/Pin, SST	8
156978	Helix Net Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100201	⁵ / ₈ " x 1 ¹ / ₂ " BHCS w/Pin, SST	8
100611	¹ / ₄ " x ³ / ₈ " Drive Rivet, AL/SST	2
157704	7/16" x 2" BHCS w/Pin Limited Thread, SST	20
157224	.439" I.D. x 1.156" Bushing, SST	20
162729	Connecting Plug	40

Specifications

In

5" Clamp:	Cast from 356-T6 aluminum. Finish: ProShield, color specified.
Ball Clamp/ Ball Retainer:	Cast from 356-T6 aluminum. Finish: ProShield [®] , color specified.
Helix Net Assy.:	(Net) Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a poly- propylene core. (Swage) $\frac{3}{4}$ " schedule 40 6061-T6 aluminum pipe. (S-Hooks) Fabricated from $\frac{5}{16}$ " diameter 316 stainless steel. (Cable Connectors) Fabricated from 6061-T6 aluminum.
Net Railing:	Weldment comprised of 2.375" O.D. RS40 (.130"140" Wall) galvanized steel tubing, 1.900" O.D. RS20 (.090"100" Wall) galvanized steel tubing, $3/_8$ " thick stainless steel plate, and 1 $7/_8$ " steel ball. Finish: ProShield, color specified.
Helix Net Footer:	Fabricated from 1.900" O.D. RS20 (.090"100" Wall) galvanized steel tubing. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Concrete Req.: Area Req.: Weight: Fall Height:	Approx. 2 ³ / ₄ man hours Approx. 2.5 cu. ft. 6'/1830 mm minimum use zone 165 lbs. 48"

Installation Instructions

- (Direct Bury) Refer to the Site Plan for footing locations. 1)
- Attach (2) 5" clamps to arches as shown, using $\frac{5}{8}$ " x 1 $\frac{1}{2}$ " BHCS w/ 2) pin (with gray anti-seize). Do not final tighten fasteners at this time, 5" round clamps will need to be adjusted to attach Helix net railings.
- Attach ball retainers to 5" clamps using $\frac{5}{8}$ " x 1 $\frac{1}{2}$ " BHCS w/pin. 3) Place supports in footing holes. Attach long and short net railings to ball retainers using ball clamps and 3/8" x 1 1/8" BHCS w/pin. Refer to the Helix Net Railing Attachment Detail. NOTE: Helix Net is not symmetrical and must be attached with $47 \frac{3}{4}$ & $92 \frac{1}{2}$ cable lengths positioned, as shown. 5" Clamps will need to be turned to connect, and position net railings properly.
- Attach helix net to long and short net railing tabs, using .439" I.D. x 4) 1.156" bushings, connecting plugs and 7/16" x 2" BHCS w/pin limited thread bolts. Spread long and short railings apart as far as possible to tighten net. Railing sleeves should be plumb. Refer to the Helix Net Attachment Detail. NOTE: When Helix net railings are in proper position, tighten 5" clamp fasteners.
- Insert supports into net railing sleeves. Drill through holes in sleeves 5) and into supports with a 1/4" or "F" (only) drill bit. Insert 1/4" x 3/8" rivets into holes and hammer rivet pins in until it is flush with head.
- Pour concrete footings. Allow concrete footings to cure for a minimum 6) of 72 hours before users are allowed to play on the structure.
- 7) Install protective surfacing before users are allowed to play on the structure.

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DETAIL





Parts List

Part#	Description	Qty.
155304	RingTangle Top, Specify Color	
155305	RingTangle Bottom, Specify Color	1
156699	Ball Clamp, Specify Color	2
156700	Ball Retainer, Specify Color	2
154461	E-Pod, Specify Color	2
156806	Pod Casting, Specify Color	2
156968	Pod Hardware Package	2
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
156973	RingTangle Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100201	5/8" x 1 1/2" BHCS w/Pin, SST	4
100611	¹ / ₄ " x ³ / ₈ " Drive Rivet, AL/SST	4

Specifications

Ball Clamp/	
Ball Retainer:	Cast from 535 almag. Finish: ProShield [®] , color specified.
RingTangle Top:	Weldment comprised of 1.315 O.D. RS20 (.080090 Wall) galvanized steel tubing, 2.375 O.D. RS20 (.095105 Wall) galvanized steel tubing, and $1^{7}/_{8}$ " steel ball. Finish: ProShield, color specified.
RingTangle Bottom:	Weldment comprised of 1.315 O.D. RS20 (.080090 Wall) galvanized steel tubing and 2.375 O.D. RS20 (.095105 Wall) galvanized steel tubing. Finish: ProShield, color specified.
E-Pod:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Pod Casting:	Fabricated from sand cast alloy 356 in accordance with ASTM B26. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Concrete Req.: Area Req.: Weight:	Approx. 2 ¹ / ₂ man hours Approx. 2.5 cu. ft. 6' (1,83 m) minimum use zone 198 lbs.

Fall Height: 66" (1,67 m)

Installation Instructions

7)

- 1) (Direct Bury) Refer to the Site Plan for footing locations.
- 2) Insert RingTangle bottom into RingTangle top, as shown. Drill through holes in RingTangle top and into RingTangle bottom with a 1/4" or "F" (only) drill bit. Insert 1/4" x 3/8" rivets into holes and hammer rivet pins in until it is flush with head. Refer to the RingTangle Assembly Detail
- 3) Attach ball retainers to 5" clamps using ⁵/₈" x 1 ¹/₂" BHCS w/pin. Attach RingTangle to ball retainers using ball clamps and ³/₈" x 1 ¹/₈" BHCS w/pin. Refer to the RingTangle Attachment Detail. NOTE: 5" Clamps may need to be turned to connect RingTangle and position properly. Retighten 5" clamp fasteners when RingTangle is in proper position.
- Attach e-pods and pod castings to arches at dimensions shown, using ³/₈" x 1 ¹/₈" BHCS w/pin.
- 5) Drill through hole in pod casting and into noodle post with a $\frac{1}{4}$ " or "F" (only) drill bit. Insert $\frac{1}{4}$ " x $\frac{5}{8}$ " rivet in hole and hammer rivet pin in until it is flush with head.
- 6) Pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure.
 - Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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Climbers 200677 Wee Planet[™] Climber Sheet 1 of 3 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185 © 2016 by Landscape Structures. All rights reserved. Document #21895400



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Document #21895400





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Climbers 200677 Wee Planet[™] Climber

Parts List

Part#	Description	Qty.
173361	Panel #1, Specify Color	1
173362	Panel #2, Specify Color	1
200597	Panel #3, Specify Color	1
173364	Table Panel, Specify Color	1
173365	Table Support, DB, Specify Color	1
173939	Table Support, SM, Specify Color	1
201389	Panel Footer, DB, Specify Color	1
201390	Panel Footer, SM, Specify Color	1
173367	Rail, Specify Color	2
173935	109º Angle Bracket, Specify Color	2
173936	140º Angle Bracket, Specify Color	12
217716	Wee Planet Climber Hardware Package	1
100195	3/8" x 5/8" BHCS w/Pin, SST	6
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	25
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	1
100349	³ / ₈ " Low Crown Cap Nut, SST	6
100353	³ / ₈ " Flange Nut w/Pin, SST	34
100365	³ / ₈ " SAE Flat Washer, SST	
151421	³ / ₈ " x 1 ¹ / ₂ " FHCS w/Pin, SST	6
183064	Warning Label	1
200332	Age Appropriate Label 2-12 Yrs.	1
111392	2-Hole (SM) Hardware Package	3
100266	¹ / ₂ " x 2 ³ / ₄ " Expansion Anchor	6
100322	1/2" Standard Hex Nut, SST	6
100363	¹ / ₂ " Flat Washer, SST	6
DB = Direct Bur	y	
SM = Surface M	ount	

Specifications

Permalene [®] , color specified.
Weldment comprised of 1.315" O.D. RS20 (.080" - 090" Wall) galvanized steel tubing and ${}^{1}\!/_{4}$ " HRPO flat steel. Finish: ProShield, color specified.
Weldment comprised of 1.315" O.D. RS20 (.080" - 090" Wall) galvanized steel tubing and ${}^{1}\!/_{4}$ " HRPO flat steel. Finish: ProShield, color specified.
Fabricated from 1.900" O.D. RS20 (.090"100" Wall) galvanized steel tubing and ${}^{3}\!/_{16}$ " HRPO steel sheet. Finish: ProShield, color specified.
Fabricated from 7 GA. (.188") HRPO Zinc plated- Finish: ProShield, color specified.
Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Approx. 2 ${}^{3}/_{4}$ man hours Approx. 3.93 cu. ft. 6' (1,83 m) minimum use zone DB = 127 lbs. SM = 124 lbs. 53" (1350 mm)

Installation Instructions

- (Direct Bury) Refer to the Plan View/Footing Layout. Refer to sheet 3 of 3.
- 2) Attach panels #1 and #2 to panel #3, using 140° brackets, ³/₈" x ⁵/₈" BHCS w/ pin with ³/₈" SAE flat washers and ³/₈" flange nuts with pin. Refer to the Wee Planet Climber Assembly Detail.
- 3) Attach rails to panel #3, using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers and $\frac{3}{8}$ " flange nuts with pin. Refer to the Wee Planet Climber Assembly Detail.
- 4) Attach rails to panels #1 and #2, using ³/₈" x ⁵/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" flange nuts with pin. Refer to the Wee Planet Climber Assembly Detail.
- 5) Attach table panel to panels #1 and #2, using 109° brackets, ³/₈" x ⁵/₈" BHCS w/ pin with ³/₈" SAE flat washers and ³/₈" flange nuts with pin. Refer to the Table Attachment Detail.
- 6) Attach table support to table panel, using ³/₈" x 1¹/₂" Flat Head Cap Screws w/ pin and ³/₈" low crown cap nuts with ³/₈" SAE flat washers. Refer to the Table Attachment Detail.
- 7) Attach table support to panels #1 and #2, using ³/₈" x 1 ¹/₂" Flat Head Cap Screws w/pin and ³/₈" low crown cap nuts with ³/₈" SAE flat washers. Refer to the Table Attachment Detail.
- Attach panel footer to panel #3, using ³/₈" x 1 ¹/₈"BHCS w/pin with ³/₈" SAE flat washer and ³/₈" flange nut w/pin. Refer to the Table Attachment Detail.
- 9) (Direct Bury) With panel footer and table panel support plumb and positioned properly, pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) Mark anchor bolt locations on concrete slab through holes in panel footer plate and table panel support plate. Drill $\frac{1}{2}$ " x 3" deep holes on marks into concrete using a hammer drill and $\frac{1}{2}$ " masonry bit. Tap expansion anchors into drilled holes. Fasten panel footer plate and table panel support plate to expansion anchors, using $\frac{1}{2}$ " standard hex nuts with $\frac{1}{2}$ " flat washers.

- 10) Apply labels, as shown.
- 11) Install protective surfacing before users are allowed to play on the structure.
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PlayBooster® 176081 Canyon Climber, 16"-72" Deck 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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Parts List

Part#	Description	Qty.
176030	End Bracket, Specify Color	2
176031	Canyon Climber, Specify Color	1
176343	Canyon Climber Hardware Package	1
113027	3/8" x 1 3/8" BHCS w/Pin, SST	4
100198	3/8" x 1 1/8" BHCS w/Pin, SST	4
100349	³ / ₈ " Low Crown Cap Nut, SST	4
100327	3/8" Standard Hex Nut, SST	4
100365	³ / ₈ " SAE Flat Washers, SST	
100362	³ / ₈ " Flat Washers, SST	4

Specifications

Canyon Climber:	Weldment comprised of 1.315" O.D. RS20 (.080"090" wall) galvanized steel tube, 1.900" O.D. RS40 (.120"130" wall) galvanized steel tube, and $\frac{3}{8}$ " HRPO steel sheet. Finish: ProShield, color specified.
End Bracket:	Weldment comprised of 1.315" O.D. RS20 (.080"090" wall) galvanized steel tube, $1/_4$ " HRPO steel sheet, and $3/_{16}$ " HRPO steel sheet. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).
Installation Time: Weight: Fall Height:	Approx. 1 man hour 112 lbs. Deck Height + 4" (100 mm)

Specifications are subject to change without notice.

- Attach Canyon climber to end brackets, using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" low crown cap nuts with ³/₈" SAE flat washers, as shown. Refer to Detail.
- 2) Set Canyon climber onto decks. Fasten Canyon climber and end brackets to decks, using ³/₈" x 1 ³/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" standard hex nuts with ³/₈" flat washers, as shown. Refer to Detail.
- 3) Install protective surfacing before users are allowed to play on the component.



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PlayBooster® 152907 Deck Link, w/ Barriers

Parts List

Part#	Description	Qty.
144696	1-Step Section, Specify Color	1
144698	2-Step Section, Specify Color	1
144700	3-Step Section, Specify Color	1
144702	4-Step Section, Specify Color	1
144703	1-Step Barrier, Specify Color	2
144705	2-Step Barrier, Specify Color	2
144707	3-Step Barrier, Specify Color	2
144709	4-Step Barrier, Specify Color	2
153896	Lower Panel, Specify Color	2
153895	Upper Panel, Specify Color	2
113468	Spacer Tube, Specify Color	4
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	4
105327	5" Half Clamp, Specify Color	4
113729	Offset Hanger Clamp, Specify Color	4
156283	Deck Link Barr/Hrail Hardware Package	1
100168	³ / ₈ " x 3 ¹ / ₄ " BHCS, SST	4
100196	3/8" x 7/8" BHCS w/Pin, SST	12
100198	3/8" x 1 1/8" BHCS w/Pin, SST	16
100327	3/8" Standard Hex Nut, SST	12
100351	³ / ₈ " Tee Nut, SST	8
100353	³ / ₈ " Flange Nut w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	36

Specifications

Panels:	Zinc plated 7 GA. (.179") HR flat steel. Finish: $ProShield^{\circ}$, color specified.
Step Section:	Formed from 12 GA (.105) sheet steel conforming to ASTM A1011. Standing surface is $24^{3}/_{8}$ " wide x 14" deep and is perforated with $5/_{16}$ " diameter holes. Finish: TenderTuff, color specified.
Barrier:	Weldment comprised of 1.125" O.D. x 11 Ga. (.120" wall) steel tubing, $\frac{5}{8}$ " O.D. steel bar with 203 or 303 stainless steel inserts with $\frac{3}{8}$ " internal threads. Finish: TenderTuff, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}"$ O.D. x 1 $^{11}\!/_{16}".$ Finish: ProShield, color specified.
Clamps:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).
Installation Time: Weight:	Approx. 1 ¹ / ₂ man hours 1-Step - 130 lbs. 2-Step - 182 lbs. 3-Step - 236 lbs. 4-Step - 296 lbs.
Fall Height:	Deck Height

- Attach step section to decks using ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" standard hex nuts with ³/₈" SAE flat washers, as shown. Refer to the Step Section To Deck Attachment Detail.
- Attach upper and lower panels to the face of the deck using ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" standard hex nuts with ³/₈" SAE flat washers. Refer to the Panel to Deck Attachment Detail.
- 3) Attach offset hanger clamps to posts at heights shown using 5" half clamps, ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 4) Attach upper and lower panels to offset hanger clamps using ³/₈" x 3 ¹/₄" BHCS with ³/₈" SAE flat washers, spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel To Clamp Attachment Detail.
- 5) Attach barriers to upper and lower panels using $3/8" \times 7/8"$ BHCS w/pin and 3/8" SAE flat washers, as shown.
- Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 7) Install protective surfacing before users are allowed to play on the structure.



PLAN VIEW/FOOTING LAYOUTS

FOOTINGS/ 1-STEP



Deck Deck

FOOTINGS/ 2-STEP

FOOTINGS/ 3-STEP



Deck Deck

FOOTINGS/ 4-STEP





Sheet 1 of 2 Document #17911300



PlayBooster[®] 178957 Snake Climbers, w/ Vibe[®] Handholds, 48"-72"

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Parts List

Part#	Description	Qty.
100610-00	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
105327-01	5" Half Clamp, Specify Clamp	2
113468-00	Spacer Tube, Specify Color	2
113729-00	Offset Hanger Clamp, Specify Color	2
142047-00	Snake Climber, 48" & 56", Specify Color	1
142048-00	Snake Climber, 64" & 72", Specify Color	1
142084-00	Support, 48" & 64" Deck (DB), Specify Color	2
142083-00	Support, 56" & 72" Deck (DB), Specify Color	2
142101-00	Support, 48" Deck (SM), Specify Color	2
142103-00	Support, 56" Deck (SM), Specify Color	2
142105-00	Support, 64" Deck (SM), Specify Color	2
142107-00	Support, 72" Deck (SM), Specify Color	2
177645-00	Roto Double Handhold, Right, Specify Color	1
177646-00	Roto Double Handhold, Left, Specify Color	1
178742-00	Double Handhold Infill, Specify Color	2
182512-00	Rivets/O-Rings Hardware Package	1
182457-00	O-Ring	6
160020-00	Snap Rivet. Male	6
160021-00	Snap Rivet, Female	6
	1	
179892-00	Snake Climber Hardware Package	1
100168-00	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	2
100195-00	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	8
100196-00	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	4
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	6
100327-00	3/8" Standard Hex Nut, SST	6
100351-00	³ / ₈ " Tee Nut, SST	4
100353-00	3/8" Flange Nut w/Pin, SST	2
100362-00	³ / ₈ " Flat Washer, SST	6
100365-00	³ / ₈ " SAE Flat Washer, SST	16
100611-00	$^{1}/_{4}$ " x $^{3}/_{8}$ " Drive Rivet, AL/SST	4
121348-00	4 Hole (SM) Hardware Package	1
100266-00	¹ / ₂ " x 2 ³ / ₄ " Expansion Anchor	4
100322-00	1/2" Standard Hex Nut, SST	4
100363-00	¹ / ₂ " Flat Washer, SST	4
DB=Direct Bury	y .	
SM=Surface Mo	ount	

Specifications

Climber:	Weldment comprised of 1.660" (42,16 mm) O.D. RS- 40 (.111"121") (2,82 mm-3,07 mm) galvanized steel tubing, $^{1}/_{4}$ " (6,35 mm) thick HR steel plate and 1.315" (33,40 mm) O.D. RS-20 (.080"090") (2,03 mm- 2,29 mm) galvanized steel tubing. Finish: ProShield [®] , color specified.
Supports:	Formed from 1.660" (42,16 mm) O.D. RS-40 (.111"121") (2,82 mm-3,07 mm) galvanized steel tubing. Finish: ProShield, color specified.
Handhold Infill :	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield, color specified.
Roto Handhold:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.

Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}$ " (22,23 mm) O.D. x 1 $^{11}\!/_{16}$ " (42,85 mm). Finish: ProShield, color specified.
Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).
Installation Time:	SM - Approx. 1^{3}_{4} man hours DB - Approx. 2^{3}_{4} man hours
Concrete Reg.:	Approx. 2.6 cu. ft.
Weight:	Off 48" & 56" Deck (SM) - 123 lbs.
0	Off 48" & 56" Deck (DB) - 131 lbs.
	Off 64" & 72" Deck (SM) - 128 lbs.
	Off 64" & 72" Deck (DB) - 136 lbs.
Fall Height:	Deck Height

Installation Instructions

- 1) **(Direct Bury)** Dig footing holes spaced as shown. Refer to the Elevation Key.
- 2) Insert supports into snake climber. Attach snake climber to deck using ³/₈" x I ¹/₈" BHCS w/pin with ³/₈" SAE flat washers (small)and ³/₈" standard hex nuts with ³/₈" flat washers (large). Refer to the Deck Attachment Detail.
- 3) With supports plumb, drill through holes in snake climber into supports with a ¹/₄" or "F" (only) drill bit. Insert ¹/₄" x ³/₈" drive rivets in holes and hammer drive rivet pin in until flush with head. Refer to the Support Attachment Detail.
- Attach roto handholds to handhold infill panels, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 5) Attach handhold infill panels to deck, using ${}^{3}/{}_{8}$ " x ${}^{7}/{}_{8}$ " BHCS w/pin with ${}^{3}/{}_{8}$ " SAE flat washers (small) and ${}^{3}/{}_{8}$ " standard hex nuts with ${}^{3}/{}_{8}$ " flat washers (large).
- 6) Attach offset hanger clamps to handhold infill panels, using ³/₈" x 3 ¹/₄" BHCS w/pin, ³/₈" SAE flat washers (small), spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 7) Attach offset hanger clamps to post, using 5" half clamps, ³/₈" x 1 ¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- Install snap rivets and o-rings through unused ¹/₂" diameter holes in handhold infill panels. Refer to the Snap Rivet Attachment Detail.
- 9) (**Direct Bury**) With snake climber in final position, pour concrete footings. Allow concrete footings to cure a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) Mark anchor bolt locations on concrete slab through holes in anchor plate and remove climber. Drill $\frac{1}{2}$ " x 3" deep holes on marks into concrete using hammer drill and $\frac{1}{2}$ " masonry bit. Tap expansion anchors into drilled holes. Reposition climber and reattach to the face of the deck following step 3. Fasten anchor plates to expansion anchors using $\frac{1}{2}$ " standard hex nuts with $\frac{1}{2}$ " flat washers.

10) Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)



PlayBooster® 178957 Snake Climbers, w/ Vibe® Handholds, 48"-72" 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185



structures

PlayBooster® 178962 SpaceWalk, w/ Vibe® Handholds, Deck to Deck, 32"-48"

Parts List

Part#	Description Qty.
100610	$^{1}/_{4}$ " x $^{5}/_{8}$ " Drive Rivet, AL/SST
105327	5" Half Clamp, Specify Color 16
113468	$\frac{7}{8}$ " O.D. x 1 $\frac{11}{16}$ " Spacer Tube, Specify Color 4
113729	5" Offset Hanger Clamp, Specify Color 4
145154	Spacer Bar, Specify Color 2
161898	Net Clamp, Specify Color 8
202598	Net, Specify Color 1
171211	Net Face Plate, Specify Color 2
177534	Roto Double Handhold, Left, Specify Color 2
177535	Roto Double Handhold, Right, Specify Color 2
178740	Double Handhold Infill Panel, Specify Color 4
180209	SpaceWalk Climber Hardware Package 1
100168	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST 4
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST 20
100290	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin Ltd. Thread Bolt, SST 12
100327	³ / ₈ " Standard Hex Nuts, SST 12
100351	³ / ₈ " Tee Nut, SST
100353	³ / ₈ " Flange Nut w/Pin, SST 4
100362	³ / ₈ " Flat Washer, SST
100365	³ / ₈ " SAE Flat Washer, SST
127179	$^{5}\!/_{8}"$ O.D. x $^{3}\!/_{8}"$ Bushing, SST 12
182512	Rivets/O-Rings Hardware Package 2
182457	O-Ring
160020	Snap Rivet, Male 12
160021	Snap Rivet, Female 12

Specifications

Net:	Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypropylene core. Connector fabricated from 1.250" (31,75 mm) O.D. 6061-T6 aluminum.	6)
Net Face Plate:	Fabricated from $^{1}/_{4}$ " (6,35 mm) HRPO sheet steel. Finish: ProShield [®] , color specified.	
Spacer Bar:	Weldment comprised of 1.660" (42,16 mm) O.D. RS40 (.111"121") (2,82 mm-3,07 mm) galvanized steel tubing and $1/4$ " x 1 $3/4$ " (6,35 mm x 44,45 mm) steel half clamps. Finish: ProShield, color specified.	7)
Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield, color specified.	
Roto Handhold:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	8)
Spacer Tubes:	Made from 6061-T6 aluminum $^{7/8}$ " (22,23 mm) O.D. Finish: ProShield, color specified.	9)
Net Clamp:	Weldment comprised of $^{1}/_{4}$ " x 1 $^{3}/_{4}$ " (6,35 mm x 44,45 mm) HRPO flat steel and .375" (9,53 mm) stainless	
	steel sheet. Finish: ProShield, color specified.	10
		11)
		12

Specifications are subject to change without notic

Clamps: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Installation Time:	Approx. 2 man hours
Weight:	245 lbs.
Fall Height:	49" (32" Deck Height)
_	57" (40" Deck Height)
	65" (48" Deck Height)

Installation Instructions

- Attach offset hanger clamps to posts at height shown, using 5" half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- 2) Attach net clamps to posts at height shown, using 5" half clamps and ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Net To Post Attachment Detail. NOTE: Lower net clamp assemblies will be turned in slightly, as shown. Refer to Detail.
- Attach roto handholds to handhold infill panels, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 4) Attach handhold infill panels and net face plate to the face of the deck using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large). Refer to the Net Face Plate Attachment Detail.
- 5) Attach handhold infill panels to offset hanger clamp assemblies, using ³/₈" x 3 ¹/₄" BHCS w/pin, ³/₈" SAE flat washers (small), spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 6) Attach net face plate to the face of the deck using ³/₈" x 1 ¹/₈" BHCS w/ pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large). Refer to the Net Face Plate Attachment Detail.
- 7) With mainstructure posts and decks in position, attach spacer bars to mainstructure posts and net face plates using 5" half clamps, 3 ¹/₂" BHCS w/pin with ³/₈" SAE flat washers (small), ⁷/₈" O.D. x 2 ¹/₈" spacer tubes and ³/₈" tee nuts. Fasten 5" half clamps to spacer bars using ³/₈" x ⁷/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Net Face Plate/Spacer Bar Attachment Detail.
 - Insert $\frac{5}{8}$ " O.D. x $\frac{3}{8}$ " bushings into net clamp tabs. Attach net to net clamps with bushings, using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin limited thread. Refer to the Net to Post Attachment Detail.
- 9) Insert ⁵/₈" O.D. x ³/₈" bushings into net face plate tabs. Attach net to net face plate, using ³/₈" x ⁷/₈" BHCS w/pin limited thread. Refer to the Net Face Plate Attachment Detail.
- Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Refer to the Offset Hanger Clamp Spec Sheet.
- Install snap rivets and o-rings through unused ¹/₂" diameter holes in handhold infill panels. Refer to the Snap Rivet Attachment Detail.
- 12) Install protective surfacing before users are allowed to play on the structure.

Eco #0100303 Document #20772100 replaces #17910200. Replaced Net.





PlayBooster® 178962 SpaceWalk, Deck to Deck, w/ Vibe® Handholds, 32"-48" 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Heightof the adjacent equipment. (Ref. ASTM

F1487.)

179102b

DETAIL SNAP RIVET ATTACHMENT (FOR FILLING UNUSED 1/2" DIAMETER HOLES)



PlayBooster[®] 178962 SpaceWalk, Deck to Deck, w/ Vibe[®] Handholds, 32"-48" 601 7th street south, Delano, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185



Surfacing



17909400

³/₈" Flange

Nut w/Pin

Typical Offset

Hanger Clamp

Spacer Tube

Assembly

34 ["] 864

DETAIL PANEL ATTACHMENT PLAN VIEW/FOOTING LAYOUT (4) $^{3}\!/_{8}$ " x $^{5}\!/_{8}$ " BHCS w/Pin w/ $^{3}\!/_{8}$ " SAE Flat 11 ¹/₂" 14" Post Washers 292 356 Handhold (Small) Infill --Panel 23 Handhold Roto 254 10" Infill Handhold 24" Deck Panel Roto Handhold NOTE: If there is a clamp Typical PlayBooster ³/₈" x 3 ¹/₄" BHCS w/Pin conflict, use this hole to Post attach panel to clamp. Top of w/ ³/₈" SAE Flat Washer Clamp (2) ³/₈" x ⁷/₈" BHCS w/Pin (Small) DETAIL w/ ³/₈" SAE Flat Washers SURFACE MOUNT (8) 1/2" Standard (Small) Hex Nuts w/ 1/2 (2) Supports 曲 3/₈" Flat Washers 35 ³ 908 (8) ¹/₂" x 2 ³/₄ Expansion Anchors <u>૱૱૱ૼ૱</u>૱૱૱૱૱૱ Concrete NOTE: Sufficient protective surfacing must cover Crushed hardware to satisfy fall Top of Handloop Rock height requirements. Deck (Optional) 24" Deck DETAIL (2) ³/₈" x ⁷/₈" BHCS w/Pin **DIRECT BURY** O. w/ 3/8" SAE Flat (2) ³/₈" _____ Standard Hex Washers Support (Small) Loose Fill [°]20" Nuts w/ 3/8" Protective Flat Washers Surfacing (Large) Minimum Subgrade ^O 10" 4 ٩.: 20" 508 Protective **DETAIL** Concrete **DISC ATTACHMENT** Disć Support Crushed 12' Rock 305 (2) Discs NOTE: The 24" deck height requires a minimum of one handhold panel. The (6) ³/₈" x ⁷/₈" BHCS w/Pin w/ ³/₈" SAE handhold panel can be (2) Supports mounted on either side. Flat Washers





PlayBooster® 179013 Pod Climber®, w/Vibe® Handholds, 24"

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Parts List

Part#	Description Qty
100610-00	1/4" x $5/8$ " Drive Rivet, SST
105327-01	5" Half Clamp, Specify Color 1
113468-00	Spacer Tube, Specify Color 1
113729-00	Offset Hanger Clamp, Specify Color 1
126956-00	Disc, Specify Color 2
135553-00	Handloop, (Optional) Specify Color 1
156623-00	Support 10" (SM), Specify Color 1
156624-00	Support 10" (DB), Specify Color 1
156625-00	Support 20" (SM), Specify Color 1
156627-00	Support 20" (DB), Specify Color 1
177534-00	Roto Double Handhold, Left, Specify Color 1
177535-00	Roto Double Handhold, Right, Specify Color 1
178740-00	Double Handhold Infill Panel, Specify Color 1
184986-00	Disc Climber Hardware Package 2
100196-00	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST
100365-00	³ / ₈ " SAE Flat Washer, SST 6
180736-00	Single Vibe Handhold Hardware Package
100168-00	3/8" x 3 $1/4$ " BHCS w/Pin, SST 1
100195-00	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin. SST
100196-00	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin. SST
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST
100327-00	³ / ₈ " Standard Hex Nut, SST
100351-00	³ / ₈ " Mod T-Nut, SST
100353-00	³ / ₈ " Flange Nut w/Pin, SST 1
100362-00	³ / ₈ " Flat Washer, SST
100365-00	³ / ₈ " SAE Flat Washer, SST 7
180226-00	Handrail/Handloop Hardware Pkg. (Optional) 1
100196-00	$^{3}/_{8}$ " x $^{7}/_{8}$ " BHCS w/Pin. SST
100365-00	³ / ₈ " SAE Flat Washer, SST 3
121348-00	4 Hole (SM) Hardware Package 2
100266-00	$\frac{1}{2}$ " x 2 $\frac{3}{4}$ " Expansion Anchor
100322-00	$\frac{1}{2}$ Standard Hex Nut. SST
100363-00	¹ / ₂ " Flat Washer, SST
182512-00	Rivets/O-Rings Hardware Package 1
182457-00	O-Ring
160020-00	Snap Rivet, Male
160021-00	Snap Rivet, Female
DB = Direct Bu	ry
() A A	

SM=Surface Mount

Specifications

Disc:	Rotationally molded from U.V. stabilized linear low density polyethylene, disc measures 14" (356 mm) in diameter x 7" (178 mm) high, color specified.	0)
Handloop:	Weldment comprised of 1.125" (28,58 mm) O.D. 11 GA (.120") (3,05 mm) steel tubing with 203 or 303 stainless steel inserts, with $\frac{3}{8}$ " (9,53 mm) internal thread. Finish: TenderTuff [®] , color specified.	7)
Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield [®] , color specified.	0)
Roto Handhold:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	9)
		10

Support:	Weldment comprised of 1.900" (48,26 mm) O.D. RS- 20 (.090"100") (2,29 mm-2,54 mm), 1.315" (33,40 mm) O.D. RS-20 (.080"090") (2,03 mm-2,29 mm) and ${}^{3}{}_{16}$ " x 5" (4,75 mm x 127 mm) diameter plate. Finish: ProShield, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}"$ (22,23 mm) O.D. x 1 $^{11}\!/_{16}"$ (42,85 mm). Finish: ProShield, color specified.
Offset Hanger	
Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	SM - Approx. 1 $\frac{1}{2}$ man hour
	DB - Approx. $2^{1/4}$ man hour
Concrete Req.: Weight:	Approx. 2.6 cu. ft.
weight:	53 lbs. (SM) One Handhold
	55 lbs. (DB) One Handhold & Handloop
	57 lbs. (SM) One Handhold & Handloop
Fall Height:	Deck Height

Installation Instructions

- (Direct Bury) Dig footings spaced as shown. See your Plan View/ Footing Layout.
- 2) Attach discs to supports using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers (small), as shown.
- 3) (Direct Bury) Position supports in footing holes and pour concrete footings. With support posts plumb, prop supports to hold in position. Allow concrete footings to cure a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) Mark anchor bolt locations on concrete slab through holes in anchor plates. Remove supports with disc. Drill $1/2" \times 3"$ deep holes on marks into concrete using hammer drill and 1/2" masonry bit. Tap expansion anchors into drilled holes. Fasten anchor plates to expansion anchors using 1/2" standard hex nuts with 1/2" flat washers.

- Attach roto handhold to handhold infill panel, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 5) Attach handhold infill panel to deck, using $3/8" \times 7/8"$ BHCS w/pin with 3/8" SAE flat washers (small) and 3/8" standard hex nuts with 3/8" flat washers (large).
- 6) Attach offset hanger clamp to handhold infill panel, using ³/₈" x 3 ¹/₄" BHCS w/pin, ³/₈" SAE flat washers (small), spacer tube and ³/₈" flange nut w/pin. Refer to the Panel Attachment Detail.
-) Attach offset hanger clamp to post, using 5" half clamp, ³/₈" x 1 ¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- Attach handloop (optional) to handhold panel using $\frac{3}{8}$ " x 1 $\frac{3}{8}$ " BHCS w/pin.
-) Install snap rivets and o-rings through unused ¹/₂" diameter holes in handhold infill panel. Refer to the Snap Rivet Attachment Detail.
- 0) Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)





PlayBooster® 179013 Pod Climber®, w/Vibe® Handholds, 24" Sheet 2 of 2 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX:7763) 972-3185 © 2012 by Landscape Structures. All rights reserved. Document #18500500





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM 51497)

17908900



 PlayBooster®
 179018 Logo Climber, w/ Vibe® Handholds, 56"-64"
 Sheet 1 of 2

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Parts List

Part#	Description	Qty.	
100610-00	$\frac{1}{4}$ " x $\frac{5}{8}$ " Drive Rivet, AL/SST	. 2	
105327-01	5" Half Clamp, Specify Color	. 2	
113468-00	$\frac{7}{8}$ " O.D. x 1 $\frac{11}{16}$ " Spacer Tube, Specify Color	. 2	
113729-00	5" Offset Hanger Clamp, Specify Color	. 2	
176034-00	56"-64" Logo Climber, DB, Specify Color	. 1	
176292-00	56" Logo Climber, SM, Specify Color	. 1	
176293-00	64" Logo Climber, SM, Specify Color	. 1	
177534-00	Roto Double Handhold, Left, Specify Color	. 1	
177535-00	Roto Double Handhold, Right, Specify Color	. 1	
178740-00	Double Handhold Infill Panel, Specify Color	. 2	
180229-00	Logo Climber Hardware Package	. 1	
100168-00	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	. 2	
100195-00	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	. 8	
100196-00	3/8" x 7/8" BHCS w/Pin, SST	. 4	
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	. 6	
100327-00	³ / ₈ " Standard Hex Nut, SST	. 6	
100351-00	³ / ₈ " Mod T-Nut, SST	. 4	
100353-00	3/8" Flange Nut w/Pin, SST	. 2	
100362-00	³ / ₈ " Flat Washer, SST	. 6	
100365-00	³ / ₈ " SAE Flat Washer, SST	16	
182512-00	Rivets/O-Rings Hardware Package	. 1	
182457-00	O-Ring	. 6	
160020-00	Snap Rivet, Male	. 6	
160021-00	Snap Rivet, Female	. 6	
111392-00	2-Hole (SM) Hardware Package	. 1	
100266-00	¹ / ₂ " x 2 ³ / ₄ " Expansion Anchors	. 2	
100322-00	¹ / ₂ " Standard Hex Nut, SST	. 2	
100363-00	¹ / ₂ " Flat Washer, SST	. 2	
DB = Direct Bury			
SM = Surface Mount			

Specifications

Logo Climber:	Weldment comprised of 2.375" (60,33 mm) O.D. RS40 (.130"140") (3,30 mm-3,56 mm) wall galvanized steel tube, 1.029" (26,14 mm) O.D. RS20 (.070"080") (1,78 mm-2,03 mm) wall galvanized steel tube, and $^{1}/_{4}$ " (6,35 mm) HRPO steel sheet. Finish: ProShield [®] , color specified.
Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield, color specified.
Roto Handhold:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}$ " (22,23 mm) O.D. x 1 $^{11}\!/_{16}$ " (42,85 mm). Finish: ProShield, color specified.
Clamps:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) perASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).

Specifications are subject to change without notice.

Installation Time:	SM - Approx. $1^{1/2}$ man hours
	DB - Approx. 2 man hours
Concrete:	DB - Approx. 1.31 cu. ft.
Weight:	DB 122 lbs. (56"-64")
	SM 111 lbs. (56")
	SM 115 lbs. (64")
Fall Height:	Deck Height

Installation Instructions

- 1) (Direct Bury) Dig footing hole spaced as shown.
- Attach roto handholds to handhold infill panels, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 3) Attach handhold infill panels to deck, using $3/8" \ge 7/8"$ BHCS w/pin with 3/8" SAE flat washers (small) and 3/8" standard hex nuts with 3/8" flat washers (large).
- 4) Attach offset hanger clamps to handhold infill panels, using ³/₈" x 3 ¹/₄" BHCS w/pin, ³/₈" SAE flat washers (small), spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- Attach offset hanger clamps to posts, using 5" half clamps, ³/₈" x 1¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 6) Attach Logo climber to deck, using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large).
- Install snap rivets and o-rings through unused ¹/₂" diameter holes in handhold infill panels. Refer to the Snap Rivet Attachment Detail.
- 8) Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Drill through hole in 5" half clamp and into 5" post with a ¹/₄" or "F" (only) drill bit, insert drive rivet into hole through clamp and into post. Hammer drive rivet pin in until flush with head. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 9) (**Direct Bury**) With Logo climber plumb, pour concrete footing. Allow concrete footing to cure for a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) With Logo climber plumb, drill $\frac{1}{2}$ " x 3" deep holes through mounting plates using hammer drill and $\frac{1}{2}$ " masonry bit. Tap expansion anchors into drilled holes. Fasten mounting plates to expansion anchors, using $\frac{1}{2}$ " standard hex nuts with $\frac{1}{2}$ " flat washers.

10) Install protective surfacing before users are allowed to play on the component.



DETAIL SNAP RIVET ATTACHMENT (FOR FILLING UNUSED 1/2" DIAMETER HOLES)









Choose a protective surfacing material that

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

179089a

PLAN VIEW/FOOTING LAYOUT





PlayBooster[®] 179018 Logo Climber, w/ Vibe[®] Handholds, 56"-64"

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Parts List

Part#	Description	Qty.
100610-00	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
105327-01	5" Half Clamp, Specify Color	2
113468-00	⁷ / ₈ " O.D. x 1 ¹¹ / ₁₆ " Spacer Tube, Specify Color	2
113729-00	5" Offset Hanger Clamp, Specify Color	2
175873-00	48"-56" Lollipop Climber, DB, Specify Color	1
175871-00	64"-72" Lollipop Climber, DB, Specify Color	1
176115-00	48" Lollipop Climber, SM, Specify Color	1
176116-00	56" Lollipop Climber, SM, Specify Color	1
176117-00	64" Lollipop Climber, SM, Specify Color	1
176118-00	72" Lollipop Climber, SM, Specify Color	1
177534-00	Roto Double Handhold, Left, Specify Color	1
177535-00	Roto Double Handhold, Right, Specify Color	1
178740-00	Double Handhold Infill Panel, Specify Color	2
180230-00	Lollipop Climber Hardware Package	1
100168-00	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	2
100195-00	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	8
100196-00	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	4
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	6
100327-00	³ / ₈ " Standard Hex Nut, SST	6
100351-00	³ / ₈ " Mod T-Nut, SST	4
100353-00	³ / ₈ " Flange Nut w/Pin, SST	2
100362-00	³ / ₈ " Flat Washer, SST	6
100365-00	3/8" SAE Flat Washer, SST	16
182512-00	Rivets/O-Rings Hardware Package	1
182457-00	O-Ring	6
160020-00	Snap Rivet, Male	6
160021-00	Snap Rivet, Female	6
111392-00	2-Hole (SM) Hardware Package	1
100266-00	¹ / ₂ " x 2 ³ / ₄ " Expansion Anchors	2
100322-00	1/2" Standard Hex Nut, SST	2
100363-00	¹ / ₂ " Flat Washer, SST	2
DB = Direct Bur	y	

SM = Surface Mount

Specifications

Lollipop Climber:	Weldment comprised of 1.315" (33,40 mm) O.D. RS20 (.080"090") (2,03 mm-2,29 mm) wall galvanized steel tube, 2.375" (60,33 mm) O.D. RS20 (.095"105") (2,41 mm-2,67 mm) wall galvanized steel tube, $^{1}/_{4}$ " (6,35 mm) HRPO steel sheet and 10 GA. (.135") (3,43 mm) HRPO steel. Finish: ProShield [®] , color specified.
Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield, color specified.
Roto Handhold:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}$ " (22,23 mm) O.D. x 1 $^{11}\!/_{16}$ " (42,85 mm). Finish: ProShield, color specified.
Clamps:	Cast aluminum. Finish: ProShield color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).

Specifications are subject to change without notice.

Installation Time:	SM - Approx. $1^{-1}/_{2}$ man hours
	DB - Approx. 2 man hours
Concrete:	DB - Approx. 1.31 cu. ft.
Weight:	DB 89 Îbs. (48"-56")
0	DB 98 lbs. (64"-72")
	SM 85 lbs. (48")
	SM 86 lbs. (56")
	SM 93 lbs. (64")
	SM 95 lbs. (72")
Fall Height:	Deck Height

Installation Instructions

- 1) (Direct Bury) Dig footing hole spaced as shown.
- Attach roto handholds to handhold infill panels, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 3) Attach handhold infill panels to deck, using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers (small) and $\frac{3}{8}$ " standard hex nuts with $\frac{3}{8}$ " flat washers (large).
- 4) Attach offset hanger clamps to handhold infill panels, using ³/₈" x 3 ¹/₄" BHCS w/pin, ³/₈" SAE flat washers (small), spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- Attach offset hanger clamps to posts, using 5" half clamps, ³/₈" x 1¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 6) Attach Lollipop climber to deck, using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large).
- Install snap rivets and o-rings through unused ¹/₂" diameter holes in handhold infill panels. Refer to the Snap Rivet Attachment Detail.
- 8) Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Drill through hole in 5" half clamp and into 5" post with a ¹/₄" or "F" (only) drill bit, insert drive rivet into hole through clamp and into post. Hammer drive rivet pin in until flush with head. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- (Direct Bury) With Lollipop climber plumb, pour concrete footing. Allow concrete footing to cure for a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) With Lollipop climber plumb, drill $\frac{1}{2}$ " x 3" deep holes through mounting plates using hammer drill and $\frac{1}{2}$ " masonry bit. Tap expansion anchors into drilled holes. Fasten mounting plates to expansion anchors, using $\frac{1}{2}$ " standard hex nuts with $\frac{1}{2}$ " flat washers.

10) Install protective surfacing before users are allowed to play on the component.



DETAIL SNAP RIVET ATTACHMENT (FOR FILLING UNUSED 1/2" DIAMETER HOLES)



 PlayBooster®
 179019
 Lollipop
 Climber, w/ Vibe®
 Handholds, 48"-72"

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DETAIL

Choose a protective surfacing material that

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

179088a

PLAN VIEW/FOOTING LAYOUT





PlayBooster[®] 179019 Lollipop Climber, w/ Vibe[®] Handholds, 48"-72" 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185





PlayBooster[®] 179022 Sunbeam Climber, w/ Vibe[®] Handhold, 64"-72"

Parts List

Part#	Description Q	ty.
100610-00	$\frac{1}{4}$ " x $\frac{5}{8}$ " Drive Rivet, AL/SST	4
105327-01	5" Half Clamp, Specify Color	6
113468-00	$\frac{7}{8}$ " O.D. x 1 $\frac{11}{16}$ " Al. Spacer Tube, Specify Color	2
108542-00	Handloop, Specify Color	1
113729-00	5" Offset Hanger Clamp, Specify Color	4
176050-00	Sunbeam Climber, Specify Color	1
177251-00	Roto ³ / ₄ Handhold Right, Specify Color	1
178734-00	Infill ³ / ₄ Panel, Specify Color	1
178736-00	Spacer Plate, Specify Color	1
11 4200 00		1
114309-00	Handloop/Kall Hardware Package	1
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100203-00	$\frac{5}{8}$ " x 2 $\frac{1}{4}$ " BHCS w/Pin, SST	2
100351-00	³ / ₈ " Mod T-Nut, SST	4
100610-00	$^{1}/_{4}$ " x $^{5}/_{8}$ " Drive Rivet, AL/SST	2
179752-00	Sunbeam Climber Hardware Package	1
100168-00	3/8" x 3 $1/4$ " BHCS w/Pin. SST	2
100195-00	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	5
100196-00	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin. SST	5
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin. SST	4
100327-00	³ / ₈ " Standard Hex Nut, SST	4
100351-00	³ / ₈ " Mod T-Nut. SST	8
100353-00	³ / ₈ " Flange Nut w/Pin, SST	2
100362-00	³ / ₈ " Flat Washer, SST	4
100365-00	³ / ₈ " SAE Flat Washer, SST 1	5
113027-00	³ / ₈ " x 1 ³ / ₈ " BHCS w/Pin. SST	3

Specifications

Sunbeam Climber:	Weldment comprised of 1.315" (33,40 mm) O.D. RS20 (.080"090") (2,03 mm-2,29 mm) wall galvanized steel tube, 2.375" (60,33 mm) O.D. RS40 (.130"140") (3,30 mm-3,56 mm) wall galvanized steel tube, and $\frac{1}{4}$ " (6,35 mm) HRPO steel sheet. Finish: ProShield [®] , color specified.
Handloop:	Weldment comprised of 1.125" (28,58 mm) O.D. 11 GA (.120") (3,05 mm) steel tubing with 203 or 303 stainless steel inserts, with $\frac{5}{8}$ " (15,88 mm) internal threads. Finish: TenderTuff, color specified.
Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield, color specified.
Spacer Plate:	Made from 7 GA. (.179") (4,75 mm) thick HRPO steel sheet. Finish: ProShield, color specified.
Handhold:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}$ " (22,23 mm) O.D. x 1 $^{11}\!/_{16}$ " (42,85 mm). Finish: ProShield, color specified.
Clamps:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific prod- uct installation/specifications).

Specifications are subject to change without notice

Installation Time:	Approx. $1^{1/4}$ man hour
Weight:	126 lbs.
Fall Height:	Deck Height

- 1) Attach roto handhold to infill panel, using $\frac{3}{8}$ " x $\frac{5}{8}$ " BHCS w/pin and $\frac{3}{8}$ " SAE flat washers (small). Refer to the Panel Attachment Detail.
- 2) Attach infill panel to deck, using ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" SAE flat washer (small) and ³/₈" standard hex nut with ³/₈" flat washer (large).
- 3) Attach offset hanger clamps to infill panel, using ³/₈" x 3 ¹/₄" BHCS w/ pin, ³/₈" SAE flat washers (small), spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- Attach offset hanger clamps to post, using 5" half clamps, ³/₈" x 1 ¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 5) Attach Sunbeam climber and spacer to deck, using ${}^{3}/{}_{8}$ " x 1 ${}^{3}/{}_{8}$ " BHCS w/pin with ${}^{3}/{}_{8}$ " SAE flat washers (small) and ${}^{3}/{}_{8}$ " standard hex nuts with ${}^{3}/{}_{8}$ " flat washers (large). Refer to Detail.
- 6) Attach Sunbeam climber to post, using 5" half clamps, ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" tee nuts. Refer to Climber To Post Attachment Detail.
- 7) Mark locations for clamps on posts per dimensions on front of sheet. Attach offset hanger clamps to posts, using 5" half clamps, ³/₈" x 1 ¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Assembly Sheet. Attach handloop to offset hanger clamp assemblies, using ⁵/₈" x 2 ¹/₄" BHCS w/pin.
- 8) Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Drill through hole in 5" half clamp and into 5" post with a ¹/₄" or "F" (only) drill bit, insert drive rivet into hole through clamp and into post. Hammer drive rivet pin in until flush with head. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 9) Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

14582400



structures

PlayBooster® 111231 Triangular Tenderdeck

Parts List

Part#	Description	Qty.
145657	Tri-Deck, Specify Color	1
105327	5" Half Clamp, Specify Color	3
106022	Deck Hanger Clamp, Specify Color	3
120203	Triangular Deck Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	6
100321	³ / ₈ " Hex Patch Nut, SST	3
100351	³ / ₈ " Tee Nut, SST	6
100362	³ / ₈ " Flat Washer, SST	3
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	3

Specifications

- Triangular Deck:Flange formed from 12 GA (.105") sheet steel
conforming to ASTM A1011. Standing surface is
perforated with $5/_{16}$ " diameter holes. Deck face has
(4) slotted holes for face mounting components.
The finished size measures 2 $5/_8$ " x 37 $3/_4$ ". Finish:
TenderTuffTM, color specified.Deck Hanger
Clamp Assembly:Cast aluminum. Finish: ProShield[®], color specified.
 - **Fasteners:** Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
- Installation Time: Approx. ¹/₂ man hour Weight: 61 lbs.

- 1) Mark posts for the appropriate height of the deck you are installing.
- 2) Fasten deck hanger clamps to marked position on posts. See Detail on the front of this sheet.
- 3) Lift deck assembly into position, lining up stud underneath deck with deck hanger clamp as shown. Attach using ³/₈" hex patch nuts with ³/₈" flat washers. With deck level and posts plumb, final tighten all hardware.
- 4) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 5) After attachment of enclosures and components is complete, pour concrete footings. Allow concrete footings to cure a minimum of 72 hours before users are allowed to play on the structure.
- 6) Install protective surfacing before users are allowed to play on the structure.

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

16574300





Parts List

Part#	Description Qty.	
121819	Kick Plate (For 6" or 8" Rise), Specify Color1	
121818	Kick Plate (For 16" Rise), Specify Color1	
156058	Kick Plate Tenderdeck Hardware Package1	
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	
100327	³ / ₈ " Standard Hex Nut, SST	
100362	³ / ₈ " Flat Washer, SST	

Specifications

Kick Plate:	Fabricated from 11 GA (.120") HR flat steel. Finish: TenderTuff [™] , brown or gray in color.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Approx. ¹ / ₄ man hour Kick Plate (For 6" or 8" Rise) 13 lbs. Kick Plate (For 16" Rise) 23 lbs.

Specifications are subject to change without notice

- 1) Locate kick plates as labeled on your plan drawing.
- Attach kick plate using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" flat washers and ³/₈" standard hex nuts with ³/₈" flat washers, as shown. NOTE: *Kick plates mount to face of lower deck.*
- 3) Install protective surfacing before users are allowed to play on the structure.



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Document #18161700



Parts List

Part#	Description Qty.
121820	Kick Plate (For 6" or 8" Rise), Specify Color1
121822	Kick Plate (For 16" Rise), Specify Color1
156059	Kick Plate Tenderdeck Hardware Package1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST6
100327	³ / ₈ " Standard Hex Nut, SST
100362	³ / ₈ " Flat Washer, SST

Specifications

Kick Plate:	Fabricated from 11 GA (.120") HR flat steel. Finish: TenderTuff [™] , color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Approx. ¹ / ₄ man hour Kick Plate (For 6" or 8" Rise) 13 lbs. Kick Plate (For 16" Rise) 33 lbs.

Specifications are subject to change without notice

- 1) Locate kick plates as labeled on your plan drawing.
- Attach kick plate using ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" flat washers and ³/₈" standard hex nuts with ³/₈" flat washers, as shown. NOTE: *Kick plates mount to face of lower deck.*
- 3) Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

14582500



122197 90° Triangular Tenderdeck

601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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PlayBooster®

Document #14582500

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PlayBooster[®] 122197 90° Triangular Tenderdeck

Parts List

Part#	Description	Qty.
145658	90° Tri-Deck, Specify Color	1
105327	5" Half Clamp, Specify Color	3
106022	Deck Hanger Clamp, Specify Color	3
120203	Triangular Deck Hardware Package	1
100198	³ / _s " x 1 ¹ / _s " BHCS w/Pin, SST	6
100321	³ / [°] Hex Patch Nut, SST	3
100351	³ / ₈ " Tee Nut, SST	6
100362	³ / ₈ " Flat Washer, SST	3
100610	$\frac{1}{4}$ " x $\frac{5}{8}$ " Drive Rivet, AL/SST	3

Specifications

- Triangular Deck: Flange formed from 12 GA (.105") sheet steel conforming to ASTM A1011. Standing surface is perforated with ⁵/₁₆" diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 ⁵/₈" x 37 ³/₄". Finish: TenderTuff[™], color specified.
 Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield[®], color specified.
 - **Fasteners:** Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
- **Installation Time:** Approx. ¹/₂ man hour **Weight:** 67 lbs.

Installation Instructions

6)

- 1) Mark posts for the appropriate height of the deck you are installing.
- 2) Fasten deck hanger clamps to marked position on posts. See Detail on front of sheet.
- 3) Lift deck assembly into position, lining up stud underneath deck with deck hanger clamp as shown. Attach using $\frac{3}{8}$ " hex patch nuts with $\frac{3}{8}$ " flat washers. With deck level and posts plumb, final tighten all hardware.
- 4) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 5) After attachment of enclosures and components is complete, pour concrete footings. Allow concrete footings to cure a minimum of 72 hours before users are allowed to play on the structure.
 - Install protective surfacing before users are allowed to play on the structure.
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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref.

20402200





Parts List

Part#	Description	Qty.
105327	5 [#] Half Clamp, Specify Color	2
113468	⁷ / ₈ " O.D. x 1 ^{fl} / ₁₆ " Spacer Tube, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
181371	Deck Support (DB), Specify Color	1
181373	Deck Support (SM), Specify Color	1
181374	Step Support (DB), Specify Color	l
1813/6	Step Support (SM), Specify Color	1
144696	1-Step Section, Specify Color	2
152038	I-step Handrall, Specify Color	<u>2</u>
152041	Transfer Deek, Specify Color	1 1
153885	Infill Panel Specify Color	1
155005	mini i anci, speeny coloi	2
204034	Transfer Module Hardware Package	1
100173	³ /." x 2" BHCS, SST	6
100196	$\frac{3}{6}$ " x $\frac{7}{6}$ " BHCS w/Pin, SST	4
100198	³ / ₈ " x 1 ⁸ / ₉ " BHCS w/Pin, SST	20
100327	³ /° Standard Hex Nut, SST	
100351	³ / ₈ " Tee Nut, SST	4
100353	³ / ₈ " Flange Nut w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	54
113027	³ / ₈ " x 1 ³ / ₈ " BHCS w/Pin, SST	8
124460	$\frac{3}{8}$ x 3 $\frac{3}{4}$ BHCS w/Pin, SST	2
100378	³ / ⁸ Fender Washer, SST	6
100349	³ / ₈ " Low Crown Cap Nut, SST	12
111202	4 Hala (SM) Handwara Daakaga	1
100262	3/ " x 2 3/ " Expansion Anchors	1
100203	³ / ⁸ " Standard Hey Nut SST	
100365	³ / ⁸ " SAE Flat Washers SST	
100505	⁷ ₈ SAL 1 lat Washers, 551	
121256	2-Hole (SM) Hardware Package	1
100263	³ / ₃ " x 2 ³ / ₄ " Expansion Anchors.	2
100327	³ / _o " Standard Hex Nut, SST	2
100365	³ / _o " SAE Flat Washers, SST	2
DB=Direct Bury	0	

SM=Surface Mount

Specifications

Deck:	Flange formed from 12 GA (.105") sheet steel conforming to ASTM A1011. Standing surface is perforated with $\frac{5}{16}$ " diameter holes and measure 29" per (2) sides. Finish: TenderTuff TM , color specified.	
Railings:	Weldment comprised of formed $1 \frac{1}{8}$ " O.D. x 11 GA (.120") steel tubing with 203 or 303 stainless steel inserts with $\frac{3}{8}$ " internal threads. Finish: TenderTuff, color specified.	
Step Sections:	Formed from 12 GA (.105") sheet steel conforming to ASTM A1011. Standing surface is $24^{3/8}$ " wide x 14" deep and is perforated with $5/16$ " diameter holes. Finish: TenderTuff, color specified.	
Panel:	Solid color Permalene® panel, color specified.	
Deck Support:	Weldment comprised of 3 ¹ /," O.D. RS-20 (.125") galvanized steel tubing and ${}^{37}_{g}$ " O.D. x 5" long rod. Finish: ProShield [®] , color specified.	
Step Support:	Weldment comprised of 1.660 O.D. RS20 (.080"095) and $1 \frac{3}{4}$ " x $1 \frac{3}{4}$ " x $1\frac{3}{4}$ " K HR angle. Finish: ProShield, color specified.	
Spacer Tube:	Made from 6061-T6 aluminum $\frac{7}{8}$ " O.D. x 1 $\frac{11}{16}$ ". Finish: ProShield, color specified.	
Clamps:	Cast aluminum. Finish: ProShield, color specified.	
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).	

Specifications are subject to change without notice

Installation Time:	SM - Approx. 3 man hours
	DB - Approx. 4 man hours
Concrete Req.:	Approx. 3.4 cu. ft.
Weight:	SM - 180 lbs.
e	DB - 195 lbs.
Fall Height:	Deck Height
0	-

Installation Instructions

- 1) (Direct Bury) Dig footings as shown. Refer to your Plan View/Footing Layout.
- 2) Attach the deck support to the transfer deck using ³/₈ " x ⁷/₈" BHCS w/pin and ³/₉" low crown cap nuts with ³/₈" SAE flat washers. NOTE: Make sure ³/₈" rod on support is under support strap on deck as shown. Refer to the Deck Support Attachment Detail.
- 3) Attach the 1-step section to the transfer deck using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" standard hex nuts with ³/₈" SAE flat washers.
- 4) Attach the 1-step section to the face of the mainstructure deck using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" standard hex nuts with ³/₈" SAE flat washers.
- 5) Attach the step support to the 1-step section (lower) using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers and $\frac{3}{8}$ " standard hex nuts with $\frac{3}{8}$ " SAE flat washers. Refer to the Step Support Attachment Detail.
- 6) Attach the 1-step section (lower) to the transfer deck using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers and $\frac{3}{8}$ " standard hex nuts with $\frac{3}{8}$ " SAE flat washers.
- 7) Attach offset hanger clamps to posts at heights shown using 5" half clamps, ³/₈" x 1 ¹/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 8) Attach infill panels to the face of the mainstructure deck using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers and $\frac{3}{8}$ " flange nuts w/pin.
- 9) Attach infill panels to offset hanger clamp assemblies using ³/₈ " x 3 ³/₄" BHCS, spacer tubes and ³/₈" flange nuts w/pin. See Panel Attachment Detail.
- 10) Attach the handrails to the steps using ³/₈" x 2" BHCS with ³/₈" SAE flat washers and ³/₈" low crown cap nuts with ³/₈" fender washers. Refer to the Handrail Attachment Detail.
- 11) Attach the handrails to the infill panels using 3/8" x $1^3/8$ " BHCS w/pin and 3/8" SAE flat washers.
- 12) Attach the lower rail to the transfer deck using ³/₈" x 1 ³/₈" BHCS w/ pin with ³/₈" SAE flat washers and ³/₈" low crown cap nuts with ³/₈" SAE flat washers.
- 13) Attach the lower rail to the 1-step section (lower) using ³/₈" x 2" BHCS with ³/₈" SAE flat washers and ³/₈" low crown cap nuts with ³/₈" fender washers. Refer to the Handrail Attachment Detail.
- 14) (**Direct Bury**) With transfer deck and steps level and supports plumb, pour concrete footings. Allow concrete footings to cure a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) Mark holes for expansion anchors on concrete slab through support plates. Detach the module from the mainstructure and slide module aside, drill $\frac{3}{8}$ " x 3" deep holes on marks using hammer drill and $\frac{3}{8}$ " masonry bit. Reposition module over drilled holes and tap expansion anchors into drilled holes. Fasten support plates to expansion anchors using $\frac{3}{8}$ " standard hex nuts with $\frac{3}{8}$ " SAE flat washers. Reattach module to structure.

- 15) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 16) Install protective surfacing before users are allowed to play on the structure.

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NOTE: Refer to the site plan drawing for proper orientation.

SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487)

204022a



Document #24445000



Document #20738800



PlayBooster® 178710 Hexagon Tenderdeck

Parts List

Part#	Description	Qty.
207385	Deck Brace, Silver	2
105327	5" Half Clamp, Specify Color	6
106022	Deck Hanger Clamp, Specify Color	6
145659	Hex Deck, Specify Color	2
137121	Hex Deck Hardware Package	1
100196	³ / _o " x ⁷ / _o " BHCS w/Pin, SST	4
100198	3/°," x 1 1/°," BHCS w/Pin, SST	15
100327	3/°," Standard Hex Nut, SST	
100351	³ /°," Tee Nut, SST	
100362	³ /°," Flat Washer, SST	
100365	³ / _o " SAE Flat Washer, SST	4
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	6
100321	³ /," Hex Patch Nut, SST	6
137091	³ / _o " x 1" Flat Head Cap Screw, SST	4

Specifications

Flange formed from 12 GA (.105") (2,67 mm) sheet
steel conforming to ASTM A1011. Standing surface
is perforated with $\frac{5}{16}$ (7,94 mm) diameter holes.
Deck face has (4) slotted holes for face mounting
components. The finished size measures $2\frac{5}{8}$ " x 36"
(66,68 mm x 914 mm) per each of the six sides for an
overall dimension of 78" (1981 mm) face to face or
87" (2210 mm) point to point. Finish: TenderTuff [™] ,
color specified.

Deck Brace: Fabricated from $\frac{3}{8}$ " x 1 $\frac{3}{4}$ " x 28 $\frac{1}{2}$ " long zinc plated steel strap. Finish: ProShield[®], silver in color.

Deck Hanger

Clamp Assembly:	Cast aluminum. Finish: ProShield [®] , color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	Approx. $2^{1}/_{2}$ man hours

Weight: 284 lbs.

Installation Instructions

- 1) Mark posts for the appropriate height of the deck you are installing.
- 2) With deck on ground, position deck braces inside & under deck as shown and fasten outside two holes of deck braces to hex deck half using ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" flat washers and ³/₈" standard hex nuts. Fasten inside two holes of deck braces to hex deck half using ³/₈" x 1" flat head cap screws and ³/₈" standard hex nuts with ³/₈" SAE flat washers. Fasten tenderdeck members together using ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" flat washers and ³/₈" flat washers.
- 3) Fasten hanger clamps to marked position on posts. See Detail on the front of this sheet.
- 4) Lower deck assembly into position, lining up stud underneath deck with deck hanger clamp as shown. Attach using 3/8" hex patch nuts with 3/8" flat washers.
- 5) Level deck and plumb posts. Install the ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Spec sheet.
- 6) After all enclosures/ components are installed, pour concrete footings per the Typical Concrete Footing Detail sheet. Allow concrete footings to cure a minimum of 72 hours before users are allowed to play on the structure.
- 7) Install protective surfacing before users are allowed to play on the structure.

M landscape structures[®]



17906400



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Document #17906400

M landscape structures

PlayBooster[®] 179043 Bubble Vibe[®] Panel[™]

Parts List

Part#	Description	Qty.
	ABOVE DECK	C <i>J</i>
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
113468	Spacer Tube, Specify Color	2
178197	Bubble	1
177038	Roto Full Enclosure, Specify Color	1
178729	Infill Wide Panel, Specify Color	1
178731	Infill Narrow Panel, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
179653	Bubble Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6
112501	Nylon Spacer	6
179614	Full Vibe Panel Deck Mt. Hardware Package	1
100168	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	2
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	4
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	6
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100327	³ / ₈ " Standard Hex Nut, SST	4
100351	³ / ₈ " Tee Nut. SST	4
100353	³ / _o " Flange Nut w/Pin. SST	2
100362	³ / ₈ " Flat Washer, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	12
	BELOW DECK	
105327	5" Half Clamp, Specify Color	4
113729	Offset Hanger Clamp, Specify Color	4
178197	Bubble	1
177038	Roto Full Enclosure. Specify Color	1
179251	Infill Below Deck Wide Panel, Specify Color	1
179252	Infill Below Deck Narrow Panel, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	4
179653	Bubble Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin. SST	6
100365	³ / _o " SAE Flat Washer. SST	6
112501	Nylon Spacer	6
179615	Full Panel Below Deck Hardware Package	1
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	6
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100351	³ / ₈ " Tee Nut, SST	8
100353	³ / ₈ " Flange Nut w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	10
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST	4

Specifications

Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield [®] , color specified.	5)
Roto Full Enclosure:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	6)
Bubble:	Vacuum formed .230" x 26 $\frac{3}{8}$ " (5,84 mm x 669,93 mm) diameter clear polycarbonate.	
Nylon Spacer:	³ / ₈ " (9,53 mm) I.D. nylon washer.	
Spacer Tube:	Made from 6061-T6 aluminum $^{7}/_{8}$ " (22,23 mm) O.D. x 1 $^{11}/_{16}$ " (42,85 mm). Finish: ProShield, color specified.	

Specifications are subject to change without notice.

Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Above Deck Approx. 1 man hour Below Deck Approx. 1 ¹ / ₄ man hours Above Deck 55 lbs. Below Deck 42 lbs.

Installation Instructions

ABOVE DECK (See Sheet 1 of 2)

- Attach offset hanger assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Assembly Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/ pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 3) Attach bubble to roto full enclosure with roto full enclosure laying on its backside. Position the (6) nylon spacers over the holes in roto full enclosure. Lower bubble onto roto full enclosure and secure using ³/₈" x ⁷/₈" BHCS w/pin and ³/₈" SAE flat washers (small).
- Attach infill panels to deck, using ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large).
- 5) Attach infill panels to offset hanger clamps, using ³/₈" x 3 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers (small), spacer tubes and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 6) Install protective surfacing before users are allowed to play on the structure.

BELOW DECK (See Sheet 2 of 2)

- Attach offset hanger clamp assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/ pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 3) Attach bubble to roto full enclosure with roto full enclosure laying on its backside. Position the (6) nylon spacers over the holes in roto full enclosure. Lower bubble onto roto full enclosure and secure using ³/₈" x ⁷/₈" BHCS w/pin and ³/₈" SAE flat washers (small).
- 4) Attach infill panels to offset hanger clamps, using ³/₈" x 1 ¹¹/₁₆" BHCS w/pin with ³/₈" SAE flat washers (small), and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 5) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Assembly sheet.
 - Install protective surfacing before users are allowed to play on the structure.



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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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PlayBooster[®] 179044 Color Splash Vibe[®] Panel[™]

Parts List

Part#	Description	Qty.
	ABOVE DECK	- •
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
113468	Spacer Tube, Specify Color	2
178123	Color Splash Panel Assembly, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
177038	Roto Full Enclosure, Specify Color	1
178729	Infill Wide Panel, Specify Color	1
178731	Infill Narrow Panel, Specify Color	1
179614	Full Vibe Panel Deck Mt. Hardware Package	1
100168	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	2
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	6
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin. SST	4
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100327	³ / ₈ " Standard Hex Nut. SST	4
100351	³ / _s " Tee Nut. SST	4
100353	³ / ₈ " Flange Nut w/Pin. SST	2
100362	³ / _s " Flat Washer, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	12
179680	Sensory Vibe Panel Hardware Package	1
100199	3/8" x 2 $1/4$ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6
	BELOW DECK	
105327	5" Half Clamp, Specify Color	4
113729	Offset Hanger Clamp, Specify Color	4
178123	Color Splash Panel Assembly, Specify Color	1
177038	Roto Full Enclosure, Specify Color	1
179251	Infill Below Deck Wide Panel, Specify Color	1
179252	Infill Below Deck Narrow Panel, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	4
179615	Full Vibe Panel Below Deck Hardware Packag	ge1
100195	3/8" x 5/8" BHCS w/Pin, SST	6
100198	3/8" x 1 1/8" BHCS w/Pin, SST	8
100351	³ / ₈ " Tee Nut, SST	8
100353	3/8" Flange Nut w/Pin, SST	4
100365	3/8" SAE Flat Washer, SST	
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST	4
179680	Sensory Vibe Panel Hardware Package	1
100199	3/8" x 2 1/4" BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6

Specifications

Color Splash Panel Assembly:

anel Assembly: Assembly comprised of (Permalene[®] Panels), color specified. (Lexan Panel) ${}^{1}_{4}$ " (6,35 mm) thick x 26 ${}^{3}_{4}$ " (679,45 mm) diameter. (Acrylic Panel) ${}^{1}_{8}$ " (3,18 mm) thick x 26 ${}^{3}_{4}$ " (679,45 mm) diameter clear. (Color Wheel) .1875" (4,76 mm) thick x 23 ${}^{7}_{16}$ " (595,30 mm) diameter aluminum sheet. Finish: ProShield[®], image is transferred into paint by the process of infusion. (Shaft) stainless steel. (Thrust Oilite Bearing) .125" (3,18 mm) thick x 2.875" (73,03 mm) diameter. (Sleeve Oilite Bearing) 1.25" (31,75 mm) diameter x .750" (19,05 mm) long.

Infill Panel: Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield[®], color specified.

Roto Full Enclosure	density polyethylene, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}"$ O.D. x 1 $^{11}\!/_{16}".$ Finish: ProShield, color specified.
Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Above Deck Approx. 1 man hour Below Deck Approx. 1 $^{1}/_{4}$ man hours Above Deck 86 lbs. Below Deck 73 lbs.

Installation Instructions

ABOVE DECK (See Sheet 1 of 2)

- Attach offset hanger assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Assembly Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers. Refer to the Panel Attachment Detail.
- Attach color splash panel assembly to roto full enclosure panel using ³/₈" x 2 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers (small). NOTE: *Remove protective layer from lexan before installation.*
- Attach infill panels to deck, using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large).
- 5) Attach infill panels to offset hanger clamps, using ³/₈" x 3 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers, spacer tubes and ³/₈" flange nuts w/ pin. Refer to the Panel Attachment Detail.
- 6) Install protective surfacing before users are allowed to play on the structure.

BELOW DECK (See Sheet 2 of 2)

- Attach offset hanger clamp assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- 2) Attach infill panels to roto full enclosure, using ${}^{3}/{}_{8}$ " x ${}^{5}/{}_{8}$ " BHCS w/pin and ${}^{3}/{}_{8}$ " SAE flat washers. Refer to the Panel Attachment Detail.
- Attach color splash panel assembly to roto full enclosure panel using ³/₈" x 2 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers (small). NOTE: *Remove protective layer from lexan before installation.*
- 4) Attach infill panels to offset hanger clamps, using ³/₈" x 3 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers, spacer tubes and ³/₈" flange nuts w/ pin. Refer to the Panel Attachment Detail. .
- 5) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Assembly sheet.
- 6) Install protective surfacing before users are allowed to play on the structure.

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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PlayBooster[®] 179046 Fun Mirror Vibe[®] Panel[™]

Parts List

Part#	Description	Qty.
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	4
105327	5" Half Clamp, Specify Color	4
113729	Offset Hanger Clamp, Specify Color	4
181118	Fun Mirror Panel Assembly, Specify Color	1
177038	Roto Full Enclosure, Specify Color	1
179251	Infill Below Deck Wide Panel, Specify Color	1
179252	Infill Below Deck Narrow Panel, Specify Color	1
179618	Fun Mirror Panel Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6
179615	Below Deck Full Panel Hardware Package	1
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	6
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100351	³ / ₈ " Tee Nut, SST	8
100353	³ / ₈ " Flange Nut w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	10
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST	4

Specifications

Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield [®] , color specified.
Roto Full Enclosure:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Fun Mirror Panel Assy.:	(Panels) Two color Permalene [®] , color specified. (Brackets) Fabricated from 11 GA. (.120") (3,05 mm) sheet HRPO steel. Finish: ProShield, color specified. (Curved Mirror) Fabricated from16 GA. (.060") (1,52 mm) stainless steel sheet.
Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	1 $\frac{1}{4}$ man hours 111 lbs.

Installation Instructions

- Attach offset hanger clamp assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- 2) Attach infill panels to roto full enclosure, using $\frac{3}{8}$ " x $\frac{5}{8}$ " BHCS w/pin and $\frac{3}{8}$ " SAE flat washers. Refer to the Panel Attachment Detail.
- 3) Attach fun mirror panel assembly to roto full enclosure, using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/pin and $\frac{3}{8}$ " SAE flat washers.
- 4) Attach infill panels to offset hanger clamps, using ³/₈" x 1 ¹¹/₁₆" BHCS w/pin with ³/₈" SAE flat washers, and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 5) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Assembly sheet.
- 6) Install protective surfacing before users are allowed to play on the structure.

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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Document #17906700





Parts List

Part#	Description Qty.
100610	$\frac{1}{4}$ x $\frac{5}{8}$ Drive Rivet, AL/SST
105327	5" Half Clamp, Specify Color
113729	Offset Hanger Clamp, Specify Color4
167014	Sensory Panel Ring, Specify Color1
177038	Roto Full Enclosure, Specify Color1
179251	Infill Below Deck Wide Panel, Specify Color1
179252	Infill Below Deck Narrow Panel, Specify Color 1
179615	Full Panel Below Deck Hardware Package1
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST6
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST
100351	³ / ₈ " Tee Nut, SST
100353	³ / ₈ " Flange Nut w/Pin, SST4
100365	³ / ₈ " SAE Flat Washer, SST10
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST
179618	Sensory Panel Hardware Package1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST
100365	³ / ₈ " SAE Flat Washer, SST6

Specifications

Infill Panel:	Made from ${}^{3/}_{16}$ " (.187") (4,75 mm) thick HRPO steel sheet zinc plated. Finish: ProShield [®] , color specified.
Roto Full Enclosure	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Panel Ring:	Two color Permalene [®] , color specified.
Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	$1 \frac{1}{4}$ man hours 39 lbs.

Installation Instructions

- Attach offset hanger clamp assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers. Refer to the Panel Attachment Detail.
- 3) Attach sensory panel ring to roto full enclosure, using 3/8" x 11/8" BHCS w/pin and 3/8" SAE flat washers.
- 4) Attach infill panels to offset hanger clamps, using ³/₈" x 1 ¹¹/₁₆" BHCS w/pin with ³/₈" SAE flat washers, and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 5) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Assembly sheet.
- 6) Install protective surfacing before users are allowed to play on the structure.





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M landscape structures

PlayBooster[®] 179051 Optigear Vibe[®] Panel[™]

Parts List

Part#	Description	Qty.
	ABOVE DECK	
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
113468	Spacer Tube, Specify Color	2
181247	Optigear Panel Assembly, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
177038	Roto Full Enclosure, Specify Color	1
178729	Infill Wide Panel, Specify Color	1
178731	Infill Narrow Panel, Specify Color	1
179614	Full Vibe Panel Deck Mt. Hardware Package	1
100168	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	2
100195	3/8" x 5/8" BHCS w/Pin, SST	6
100196	3/8" x 7/8" BHCS w/Pin, SST	4
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100327	³ / ₈ " Standard Hex Nut, SST	4
100351	³ / ₈ " Tee Nut, SST	4
100353	³ / ₈ " Flange Nut w/Pin, SST	2
100362	³ / ₈ " Flat Washer, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	12
181249	Optigear Vibe Panel Hardware Package	1
100199	³ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6
	BELOW DECK	
105327	5" Half Clamp, Specify Color	4
113729	Offset Hanger Clamp, Specify Color	4
181247	Optigear Panel Assembly, Specify Color	1
177038	Roto Full Enclosure, Specify Color	1
179251	Infill Below Deck Wide Panel, Specify Color	1
179252	Infill Below Deck Narrow Panel, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	4
179615	Full Vibe Panel Below Deck Hardware Packag	e1
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	6
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100351	³ / ₈ " Tee Nut, SST	8
100353	³ / ₈ " Flange Nut w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	10
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST	4
181249	Optigear Vibe Panel Hardware Package	1
100199	³ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6

Specifications

1

Optigear Panel Assy.:	(Panels) Two color Permalene [®] , color specified. (Poly Panel) .236" (5,99 mm) thick clear polycarbonate, ${}^{3}_{/8}$ " (9,53 mm) threaded rod and ${}^{3}_{/16}$ " (4,75 mm) SST plate.	
Infill Panel:	Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield [®] , color specified.	
Roto Full Enclosure	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	
Spacer Tube:	Made from 6061-T6 aluminum $^{7}/_{8}$ " (22,23 mm) O.D. x 1 $^{11}/_{16}$ " (42,85 mm). Finish: ProShield, color specified.	

Specifications are subject to change without notice

Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	Above Deck Approx. 1 man hour Below Deck Approx. 1 $\frac{1}{4}$ man hours
Weight:	Above Deck 110 lbs. Below Deck 97 lbs.

Installation Instructions

ABOVE DECK (See Sheet 1 of 2)

- Attach offset hanger assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Assembly Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/ pin and ³/₈" SAE flat washers (small). Refer to the Panel Attachment Detail.
- 3) Attach Optigear panel assembly to roto full enclosure, using $\frac{3}{8}$ " x 2 $\frac{1}{4}$ " BHCS w/pin and $\frac{3}{8}$ " SAE flat washers (small).
- Attach infill panels to deck, using ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large).
- 5) Attach infill panels to offset hanger clamps, using ³/₈" x 3 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers, spacer tubes and ³/₈" flange nuts w/ pin. Refer to the Panel Attachment Detail.
- 6) Install protective surfacing before users are allowed to play on the structure.

BELOW DECK (See Sheet 2 of 2)

- Attach offset hanger clamp assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers. Refer to the Panel Attachment Detail.
- 3) Attach Optigear panel assembly to roto full enclosure, using $\frac{3}{8}$ " x $2\frac{1}{4}$ " BHCS w/pin and $\frac{3}{8}$ " SAE flat washers (small).
- 4) Attach infill panels to offset hanger clamps, using ³/₈" x 1 ¹¹/₁₆" BHCS w/pin with ³/₈" SAE flat washers, and ³/₈" flange nuts w/pin. Refer to the Panel Attachment Detail.
- 5) Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Assembly sheet.
- Install protective surfacing before users are allowed to play on the structure.

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17906100





PlayBooster[®] 179052 Rain Sound Wheel Vibe[®] Panel[®]

Parts List

Part#	Description	Qty.
	ABOVE DECK	C <i>J</i>
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
113468	Spacer Tube, Specify Color	2
176629	Rain Sound Wheel Assembly, Specify Color	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
177038	Roto Full Enclosure, Specify Color	1
178729	Infill Wide Panel, Specify Color	1
178731	Infill Narrow Panel, Specify Color	1
179614	Full Vibe Panel Deck Mt. Hardware Package	1
100168	³ / ₈ " x 3 ¹ / ₄ " BHCS w/Pin, SST	2
100195	3/8" x 5/8" BHCS w/Pin, SST	6
100196	3/8" x 7/8" BHCS w/Pin, SST	4
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100327	3/8" Standard Hex Nut, SST	4
100351	³ / ₈ " Tee Nut, SST	4
100353	3/8" Flange Nut w/Pin, SST	2
100362	³ / ₈ " Flat Washer, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	12
179618	Sensory Vibe Panel Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6
	BELOW DECK	
105327	5" Half Clamp, Specify Color	4
113729	Offset Hanger Clamp, Specify Color	4
176629	Rain Sound Barrel Assembly, Specify Color	1
177038	Roto Full Enclosure, Specify Color	1
179251	Infill Below Deck Wide Panel, Specify Color	1
179252	Infill Below Deck Narrow Panel, Specify Color	1
100610	${}^{1}/_{4}$ " x ${}^{5}/_{8}$ " Drive Rivet, AL/SST	4
179615	Full Vibe Panel Below Deck Hardware Packag	e1
100195	³ / ₈ " x ⁵ / ₈ " BHCS w/Pin, SST	6
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100351	³ / ₈ " Tee Nut, SST	8
100353	³ / ₈ " Flange Nut w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	10
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST	4
179618	Sensory Vibe Panel Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6

Specifications

Rain Sound
Wheel Panel Assy.:Assembly comprised of (Permalene® Panels), col-
or specified. (Shaft) 1" (25 mm) diameter x 4 3/4"
(120,65 mm) long stainless steel. (Inner & Outer
Rings) 16 GA. (.059")(1,50 mm) HRPO sheet steel.
Finish: ProShield®, color specified. (Brackets) 16
GA. (.059") (1,50 mm) HRPO sheet steel. Finish:
Zinc plate with clear chromate finish. (Spacer) 3/4"
(19,05 mm) diameter x 2 1/8" (53,98 mm) long stainless steel. (Flange Oilite Bearing) 1.625" (41,28 mm)
diameter x 1.000" (25 mm) long.

Infill Panel: Made from 7GA. (.179") (4,55 mm) thick HRPO steel sheet zinc plated. Finish: ProShield, color specified.

Specifications are subject to change without notice.

Roto Full Enclosure	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Spacer Tube:	Made from 6061-T6 aluminum $^{7}\!/_{8}"$ O.D. x 1 $^{11}\!/_{16}".$ Finish: ProShield, color specified.
Offset Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Above Deck Approx. 1 man hour Below Deck Approx. 1 ¹ / ₄ man hours Above Deck 104 lbs. Below Deck 91 lbs.

Installation Instructions

ABOVE DECK (See Sheet 1 of 2)

- Attach offset hanger assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Assembly Sheet.
- Attach infill panels to roto full enclosure, using ³/₈" x ⁵/₈" BHCS w/pin and ³/₈" SAE flat washers. Refer to the Panel Attachment Detail.
- 3) Attach rain sound wheel assembly to roto full enclosure panel using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/pin with $\frac{3}{8}$ " SAE flat washers (small).
- 4) Attach infill panels to deck, using ³/₈" x 1¹/₈" BHCS w/pin with ³/₈" SAE flat washers (small) and ³/₈" standard hex nuts with ³/₈" flat washers (large).
- 5) Attach infill panels to offset hanger clamps, using ³/₈" x 3 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers, spacer tubes and ³/₈" flange nuts w/ pin. Refer to the Panel Attachment Detail.
- 6) Install protective surfacing before users are allowed to play on the structure.

BELOW DECK (See Sheet 2 of 2)

3)

- Attach offset hanger clamp assemblies to posts at height shown, using half clamps and ³/₈" x 1 ¹/₈" BHCS w/pin with ³/₈" tee nuts. Refer To The Typical Offset Hanger Clamp Spec Sheet.
- 2) Attach infill panels to roto full enclosure, using 3/8" x 5/8" BHCS w/pin and 3/8" SAE flat washers. Refer to the Panel Attachment Detail.
 - Attach rain sound wheel assembly to roto full enclosure panel using $\frac{3}{8}$ " x 1¹/₈" BHCS w/pin with $\frac{3}{8}$ " SAE flat washers (small).
- 4) Attach infill panels to offset hanger clamps, using ³/₈" x 3 ¹/₄" BHCS w/pin with ³/₈" SAE flat washers, spacer tubes and ³/₈" flange nuts w/ pin. Refer to the Panel Attachment Detail.
- 5) Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Assembly sheet.
- 6) Install protective surfacing before users are allowed to play on the structure.

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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Sheet 1 of 3 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 (763) 972-3391 1-888-LSI-INST (1-888-574-4678) FAX (763) 972-3185



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Parts List

Part#	Description	Qty.
100611-00	¹ / ₄ " x ³ / ₈ " Drive Rivet, AL/SST	. 12
127551-00	5/8" x 1 1/2" BHCS w/Pin, SST	8
166054-00	Arch 2A, Specify Color	2
166064-00	Arch 2B/2C With Tabs, Specify Color	1
166065-00	Arch 2D/2E With Tabs, Specify Color	1
166276-00	5" Clamp O, Specify Color	4
171620-00	Arch 1B/1C w/o Hemisphere Tabs, Specify Color	1
171621-00	Arch 1A w/o Hemisphere Tabs, Specify Color	2
171622-00	Arch 1D/1E w/o Hemisphere Tabs, Specify Color	1
171806-00	Evos Post w/Cap ASM, Specify Color	3

Specifications

Post:	Fabricated from 5.000" (127 mm) O.D. x 11 GA. (.120") (3,05 mm) wall galvanized steel tube, top cap shall be die-cast 369.1 aluminum alloy. Finish: ProShield [®] , color specified.
5" Arch:	Steel arch is manufactured from 5" (127 mm) O.D. galvanized tubing with a wall thickness of .120" (3,05 mm). Finish: ProShield, color specified.
5" Clamps:	Cast from 356-T6 aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Concrete Req.: Area Req.: Weight:	Approx. $4^{1/4}$ man hours Approx. 18.71 cu. ft. 6' (1,83 m) minimum use zone 815 lbs.

Installation Instructions

1) (Direct Bury) Refer to Site Plan for footing locations.

IMPORTANT! Do not pour concrete footings until all outriggers have been attached to 5" clamps with surfaces.

- Lay (4) arches on a flat surface. Using the part numbers shown on the detail as a guide, slide arches together as shown. Level arches. NOTE: Lay arches on cardboard to prevent arches from being scratched during assembly.
- 3) Line up (3) holes on inside of arches. Insert $\frac{1}{4}$ x $\frac{3}{8}$ drive rivets into holes and hammer rivet pins in until it is flush with head.
- 4) Measure center line dimension of lower arches. Position lower arches as needed to attain center line dimension. Drill through (3) outer holes in arches with ¹/₄" or letter "F" (only) drill bit. Insert ¹/₄" x ³/₈" drive rivets into holes and hammer rivet pins in until it is flush with head.
- 5) Using the arch assembly detail as a guide, attach (3) 5" clamps to each arch using ⁵/₈" x 1 ¹/₂" BHCS w/pin (with gray anti-seize). NOTE: *Refer to your 2-D Plan for clamp identification*. The 5" clamps will be positioned on top of the drive rivets and arch ends. Refer to the arch assembly details for proper location of each clamp. NOTE: *The 5" clamps with clamp surfaces, will need to be adjusted when outriggers are attached to the structure.*
- 6) Place the fully assembled arches in footing holes. Refer to the Site Plan for proper location of arches. **NOTE:** *Rope may be used to tie off the arches. The use of rope will help keep the arches in plumb position, while attaching outriggers. Tie a rope (not supplied) on each side of the top 5" clamp. The rope should be long enough to attach to a ground stake (not supplied). When the arches are in plumb position, pull the ropes tight, and attach to ground stakes.*
- Attach 5" round clamps to each Evos post, using ⁵/₈" x 1 ¹/₂" BHCS w/ pin (with gray anti-seize). Place Evos posts in footing holes.
- 8) After all outriggers have been attached to 5" clamps with surfaces and arches, posts and supports are plumb, pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure.
- 9) Install protective surfacing before users are allowed to play on the structure.



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Kids In Motion 152179 Saddle Spinner

Parts List

Part #	Description	Qty.
151539	Saddle Spinner Seat, Specify Color	1
197017	Shaft Assy., DB, Specify Color	*
197018	Shaft Assy. 12" Seat Height, SM, Specify Color	*
197011	Shaft Assy. 16" Seat Height, SM, Specify Color	*
211418	Spinner Seat Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	4
156845	Play Safe Label, 2-5 Yrs	1
156847	Play Safe Label, 5-12 Yrs	1
127935	⁵ / ₁₆ " x 2 ¹⁵ / ₃₂ " Rubber Gasket	1
183064	Warning label	1
121348	4-Hole (SM) Hardware Package	1
100266	$\frac{1}{2}$ " x 2 $\frac{3}{4}$ " Expansion Anchor	4
100322	1/2" Standard Hex Nut, SST	4
100363	¹ / ₂ " Flat Washer, SST	4
* = Quantity Dete	ermined By Your Order	
DB = Direct Bury		
SM = Surface Mo	unf	

Specifications

Shaft Assembly:	(Saddle Spinner Seat Post) Weldment comprised of 2.875" O.D. RS40 (.160"170" Wall) galvanized steel tubing, 1.250" O.D. steel shaft, 12 Ga. (.105") HR flat steel, and 1144 steel collar. Finish: Pro- Shield [®] , color specified. (Sleeve/Plate) Weldment comprised of ¹ / ₄ " sheet HRPO steel and 2.875" O.D. schedule 80 steel tubing. Finish: ProShield, color specified.	6)
Rubber Gasket:	Made from 50 durometer neoprene.	
Saddle Spinner Seat:	Rotationally molded from U.V. stabilized linear low density polyethylene measuring $18 \frac{1}{4}$ wide x 7" high, color specified.	
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).	
Installation Time:	1 man hour (DB) ${}^{3}\!/_{4}$ man hour (SM)	
Weight:	36 lbs. (DB) 30 lbs. 12" Seat Height (SM) 32 lbs. 16" Seat Height (SM)	
Area Req.:	13' 8" (4,17 m) diameter	
Concrete:	Approx. $3^{1/2}$ cu. ft. (DB)	
Fall Height:	12" (300 mm) 2-5 Years 16" (410 mm) 5-12 Years	

Installation

1	(Direct Bury)	Dig footing	as shown	Refer to	the Direct B	Surv Detail
1	(Direct Dury)	Dig looting	as shown.	Refer to	the Direct D	uly Dotall.

- Attach saddle spinner seat and rubber gasket to shaft assembly using ³/₈" x ⁷/₈" BHCS w/pin and ³/₈" SAE flat washers. Refer to the Saddle Spinner Seat Attachment Detail. NOTE: Install Rubber Gasket with small diameter down.
- 3) (Direct Bury) Place the shaft assembly in footing hole. Place a level on the shaft assembly gusset, when gusset is plumb pour concrete footing. Allow concrete footing to cure a minimum of 72 hours before users are allowed to play on structure. NOTE: Saddle spinner will have to be propped in position, until concrete has cured.

(Surface Mount) Drill $\frac{1}{2}$ " x 3" deep holes through base plate using hammer drill and $\frac{1}{2}$ " masonry bit. Tap expansion anchors into drilled holes. Attach shaft assembly base plate to expansion anchors using $\frac{1}{2}$ " standard hex nuts with $\frac{1}{2}$ " flat washers.

- 4) If required to meet Canadian Standard (CSA Z614) requirement for water ponding, drill (3) ¹/₈" diameter drain holes on top side of seat, and (3) ¹/₈" diameter holes on bottom side of seat. NOTE: *Positions are prelocated on both sides of seat with an indent marking. Use caution to drill through one wall of plastic only.*
- 5) Apply labels as shown.

Install protective surfacing before users are allowed to play on the structure.





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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Parts List

Part#	Description	Qty.
154932	Spinner Post, Specify Color	1
197022	Standing Post Assembly, Specify Color	1
183882	Stand-up Spinner Hardware Package	1
100321	³ / ₈ " Hex Patch Nut, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	4
156847	Play Safe Label, 5-12 Years	1
127935	Rubber Gasket	1
183064	Warning label	1

Specifications

Spinner Post:	Weldment comprised of 2.375" O.D. RS20 (.095" 105") galvanized steel tubing, 1.029" O.D. RS20 (.070"080") galvanized steel tubing, 7 GA. (.179") HRPO flat steel, and 7 GA. (.179") HR flat steel. Finish: TenderTuff [®] , color specified.			
Standing Post Assy:	(Spinner Post) Weldment comprised of 2.875" O.D. RS40 (.160"170" wall) galvanized steel tubing, 1.250" O.D. steel shaft, 12 Ga. (.105") HR flat steel, and 1144 steel collar. Finish: ProShield, color specified. (Sleeve/Plate) Weldment comprised of $1/_4$ " sheet HRPO steel and 2.875" O.D. schedule 80 steel tubing. Finish: ProShield [®] , color specified.			
Rubber Gasket:	Made from 50 durometer neoprene.			
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).			
Installation Time: Concrete Req.: Area Req.: Min. Use Zone: Weight: Fall Height:	Approx. 1 man hour Approx. 3.5 cu. ft. 14' (4,27 m) diameter 6' (1,82 m) minimum use zone 60 lbs. 8" (200 mm)			

Installation Instructions

- 1) Dig footing as shown. Refer to the Direct Bury Detail.
- Attach spinner post and rubber gasket to standing post assembly using ³/₈" hex patch nuts with ³/₈" SAE flat washers, as shown. NOTE: Install Rubber Gasket with small diameter down.
- 3) Position spinner in footing hole and pour concrete footing. With spinner post plumb, prop to hold in position. Allow concrete to cure a minimum of 72 hours before users are allowed to play on the structure.
- 4) Apply labels as shown.
- 5) Install protective surfacing before users are allowed to play on the structure.




Evos® 156452 Wobble Pod® Bouncer

Parts List

Part#	Description	Qty.
115154	Spring Leg, Specify Color	2
154631	Wobble Pod, Specify Color	1
156913	Spring Assembly w/Plates, Specify Color	2
156980	Wobble Pod Hardware Package	1
100196	3/8" x 7/8" BHCS w/Pin, SST	8
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8
100327	3/8" Standard Hex Nut, SST	8
100365	3/." SAF Flat Washer SST	24

Specifications

Wobble Pod:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Spring Assembly:	Comprised of 5 ${}^{5}/{}_{8}$ " diameter ${}^{13}/{}_{16}$ " tempered alloy steel coil, ${}^{1}/{}_{4}$ " thick HRPO zinc plated steel, ${}^{1}/{}_{4}$ " thick HRPO sheet steel and spring wedge casting made from A-356 T-6 aluminum. Finish: ProShield®, color specified.
Spring Leg:	Weldment comprised of 3 $^{1}/_{2}$ " O.D. RS20 (.120"130" Wall) galvanized steel tubing and $^{1}/_{4}$ " x 10" diameter HRPO zinc plated steel mounting plate. ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Concrete Req.: Area Req.: Weight: Fall Height:	Approx. 2 man hours Approx. 6 cu. ft. 6' (1,83 m) minimum use zone 122 lbs. 16" (410 mm)

Installation Instructions

5)

- 1) Dig footing holes as shown. Refer to the Site Plan for proper location of Wobble Pods.
- 2) Attach spring assemblies to Wobble Pod, using 3/8" x 7/8" BHCS w/pin with 3/8" SAE flat washers, as shown.
- 3) Attach spring legs to spring assemblies, using ³/₈" x 1 ¹/₈" BHCS w/ pin with ³/₈" SAE flat washers and ³/₈" standard hex nuts with ³/₈" SAE flat washers, as shown. Refer to the Spring Leg Attachment Detail.
- 4) With Wobble Pod propped in plumb position, pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure.
 - Install protective surfacing before users are allowed to play on the component.







EVOS[®] 156454 E-Pod[®] Step 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185



Parts List

Part#	Description Qty.
154461	E-Pod, Specify Color1
156806	Pod Casting, Specify Color1
156968	Pod Hardware Package1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST
100(10	1/ " x 5/ " Drive Divet AL/SST 1

Specifications

E-Pod:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Pod Casting:	Fabricated from sand cast alloy 356 in accordance with ASTM B26. Finish: ProShield®, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight: Fall Height:	Approx. ¹ / ₄ man hour 11 lbs. Pod Height

Installation Instructions

- 1) Attach e-pod and pod casting to arch as shown, using $^{3}\!/_{8}$ " x 1 $^{1}\!/_{8}$ " BHCS w/pin.
- 2) Drill through hole in pod casting and into arch with a 1/4" or "F" (only) drill bit. Insert 1/4" x 5/8" rivet in hole and hammer rivet pin in until it is flush with head.
- 3) Install protective surfacing before users are allowed to play on the structure.



DETAIL

20284000





Evos® 202823 Gyro Twister® Spinner, w/Steel Posts

Parts List

Part#	Description	Qty.
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
105327	5" Half Clamp, Specify Color	2
171114	Gyro Twister Spinner Assembly, Specify Color	1
157092	Footer, (DB), Specify Color	1
186027	Spinner UHMW Bushing	4
195055	Support Arm, Specify Color	1
202825	132" Steel Posts, (42" DB), Specify Color	2
160502	Gyro Twister Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	4
100351	³ / ₈ " T-Nuts, SST	4
131849	⁵ / ₁₆ " x ¹ / ₂ " BHCS w/Pin, SST	4
DB = Direct Bury		

Specifications

Support Arm:	Weldment comprised of 2.375" (60,33 mm) O.D. RS40 (.130"140")(3,30 mm - 3,56 mm) wall galvanized steel tube, 2.750" (69,85 mm) O.D. 1018 steel, and $^{1}/_{4}$ " (6,35 mm) HRPO flat steel. Finish: ProShield [®] , color specified.	5)
Post:	See PlayBooster® (PB) General Specifications.	
Gyro Twister Spinner Assy.:	Weldment comprised of 1.900" (48,26 mm) O.D. RS40 (.130"140") ($3,30 \text{ mm} - 3,55 \text{ mm}$) wall galvanized steel tube, 1.660" (42,16 mm) O.D. RS40 (.111"121") (2,82 mm-3,07 mm) galvanized steel tube, ${}^{3}/{}_{16}$ " (4,75 mm) HRPO steel plate and $1 {}^{7}/{}_{8}$ " (47,63 mm) steel ball. Finish: ProShield, color specified.	6) 7)
Bushing:	Oil-filled UHMW PE.	
Footer:	Weldment comprised of 2.375" (60,33 mm) O.D. RS40 (.130"140") ($3,30 \text{ mm} - 3,55 \text{ mm}$) wall galvanized steel tube, 12 Ga. (.105") (2,67 mm) HR flat steel and 1 $7/_8$ " (47,63 mm) steel ball. Finish: ProShield, color specified.	
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).	
Installation Time: Concrete Req.: Min. Use Zone: Weight: Fall Height:	Approx. 2 $\frac{1}{2}$ man hours Approx. 7.93 cu. ft. 6' (1830 mm) minimum use zone 253 lbs. 50" (1270 mm)	

Installation Instructions

- 1) **(Direct Bury)** Dig footing as shown. Refer to the Plan View Footing Layout and Footer Attachment Detail.
- Attach support arm to posts at height shown, using 5" half clamps, ³/₈" x ⁷/₈" BHCS w/pin and ³/₈" tee nuts. Refer to the Support Arm Attachment Detail.
- 3) Place a bushing on each side of the footer's/twist post's 1 ⁷/₈" ball, as shown. Insert footer/twist post with bushings into Gyro Twister assembly. Align holes in bushings with holes in housing. When holes are aligned, insert ⁵/₁₆" x ¹/₂" BHCS w/pin. Refer to the Gyro Twister Assembly Detail. NOTE: Use the slot in the bottom of the bushing to align holes.
- 4) Place a bushing on each side of the Gyro Twister assemblies 1⁷/₈" ball, as shown. Insert Gyro Twister assembly with bushings into upper spinner mount. Align holes in bushings with holes in housing. When holes are aligned, insert ⁵/₁₆" x ¹/₂" BHCS w/pin. Refer to the Gyro Twister Assembly Detail. NOTE: Use the slot in the bottom of the bushing to align holes.
 - (Direct Bury) Place a level on the footer gusset, when gusset and posts are plumb, pour concrete footing. Allow concrete footing to cure a minimum of 72 hours before users are allowed to play on structure. NOTE: Gyro Twister assembly will have to be propped in position, until concrete has cured.
 - Install $\frac{1}{4}$ x $\frac{5}{8}$ drive rivets in 5" half clamps. Drill through hole in half clamp and into 5" post with a $\frac{1}{4}$ or "F" (only) drill bit, insert rivet in hole and hammer rivet pin in until it is flush with head.
 - Install protective surfacing before users are allowed to play on the structure.







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165533 Bow Ladder[®], Evos To PB **Evos**[®] 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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DETAIL **DIRECT BURY** Deck $19^{1/_{2}}$ Balcony Deck Concrete Footing 21" 530 42" 1070







Evos® 165533 Bow Ladder®, Evos To PB

Parts List

Part#	Description	Qty.
146086	Balcony Deck, Specify Color	1
154461	E-Pod, Specify Color	2
154782	Bow Ladder, Specify Color	1
156699	Ball Clamp, Specify Color	2
156700	Ball Retainer, Specify Color	2
156806	Pod Casting, Specify Color	2
165568	Support, (DB), Specify Color	1
182631	Clamp Bushing, Aluminum	4
182632	Clamp Housing, Specify Color	2
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
105327	5" Half Clamp, Specify Color	2
156968	Pod Hardware Package	2
100198	3/8" x 1 1/8" BHCS w/Pin, SST	8
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	2
193359	Bow Ladder Evos To PB Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	4
100351	³ / ₈ " Tee Nut, SST	4
183100	³ / ₈ " x ¹ / ₂ " Set Screw, SST	4
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100201	⁵ / ₈ " x 1 ¹ / ₂ " BHCS w/Pin, SST	4
204452	Balcony Deck w/Support Hardware Package	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100327	³ / ₈ " Standard Hex Nut, SST	4
100365	³ / ₈ " SAE Flat Washer, SST	12
100196	3/8" x 7/8" BHCS w/Pin, SST	2
100349	³ / ₈ " Standard Hex Nut, SST	2
DB = Direct Bury		

Specifications

Bow Ladder:	Weldment comprised of 1.315" O.D. RS20 (.080"090" Wall) galvanized steel tubing, 2.375" O.D. RS20 (.095"105" Wall) galvanized steel tubing, and $1.7/_{8}$ " steel ball. Finish: ProShield [®] , color specified.	6)
Deck:	Fabricated from 12 GA (.105") sheet steel conforming to ASTM A1011. Standing surface is perforated with $\frac{5}{16}$ " diameter holes. The finished size measures 2 $\frac{5}{8}$ " x 34" (straight edge) x 17" radius (curved edge). Finish: TenderTuff [®] , color specified.	7)
Clamp Housing:	Weldment comprised of $^{1}/_{4}$ " (6,35 mm) HRPO flat steel and 1018 steel. Finish: ProShield, color specified.	8)
Half Clamp:	Cast aluminum. Finish: ProShield, color specified.	9)
Support:	Fabricated from 1.660" O.D. RS20 (.085"095" Wall) galvanized steel tubing. Finish: ProShield, color specified.	10
Ball Clamp/		
Ball Retainer:	Cast from 535 almag. Finish: ProShield, color spec- ified.	
E-Pod:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	
Pod Casting:	Fabricated from sand cast alloy 356 in accordance with ASTM B26. Finish: ProShield, color specified.	

Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	Approx. 2 man hours
Area Req.:	6' (1,83 m) minimum use zone
Concrete Req.:	Approx. 1.31 cu. ft.
Weight:	164 lbs.
Fall Height:	82" (2,08 m)

Installation Instructions

- (Direct Bury) Refer to the Site Plan for footing locations. 1)
- Attach 5" clamps to posts at dimension shown, using $\frac{5}{8}$ " x 1 $\frac{1}{2}$ " BHCS 2) w/pin (with gray anti-seize). Do not final tighten fasteners at this time. Attach ball retainers to 5" clamps using 5/8" x 1 1/2" BHCS w/pin. Refer to the Bow Ladder Attachment Detail.
- 3) Attach bow ladder to ball retainers, using ball clamps and $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/pin. Refer to the Evos Attachment Detail. NOTE: 5" Clamps may need to be turned to connect and position bow ladder properly. Retighten 5" clamp fasteners when bow ladder is in proper position.
- 4) Attach clamp housings to posts at height shown, using 5" half clamps, 3_{8} " x 7_{8} " BHCS w/pin and 3_{8} " tee nuts. Place a bushing on each side of bow ladders 1 7/8" steel balls, as shown. Insert bow ladder with bushings into clamp housings. Align holes in bushings with holes in clamp housings. When holes are aligned, insert $\frac{3}{8}$ " x $\frac{1}{2}$ " set screws. Refer to the Post Attachment Detail. NOTE: Use the slot in the bottom of the bushing to align holes.
- 5) Attach support to balcony deck, using 3/8" x 7/8" BHCS w/pin with 3/8" SAE flat washers and $\frac{3}{8}$ " low crown cap nuts with $\frac{3}{8}$ " SAE flat washers. Refer to the Support Attachment Detail.
- Attach balcony deck to tenderdeck, using $3/8" \ge 1 \frac{1}{8}"$ BHCS w/pin 6) with $\frac{3}{8}$ " SAE flat washers and $\frac{3}{8}$ " standard hex nuts with $\frac{3}{8}$ " SAE flat washers. Refer to the Tenderdeck Detail.
 - Attach e-pods and pod castings to Evos arches at dimensions shown, using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/pin.
- Drill through hole in pod casting and into arch post with a 1/4" or "F" 8) (only) drill bit. Insert 1/4" x 5/8" rivet in hole and hammer rivet pin in until it is flush with head.
- 9) With support plumb, pour concrete footing. Allow concrete footing to cure for a minimum of 72 hours before users are allowed to play on the structure.
- 10) Install protective surfacing before users are allowed to play on the structure.





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Document #17959600

landscape structures[®]

PlayBooster® 179594 Vibe® Roof

Parts List

Part#	Description	Qty.
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	
177021	Vibe Roof Roto, Specify Color	
178724	Infill Panel, Specify Color	
178725	Roof Clamp, Specify Color	2
179611	Vibe Roof Hardware Package	1
100196	3/8" x 7/8" BHCS w/Pin, SST	7
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	
100365	³ / ₈ " SAE Flat Washer, SST	7

Specifications

Infill Panel:	Made from 12 GA. (.105") (3,18 mm) thick HRPO steel sheet zinc plated. Finish: ProShield [®] , color specified.
Roof:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Clamps:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Approx. 2 man hours per roof 81 lbs.

Specifications are subject to change without notice

Installation Instructions

- 1) Fasten infill panel to roof, using ${}^{3}/{}_{8}$ " x ${}^{7}/{}_{8}$ " BHCS w/pin and ${}^{3}/{}_{8}$ " SAE flat washers.
- 2) Attach roof to posts at dimension shown, using roof clamps and $\frac{3}{8}$ " x $1\frac{1}{8}$ " BHCS w/pin.
- 3) Using the predrilled ¹/₄" holes in roof clamps as a guide, drill ¹/₄" holes into posts. Insert ¹/₄" x ⁵/₈" drive rivets into drilled holes and tap pin in until it is flush with rivet head.
- 4) Install protective surfacing before users are allowed to play on the structure.



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601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605

Sheet 1 of 2 763-972-5200 Int. FAX (763) 972-3185

Parts List

Part#	Description Qty.
1//757	Model #168100
166/5/	Sensory Roto Main Wall, Specify Color
16/219	Wall Mount Plate Footer, (DB), Specify Color*
	Model #168101
166758	Sensory Roto End Wall, Specify Color1
167219	Wall Mount Plate Footer, (DB), Specify Color*
	Model #168661
167186	Sensory Wall Plate, Specify Color1
169036	Attachment Plate Hardware Package1
100353	³ / ₈ " Flange Nuts w/Pin. SST
100365	³ / ₈ " SAE Flat Washer, SST4
100173	³ / _s " x 2" BHCS w/Pin. SST
169179	2-Hole Play Center End (DB) Hardware Pkg1
100321	³ / _s " Patch Hex Nut. SST
100362	³ / ₈ " Flat Washer. SST
123224	$3/8" \ge 1^{-11}/16"$ BHCS w/Pin. SST
183890	4-Hole Play Center Wall (DB) Hardware Pkg1
100321	³ / ₈ " Patch Hex Nut, SST
100362	³ / ₈ " Flat Washer, SST
123224	³ / ₈ " x 1 ¹¹ / ₁₆ " BHCS w/Pin, SST
156846	Play Safe Label 2-12 Yrs1
183064	Warning Label
169174	2-Hole Play Center End (SM) Hardware Pkg1
100263	$\frac{3}{8}$ x 2 $\frac{3}{4}$ Expansion Anchors
100264	³ / ₈ " x 5" Expansion Anchors
100327	³ / ₈ " Standard Hex Nut, SST
100362	³ / ₈ " Flat Washer, SST
169172	1 ¹ / ₈ " O.D. x 2" Long Spacer Tube, AL
183891	4-Hole Play Center Wall (SM) Hardware Pkg1
100263	3/8" x 2 $3/4$ " Expansion Anchors
100264	$\frac{3}{8}$ x 5" Expansion Anchors
100327	³ / _s " Standard Hex Nut. SST
100362	³ / ₈ " Flat Washer, SST
169172	1 ¹ / ₈ " O.D. x 2" Long Spacer Tube, AL
156846	Play Safe Label 2-12 Yrs
183064	Warning Label
* = Quantity I	Determined By Your Order
DB = Direct B	Burv

SM - Surface Mount

Specifications

Walls:	Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.
Wall Plate:	Fabricated from $1/4$ " HRPO steel plate. Finish: Pro-Shield [®] , color specified.
Wall Mount Plate Footer:	Weldment comprised of 2.375" O.D. RS20 (.095"105") wall galvanized steel tubing and ¹ / ₄ " HRPO steel plate. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	Main Wall (DB) $1^{1/4}$ man hours End Wall (DB) ${}^{3/4}$ man hour Main Wall (SM) $1^{-1/4}$ man hours End Wall (SM) ${}^{3/4}$ man hour
Weight:	Main Wall (JB) 88 lbs. Main Wall (SM) 54 lbs. End Wall (SM) 21 lbs. Frd Wall (SM) 21 lbs.
Concrete:	(DB) Approx. 1.31 cu. ft. per hole

Specifications are subject to change without notice

Installation Instructions

(Direct Bury)

- 1) Refer to the Site Plan for footing locations.
- 2) Insert wall plate into main wall and attach, using ³/₈" x 2" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin. Connect end wall to wall plate, using ³/₈" x 2" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin.
- 3) Attach wall mount plate footers to wall sections, using ³/₈" x 1 ¹¹/₁₆" BHCS w/pin with ³/₈" flat washers and ³/₈" patch hex nuts with ³/₈" flat washers. Refer to the Direct Bury Detail. NOTE: *Pull end wall and main wall sections together before tightening bolts.*
- 4) With Sensory wall sections in position and plumb, pour concrete footings. Allow concrete to cure a minimum of 72 hours before allowing users to play on the structure.
- 5) Apply labels as shown.
- 6) Install protective surfacing before users are allowed to play on the structure. **NOTE:** *When a Sensory Play Center is installed in a play-ground environment, protective surfacing is required.*

(Surface Mount Without Protective Surfacing)

- Insert wall plate into main wall and attach, using ³/₈" x 2" BHCS w/ pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin. Connect end wall to wall plate, using ³/₈" x 2" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin. NOTE: *Pull end wall and main wall sections together before tightening bolts.*
- 2) With Sensory wall sections in position, mark anchor bolt locations on the concrete slab (through wall section holes). Move wall sections aside. Drill ³/₈" x 3" deep holes, using a hammer drill and ³/₈" masonry bit.
- 3) Reposition wall sections. Tap ${}^{3}/{}_{8}$ " x 2 ${}^{3}/{}_{4}$ " expansion anchors into drilled holes. Fasten wall sections to ${}^{3}/{}_{8}$ " x 2 ${}^{3}/{}_{4}$ " expansion anchors, using ${}^{3}/{}_{8}$ " standard hex nuts with ${}^{3}/{}_{8}$ " flat washers. Refer to the Surface Mount Without Protective Surfacing Detail.
- 4) Apply labels as shown.

(Surface Mount With Protective Surfacing)

- Insert wall plate into main wall and attach, using ³/₈" x 2" BHCS w/ pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin. Connect end wall to wall plate, using ³/₈" x 2" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin. NOTE: *Pull end wall and main wall sections together before tightening bolts.*
- 2) With Sensory wall sections in position, mark anchor bolt locations on the concrete slab (through wall section holes). Move wall sections aside. Drill ³/₈" x 3" deep holes, using a hammer drill and ³/₈" masonry bit.
- 3) Reposition wall sections with 1 $\frac{1}{8}$ " O.D. x 2" long spacer tubes in between bottom of wall sections and concrete slab. Tap $\frac{3}{8}$ " x 5" expansion anchors into drilled holes. Fasten wall sections to $\frac{3}{8}$ " x 5" expansion anchors, using $\frac{3}{8}$ " standard hex nuts with $\frac{3}{8}$ " flat washers. Refer to the Surface Mount With Protective Surfacing Detail.
- 4) Apply labels as shown.
- 5) Install protective surfacing before users are allowed to play on the structure. **NOTE:** *When a Sensory Play Center is installed in a play- ground environment, protective surfacing is required.*

Eco #54517 Document #18384200 replaces #16871200. Added warning labels to hardware packa 305

landscape structures[®]

SAFETY NOTE

Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

168712a DETAIL **DIRECT BURY** Sensory Wall Section ³/₈" x 1 ¹¹/₁₆"-BHCS w/Pin w/ 3/8" Flat Washers Loose Fill 3/8" Patch Hex Protective Surfacing Nuts w/ 3/8" Flat Washers Δ ⊿ ⊳ Subgrade 1 늰 34" 860 Δ \triangleleft Min. Wall Mount 510 Plate Footer 20" Δ A .:-۵ 1 Concrete 4 ⊿ ∇ ⊿ Crushed Rock **NOTE: When a Sensory Play Center is** installed in a playground environment, protective surfacing is required. 12" 300 DETAIL DETAIL SURFACE MOUNT SURFACE MOUNT (WITH PROTECTIVE SURFACING) (WITHOUT PROTECTIVE SURFACING) 3/8" Standard Hex Nuts w/ 3/8" Flat 3/8" Standard Hex Washers Nuts w/ 3/8" Flat Washers Sensory Wall ³/₈" x 5" Sensory Wall Section Expansion Section ³/₈" x 2 ³/₄" Ö Anchors Expansion Anchors Unitary 1 ¹/₈" O.D. x 2" Protective Long Spacer Surfacing Concrete Tubes đ 4⊿ Ą Ш Concrete Slab Crushed Crushed Rock Rock

Sensory Play Center[®] Sensory Play Sheet 2 of 2 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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Slab

Document #18384200





18432900



168104 Optigear Panel[®]

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Sensory Play

Documggat #18432900

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Sensory Play 168104 Optigear Panel®

Parts List

Part#	Description	Qty.
181247	Optigear Panel Assembly, Specify Color	1
167014	Ring Panel, Specify Color	1
169035	Optigear Panel Hardware Package	1
169035 100200	Optigear Panel Hardware Package	1 6
169035 100200 100353	Optigear Panel Hardware Package	1

Specifications

Optigear	
Panel Assy.:	(Panels) Two color Permalene [®] , color specified. (Poly Panel) .236" thick clear polycarbonate, $\frac{3}{8}$ " threaded rod and $\frac{3}{16}$ " SST plate.
Ring Panel:	Two color Permalene, color specified.
Fasteners: Primary fasteners shall be socketed and pinn- perproof in design, stainless steel (SST) per A 879 unless otherwise indicated (see specific p installation/specifications).	
Installation Time: Weight:	$\frac{1}{2}$ man hour 41 lbs.

Installation Instructions

Attach Optigear panel assembly to sensory wall, using ring panel, ³/₈" x 3 ¹/₂" BHCS w/Pin with ³/₈" SAE flat washers and ³/₈" flange nuts with pin. NOTE: Optigear panel assembly can be attached on either side of the Sensory Wall.





16871100





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Sensory Play

Document #18129300

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Sensory Play 168662 Marble Panel®

Parts List

Part#	Description	Qty.
181246	Marble Panel Assembly, Specify Color	
167014	Ring Panel, Specify Color	1
169034	Marble Panel Hardware Package	1
100174	³ / ₈ " x 2 ¹ / ₂ " BHCS w/Pin, SST	6
100353	³ / ₈ " Flange Nut w/Pin, SST	6
100365	³ / ₈ " SAE Flat Washer, SST	6

Specifications

Marble Panel Assy.:	(Panels) Two color Permalene [®] , color specified. (Poly Panel) Fabricated from .236" thick clear polycarbonate. (Marbles) 2" Diameter glass.
Ring Panel:	Two color Permalene, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	$1/_2$ man hour 36 lbs.

Installation Instructions

Attach marble panel assembly to sensory wall, using ring panel, ³/₈" x 2 ¹/₂" BHCS w/Pin with ³/₈" SAE flat washers and ³/₈" flange nuts with pin. NOTE: Marble panel assembly can be attached on either side of the Sensory Wall.





Sensory Play 168666 Bongo and Xylofun Panel®

Parts List

Part#	Description	Qty.
163911	Small Bongo, Specify Color	1
163912	Large Bongo, Specify Color	1
167537	Bongo Panel, Specify Color	1
169062	Xylofun Panel Assembly, Specify Color	1
164523	Screen Plate, Black	2
168715	Sensory Panel Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	8
100199	³ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	6
100353	³ / ₈ " Flange Nut w/Pin, SST	14
100365	³ / ₈ " SAE Flat Washer, SST	14
162374	¹ / ₄ " x ³ / ₄ " BHCS w/Pin, SST	6
127463	T-27 Torx Hex Bit	1

Specifications

Bongo Panel:	Recycled Permalene® panel, color specified.
Xylofun Panel Assy.:	Recycled Permalene panels, $1/8$ " thick steel, .125" O.D. aluminum tube and $1/2$ " threaded steel rod, color specified.
Bongos:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Screen Plate:	Fabricated from 12 GA. (.105") HRPO flat steel. Finish: ProShield [®] , black in color.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	$^{3}/_{4}$ man hour

Weight: 55 lbs.

Installation Instructions

- Attach screen plates to bongos, using ¹/₄" x ³/₄" BHCS w/pin. Refer to the Screen Attachment Detail. NOTE: Screen plates attach (flat side to flat side) to inside of Bongos.
- 2) Attach Bongos to Bongo Panel using ³/₈" x ⁷/₈" BHCS w/pin with ³/₈" SAE flat washers and ³/₈" flange nuts w/pin. Refer to the Bongo Attachment Detail.
- 3) Attach bongo panel and xylofun panel assembly to sensory wall, using ³/₈" x 2 ¹/₄" BHCS w/Pin with ³/₈" SAE flat washers and ³/₈" flange nuts with pin. NOTE: Bongo panel and xylofun panel assembly can be attached on either side of the Sensory Wall.





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PlayBooster[®] 130390 Double Swoosh[™] Slide, 64"-72"

Parts List

Part#	Description	Qty.
128823	Double Swoosh Slide, 64"/72", Specify Color	1
128777	Slide Hood, Specify Color	1
100583	40 ⁷ / ₁₆ " Aluminum Rail, Specify Color	1
132443	Spacer Tube, Specify Color	2
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet AL/SST	2
150941	Support (DB), Specify Color	2
151021	Support 64" Deck (SM), Specify Color	2
151022	Support 72" Deck (SM), Specify Color	2
243322	Double Swoosh Slide Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	12
100203	⁵ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	2
100292	³ / ₈ " x 1 ¹ / ₄ " BHCS w/Pin Ltd. Thread Bolt, SST	4
100351	³ / ₈ " Tee Nut, SST	4
100362	³ / ₈ " Flat Washer, SST	16
111442	Rubber Bushing	4
121348	4 Hole (SM) Hardware Package	1
100266	¹ / ₂ " x 2 ³ / ₄ " Expansion Anchor	4
100322	1/2" Standard Hex Nut, SST	4
100363	¹ / ₂ " Flat Washer, SST	4
DB = Direct Bury	,	
SM = Surface Mo	unt	

Specifications

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Slide:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	
Spacer Tube:	Fabricated from 1.3125 O.D. x 16 Ga. (.065) steel tubing. Finish: ProShield [®] , color specified.	
Hood:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.	
Rail:	Extruded from 1.125" O.D. x .312" W. 6005-T5 aluminum. Finish: ProShield, color specified.	4
Support:	Weldment comprised of 2.375" O.D. RS-20 (.095"105") galvanized steel tubing and $1/4$ " x 3" mounting plate. Finish: ProShield, color specified.	4
Offset Hanger	Cost aluminum Finish: Drachield color aposfod	
Jamp Assembly:	Cast alumnum. Finish. Prosmeta, color specified.	
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).	6
nstallation Time:	SM - Approx. 2 man hours DB - Approx. 3 man hours	
Concrete Req.:	Approx. 2.6 cu. ft.	
Weight:	179 lbs.	
Fall Height:	64" (1,63 m) Deck Height 6' (1,83 m) Deck Height	

Direct Bury

- 1) Dig footings spaced as shown.
- Attach the supports to the slide using ³/₈" x 1 ¹/₄" BHCS w/Pin limited thread bolts, ³/₈" flat washers, rubber bushings and ³/₈" flat washers. Refer to the Support Attachment Detail.
- 3) Attach the slide to the face of the deck using 3/8" x 7/8" BHCS w/Pin with 3/8" flat washers. Refer to the Deck Connection Detail.
- 4) Attach the slide hood to the slide using $3/8" \ge 3/8"$ BHCS w/Pin with 3/8" flat washers.
- 5) Insert 40 $^{7}/_{16}$ " rail through top of hood, place spacer tubes over each end of the 40 $^{7}/_{16}$ " rail and attach to posts at height shown using offset hanger clamp assemblies. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 6) Prop the end of the slide according to the proper deck height. With support plumb pour concrete footings. Allow concrete footing to cure for a minimum of 72 hours before users are allowed to play on the structure.
- 7) Install protective surfacing before users are allowed to play on the structure.

Surface Mount

- Attach the supports to the slide using ³/₈" x 1 ¹/₄" BHCS w/Pin limited thread bolts, ³/₈" flat washers, rubber bushings and ³/₈" flat washers. Refer to the Support Detail.
- 2) Attach the slide to the face of the deck using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/Pin with $\frac{3}{8}$ " flat washers. Refer to the Deck Connection Detail.
- 3) Mark anchor bolt locations on concrete slab through holes in anchor plates and disconnect slide from the face of the deck. Drill ¹/₂" x 3" deep holes on marks into concrete using a hammer drill and ¹/₂" masonry bit. Tap expansion anchors into drilled holes. Reposition slide and reattach to the face of the deck following step 2. Fasten support to expansion anchors using ¹/₂" standard hex nuts with ¹/₂" flat washers.
- 4) Attach the slide hood to the slide using $\frac{3}{8}$ " x $\frac{7}{8}$ " BHCS w/Pin with $\frac{3}{8}$ " flat washers.
- 5) Insert 40 $^{7}/_{16}$ " rail through top of hood, place spacer tubes over each end of the 40 $^{7}/_{16}$ " rail and attach to posts at height shown using offset hanger clamp assemblies. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 6) Install protective surfacing before users are allowed to play on the structure.

Installation Instructions



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PlayBooster® 131437 Slide Hood Details 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 973:3185

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Document #24024500

PlayBooster® 131437 Wave Slide, 64"-72"



Parts List

Part#	Description	Qty.
130612	Wave Slide, Specify Color	1
134180	Slide Hood, Specify Color	1
103201	Exit Support, (DB), Specify Color	1
130691	Mid-Support, (DB), Specify Color	1
131653	Exit Support, 64" Deck (SM), Specify Color	1
103198	Exit Support, 72" Deck (SM), Specify Color	1
131655	Mid-Support, 64" Deck (SM), Specify Color	1
131651	Mid-Support, 72" Deck (SM), Specify Color	1
100583	40 ⁷ / ₁₆ " Rail, Specify Color	1
105327	5" Half Clamp, Specify Color	2
113729	Offset Hanger Clamp, Specify Color	2
132443	Spacer Tube, Specify Color	2
131672	Slide Hardware Package	1
100292	³ / ₈ " x 1 ¹ / ₄ " BHCS w/Pin Ltd. Thread Bolt, SST	6
111442	Rubber Bushing	6
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	2
100362	³ / ₈ " Flat Washer, SST	14
106578	Hood Hardware Package	1
100196	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin, SST	2
100362	³ / ₈ " Flat Washer, SST	2
100203	⁵ / ₈ " x 2 ¹ / ₄ " BHCS w/Pin, SST	2
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	4
100351	³ / ₈ " Tee Nut, SST	4
100610	$1/_4$ " x $5/_8$ " Drive Rivet, AL/SST	2
121348	4-Hole (SM) Hardware Package	1
100266	$\frac{1}{2}$ " x 2 $\frac{3}{4}$ " Expansion Anchor	4
100322	¹ / ₂ " Standard Hex Nut, SST	4
100363	¹ / ₂ " Flat Washer, SST	4
DB = Direct Bury	y	
SM = Surface Mo	ount	

Specifications

Hood/Slide:	Rotationally molded from U.V. stabilized linear low density polyethylene, color specified.
Mid-Support:	Weldment comprised of 2.375" O.D. RS-20 (.095"105") galvanized steel tubing and $\frac{1}{4}$ " x 3" mounting plate. Finish: ProShield [®] , color specified.
Exit Support:	Weldment comprised of 2.375" O.D. RS-20 (.095"105") galvanized steel tubing and $\frac{1}{4}$ " mounting plate. Finish: ProShield, color specified.
Spacer Tube:	Fabricated from 1.3125 O.D. x 16 Ga. (.065) steel tubing. Finish: ProShield, color specified.
Rail:	$1~^{1}/_{8}$ " O.D. 6005-T5 aluminum extrusion with $^{5}\!/_{16}$ " wall. Finish: ProShield, color specified.
Offset Hengen	
Clamp Assembly:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Installation Time:	Approx. 3 man hours
Concrete Req.:	Approx. 2.6 cu. ft.
Area Req.:	6' (1,83 m) minimum use zone at exit
Weight:	121 lbs.
Fall Height:	64" Deck (1,63 m)
C	72" Deck (1,83 m)

Installation Instructions

7)

- 1) (Direct Bury) Dig footings spaced as shown.
- 2) Insert 40 ⁷/₁₆" rail through hood, place spacer tubes over each end of the 40 ⁷/₁₆" rail, attach to offset hanger clamps as shown using ⁵/₈" x 2 ¹/₄" BHCS w/Pin. Position hood against face of deck and line up holes in hood and deck. Attach hood to deck using ³/₈" x ⁷/₈" BHCS w/Pin with ³/₈" flat washers. See Detail 1.
- 3) Attach offset hanger clamps to posts with 5" half clamps using $\frac{3}{8}$ " x 1 $\frac{1}{8}$ " BHCS w/Pin and $\frac{3}{8}$ " tee nuts. Refer to the Typical Offset Hanger Clamp Spec Sheet.
- 4) Attach supports to slide using ³/₈" x 1 ¹/₄" BHCS w/Pin limited thread bolts, ³/₈" flat washers and rubber bushings. See Detail 3. NOTE: Attach bolts in the center of the slots to allow for expansion and contraction. Snug bolts down only. Do not overtighten!
- 5) Attach slide to the face of the deck using $\frac{3}{8}$ x $\frac{7}{8}$ BHCS w/Pin and $\frac{3}{8}$ flat washers. See Detail 2.
- (Direct Bury) With supports plumb pour concrete footings. Allow concrete footings to cure for a minimum of 72 hours before users are allowed to play on the structure.

(Surface Mount) Mark anchor bolt locations on concrete slab through holes in anchor plate and remove slide. Drill $\frac{1}{2}$ " x 3" deep holes on marks into concrete using a hammer drill and $\frac{1}{2}$ " masonry bit. Tap expansion anchors into drilled holes. Reposition slide and reattach to the face of the deck following step 6. Fasten anchor plates to expansion anchors using $\frac{1}{2}$ " standard hex nuts with $\frac{1}{2}$ " flat washers.

Install protective surfacing before users are allowed to play on the structure.





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 Swings
 Inffuino Dello Dello Seal
 Sheet 1 of 2

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structures

Swings 174018 Belt Seat

Parts List

Part #	Description	Qty.
128842 178679 175251	7 Ft. High Beam Belt Swing Seat, Black 57 ⁷ / ₁₆ " Chain, TenderTuff, Specify Color 57 ⁷ / ₁₆ " Chain, ProGuard	1 2 2
132672 100292 138915 112501	Bolt Link w/Bolt & Spacers	1 2 2 4
132635 100292-00 138915	Bolt Link w/Bolt Hardware Package	1 2 2
128842 152050 174404	<u>8 Ft. High Beam</u> Belt Swing Seat, Black 67 ⁷ / ₈ " Chain, TenderTuff, Specify Color 67 ⁷ / ₈ " Chain, ProGuard	1 2 2
132672 100292 138915 112501	Bolt Link w/Bolt & Spacers ^{3/} ₈ x 1 ¹ / ₄ " BHCS w/Pin Ltd. Thread, SST Bolt Link, SST Chain Spacer	1 2 2 4
132635 100292 138915	Bolt Link w/Bolt Hardware Package	1 2 2
128842 152052 174884	<u>10 Ft. High Beam</u> Belt Swing Seat, Black 90 ¹¹ / ₁₆ " Chain, TenderTuff, Specify Color 90 ¹¹ / ₁₆ " Chain, ProGuard	1 2 2
132672 100292 138915 112501	Bolt Link w/Bolt & Spacers	1 2 2 4
132635 100292 138915	Bolt Link w/Bolt Hardware Package	1 2 2

Specifications

Chain Spacer:	Made from white nylon measuring .080" x .785" O.D.
Chain/ProGuard:	Steel ³ / ₁₆ " straight link chain, 800 lb. working load limit. Finish: ProGuard.
Chain/Coated:	Steel $\frac{3}{16}$ " straight link chain, 800 lb. working load limit. Finish: TenderTuff [®] , color specified.
Belt Seats:	Molded from U.V. stabilized black EPDM rubber encapsulating a weldment comprised of a 22 GA (.029") spring stainless steel sheet, and (4) .105" thick stainless steel washers. The belt seat elliptical shape measures 7" wide x 26" long x .700" thick.
Bolt Link:	Stainless Steel.

Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	$\frac{1}{4}$ man hour per seat
Weight:	8 lbs. (7 Ft. Beam w/ProGuard Chains)
	9 lbs. (7 Ft. Beam w/TenderTuff Chains
	8 lbs. (8 Ft. Beam w/ProGuard Chains)
	9 lbs. (8 Ft. Beam w/TenderTuff Chains)
	10 lbs. (10 Ft. Beam w/ProGuard Chains)
	11 lbs. (10 Ft. Beam w/TenderTuff Chains)

Installation

Swing Hangers With Double Clevis

- 1) Attach chains to double clevis using ${}^{3}/{}_{8}$ " x 1 ${}^{1}/{}_{4}$ " BHCS w/pin limited thread, as shown.
- Attach chains to belt seat using bolt links with ³/₈ x 1 ¹/₄ BHCS w/ pin limited thread. Be sure bolt heads face user. NOTE: Use chain spacers as shown when installing ProGuard chains.
- 3) Install protective surfacing before users are allowed to play on the structure.

Anti-wrap Swing Hangers

- 1) Attach chains to aluminum clevis using $\frac{3}{8}$ x $\frac{7}{8}$ BHCS w/pin limited thread, as shown.
- 2) Attach chains to belt seat using bolt links with ³/₈" x 1 ¹/₄" BHCS w/ pin limited thread. Be sure bolt heads face user. NOTE: Use chain spacers as shown when installing ProGuard chains.
- 3) Install protective surfacing before users are allowed to play on the structure.




Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref.

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SWING HANGER OPTIONS



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Document #21059100





SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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Swings 176038 Full-Bucket Seat, w/Chains

Parts List

Part#	Description (Qty
	7 Ft. High Beam (5" Dia. Beam)	
186276	Full-Bucket Swing Seat, Black	1
141739	43 ³ /, " Chain, TenderTuff, Specify Color	2
175248	$43\frac{3}{16}^{10}$ Chain, ProGuard	2
138414	Bucket Seat Hardware Package	1
100290	3/, " x 7/," BHCS w/Pin Limited Thread, SST	2
112501	Chain Spacer (For ProGuard Chains Only)	4
	<u>8 Ft. High Beam</u>	
186276	Full-Bucket Swing Seat, Black	1
160110	52 ⁹ / ₁₆ " Chain, TenderTuff, Specify Color	2
174882	$52 \frac{9}{16}$ " Chain, ProGuard	2
138414	Bucket Seat Hardware Package	1
100290	³ / ₈ " x ⁷ / ₈ " BHCS w/Pin Limited Thread, SST	2
112501	Chain Spacer (For ProGuard Chains Only)	4
	10 Ft. High Beam	
186276	Full-Bucket Swing Seat, Black	1
152051	76 ⁷ /" Chain, TenderTuff, Specify Color	2
174883	$76 \frac{7}{16}$ "Chain, ProGuard	2
138414	Bucket Seat Hardware Package	1
100290	³ / _o " x ⁷ / _o " BHCS w/Pin Limited Thread, SST	2
112501	Chain Špacer (For ProGuard Chains Only)	4
	7 Ft. High Ream (Tot)	
186276	Full-Bucket Swing Seat, Black	1
152053	37 ¹ / " Chain TenderTuff Specify Color	2
175247	$37 \frac{1}{2}$ " Chain, ProGuard	2
138414	Bucket Seat Hardware Package	1
100290	3/2" x 7/2" BHCS w/Pin Limited Thread. SST	2
112501	Chain Spacer (For ProGuard Chains Only)	4
	75" High Beam (Toddler)	
186276	Full-Bucket Swing Seat Black	1
152016	29 ⁷ / "Chain TenderTuff Specify Color	1
174881	29.7_8 "Chain, ProGuard	2
138414	Bucket Seat Hardware Package	1
100290	³ / _o " x ⁷ / _o " BHCS w/Pin Limited Thread, SST	2
112501	Chain Spacer (For ProGuard Chains Only)	4

Specifications

- Full-Bucket Seat:Seat shall be molded of U.V. stabilized, high quality,
black rubber, encapsulating a 24 gauge stainless steel
reinforcement plate. Handle cast from 356-T6 alumi-
num alloy with black polyarmor paint finish. Handle
attaches to seat with (3) $1/4^{"}$ x 1 $5/16^{"}$ long stainless
steel rivets. The finished size of the full bucket shall
be 9" deep x 10 $1/2^{"}$ wide.
 - **Chain/Coated:** Steel ³/₁₆" straight link chain, 800 lb. working load limit. Finish: TenderTuff, color specified.

Chain/ProGuard:	Steel ³ / ₁₆ " straight link chain, 800 lb. working load limit. Finish: ProGuard.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	 ¹/₄ man hour per seat 14 lbs. (7 FT. Beam 5" Dia. w/TenderTuff Chain) 13 lbs. (7 FT. Beam 5" Dia. w/ProGuard Chain) 14 lbs. (8 FT. Beam w/TenderTuff Chain) 14 lbs. (8 FT. Beam w/ProGuard Chain) 17 lbs. (10 FT. Beam w/ProGuard Chain) 16 lbs. (10 FT. Beam w/TenderTuff Chain) 16 lbs. (10 FT. Beam w/ProGuard Chain) 12 lbs. (7 FT. Beam w/ProGuard Chain) 12 lbs. (7 FT. Beam w/ProGuard Chain) 11 lbs. (75" Beam w/TenderTuff Chain) 11 lbs. (75" Beam w/ProGuard Chain)

Installation Instructions

Swing Hangers with Double Clevis

- 1) Attach chains to double clevis using $\frac{3}{8}$ " x 1 $\frac{1}{4}$ " BHCS w/pin limited thread bolts, as shown.
- 2) Attach chains to full-bucket seat using ³/₈ " x ⁷/₈" BHCS w/pin limited thread bolts. Be sure bolt heads face user. **NOTE:** Use chain spacers as shown when installing ProGuard chains.
- 3) Install protective surfacing before users are allowed to play on the structure.

Anti-wrap Swing Hangers

- 1) Attach chains to aluminum clevis using ³/₈" x ⁷/₈" BHCS w/pin limited thread bolts, as shown.
- 2) Attach chains to full-bucket seat using $\frac{3}{8}$ x $\frac{7}{8}$ BHCS w/pin limited thread bolts. Be sure bolt heads face user. **NOTE:** Use chain spacers as shown when installing ProGuard chains.
- 3) Install protective surfacing before users are allowed to play on the structure.





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SWING HANGER OPTIONS







SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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111418 Swing Hanger, Belt Swing 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

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Swings



Swings 111418 Swing Hanger, Belt Swing

Parts List

Part#	Description	Qty.
105327-01	5" Half Clamp, Specify Color	1
100198-00	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	2
100351-00	³ / ₈ " Tee Nut, SST	2
100610-00	$\frac{1}{4}$ " x $\frac{5}{8}$ " Drive Rivet, AL/SST	1
100292-00	3/8" x 1 $1/4$ " BHCS w/Pin Ltd. Thread Bolt, SST	1
121291-00	Swing Hanger Clamp Assy. Specify Color	1
121289-00	Swing Hanger Clamp, Specify Color	1
127068-00	⁷ / ₁₆ " x 2 ⁷ / ₁₆ " BHCS w/Pin Ltd. Thread Bolt, SST	1
138917-00	Swing Hanger Double Clevis SST	1
100667-00	Oilite Bushing	1

Specifications

Hanger Clamp Assembly:	Cast aluminum. Finish: ProShield®, color specified.
Double Clevis:	Stainless Steel.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Weight:	Approx. $1/_2$ man hour 6 lbs.

Installation Instructions

- 1) Locate and mark location of clamp on beam.
- 2) Attach 5" half clamp and swing hanger clamp to beam using 3/8" x 1 1/8" BHCS w/pin and 3/8" tee nuts. *Tighten evenly*.
- 3) IMPORTANT: Drill through holes in 5" half clamps and into 5" pipe with a ¹/₄" or "F" (only) drill bit, tap ¹/₄" x ⁵/₈" drive rivets through 5" half clamps and into pipe, to ensure that clamps remain secure.
- Attach swing chain to double clevis using ³/₈" x 1 ¹/₄" BHCS w/pin limited thread bolts.
- 5) Attach swing seat to chains using bolt links with ³/₈" x 1 ¹/₄" BHCS w/pin limited thread bolts. **NOTE:** *Do not over-tighten limited thread bolt. Threads should not protrude past bolt link. Position bolt head inward facing user.*

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SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

18448000







Swings 221292/221293 Arch Swing Frame

Parts List

Part#	Description	Q	ty.
		2 PI	Add. Bay
126749	Swing Arch, Specify Color	2	1
100610	¹ / ₄ " x ⁵ / ₈ " Drive Rivet, AL/SST	8	6
105327	5" Half Clamp, Specify Color	8	4*
216492	140" Swing Beam, Specify Color	1	1
121291	Swing Hanger Clamp Assy. Specify Color	4	4
121289	Swing Hanger Clamp, Specify Color	4	4
127068	⁷ / ₁₆ " x 2 ⁷ / ₁₆ " BHCS w/Pin Ltd. Thread, SST	4	4
138917	Swing Hanger Double Clevis	4	4
100667	Oilite Bushing	4	4
243802	Hdw Pkg 5iOD Swing Beam.	1	1
100198	³ / ₈ " x 1 ¹ / ₈ " BHCS w/Pin, SST	8	8
234397	BHCS 6LP LTHD 7/16 x 1 11/16i, SST	8	8
100292	³ / ₈ " x 1 ¹ / ₄ "BHCS w/Pin Ltd. Thread, SST	4	4
100351	³ / ₈ " Tee Nut, SST	8	8
156846	Play Safe Label, 2-12 Yrs	1	1
234937	⁷ / ₁₆ " D Cut Washer, SST	16	16
182213	Hot Surface Warning Label	1	1
182212	Entanglement Warning Label	1	1
115176	Hard Surface Warning Label	1	1
100330	⁷ / ₁₆ " Nylok Hex Nut	8	8

* = 5" Half Clamps From 2 PL. End Of Beam Need To Be Used.

Specifications

Arch Posts:	See PlayBooster® (PB) General Specifications.
Swing Beam:	Weldment comprised of tee clamps and 5" O.D. extruded 6005-T5 aluminum alloy tube with a .125" wall. Finish: ProShield [®] , color specified.
Clamp:	Cast aluminum. Finish: ProShield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time:	Approx. 8 man hours Additional Bay 4 man hours
Concrete Req.:	Approx. 7.5 cu. ft. Additional Bay 3.75 cu. ft.
Area Req.:	$24-2\frac{3}{4}$ x 32° (7,39 m x 9,75 m) Additional Bay 11'-8" x 32° (3.55 m x 9.75 m)
Weight:	204 lbs. Additional Bay 124 lbs
Fall Height:	96" (2,43 m)

Installation Instructions

- 1) Dig footings, spaced as shown. Refer to the Concrete Footing Detail.
- 2) Set arches in footing holes and attach swing beam to center of arches using 5" half clamps with 7/₁₆" BHCS w/Pin, 7/₁₆" D-Cut Washers, and 7/₁₆" Nylok nuts. Refer to the Tee Clamp Position Detail. Center of beam should be 99 ³/₄" above finished grade. When installing back to back swing beams refer to the Back To Back Tee Clamps Detail.
- 3) Level beam and plumb arches and temporarily prop in position. Pour concrete footings and let cure for 72 hours before proceeding.
- Locate, mark and attach swing hanger clamps to beam in locations shown. Refer to the Typical Swing Hanger Clamp Spec Sheet.
- 5) **NOTE:** *Refer to specific swing seat installation document for attaching chains and seats.*
- Install ¹/₄" x ⁵/₈" drive rivets in all 5" half clamps. Refer to the Typical Offset Hanger Clamp Spec Sheet. Refer to the Back To Back Tee Clamps Detail.
- 7) Apply Play Safe and Warning Labels, as shown.
- Install protective surfacing before users are allowed to play on the swing.



SAFETY NOTE Choose a protective surfacing material that has a Critical Height Value of at least the height of the Highest Accessible Part/Fall Height of the adjacent equipment. (Ref. ASTM F1487.)

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221292/221293 Arch Swing Frame **Swings**

Sheet 2 of 2

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ARCH #1 ASSEMBLY

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ARCH #3 ASSEMBLY



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ARCH #4 ASSEMBLY



Evos[®]



Arches **Evos**[®] 601 7TH STREET SOUTH, DELANO, MINNESOTA 55328-8605 888-574-4678 LSI Install Help 888-438-6574 LSI Direct 763-972-5200 Int. FAX (763) 972-3185

to ground stakes.

Sheet 4 of 4



Parts List

Part#	Description	Qty.		
166061-00	Arch 1 A With Net Tabs, Specify Color	*		
166054-00	Arch 2 A, Specify Color	*		
166062-00	Arch 1B/1C With Tabs, Specify Color	*		
166063-00	Arch 1D/1E With Tabs, Specify Color	*		
166064-00	Arch 2B/2C With Tabs, Specify Color	*		
166065-00	Arch 2D/2E With Tabs, Specify Color	*		
166055-00	Arch 3A, Specify Color	*		
166056-00	Arch 3B/3C, Specify Color	*		
166057-00	Arch 3D/3E, Specify Color	*		
166058-00	Arch 4A, Specify Color	*		
166059-00	Arch 4B/4C, Specify Color	*		
166060-00	Arch 4D/4E, Specify Color	*		
166271-00	5" Clamp A, Specify Color	*		
166272-00	5" Clamp B, Specify Color	*		
166273-00	5" Clamp C, Specify Color	*		
166275-00	5" Clamp E, Specify Color	*		
166276-00	5" Clamp O, Specify Color	*		
100611-00	¹ / ₄ " x ³ / ₂ " Drive Rivet, AL/SST	*		
127551-00	⁵ / _• " x 1 ^{°1} / ₂ " BHCS w/Pin, SST	*		
* = Quantity Determined By Your Order				

Specifications

5" Clamps:	Cast from 356-T6 aluminum. Finish: ProShield [®] , color specified.
5" Arch:	Steel arch is manufactured from 5" O.D. galvanized tubing with a wall thickness of .120". Finish: Pro-Shield, color specified.
Fasteners:	Primary fasteners shall be socketed and pinned tam- perproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
Installation Time: Concrete Req.: Area Req.: Weight:	4 People minimum approx. 6 man hours Approx. 2.25 cu. yds. 6' (1,83 m) minimum use zone 98 lbs.
Fall Height:	/5

Installation Instructions

1) (Direct Bury) Refer to the Site Plan for footing locations.

IMPORTANT! Do not pour concrete footings until all outriggers have been attached to 5" clamps with surfaces.

- 2) An Evos structure consists of (2-4) arch assemblies, numbered #1 through #4. Each arch assembly consists of (4) arches with part numbers to ensure the arch is assembled correctly.
- 3) Lay (4) arches on a flat surface. Using the part numbers shown on the detail as a guide, slide arches together as shown. Level arches. **NOTE:** *Lay arches on cardboard to prevent arches from being scratched during assembly.*
- 4) Line up (3) holes on inside of arches. Insert $\frac{1}{4}$ x $\frac{3}{8}$ drive rivets into holes and hammer rivet pins in until it is flush with head.
- 5) Measure center line dimension of lower arches. Position lower arches as needed to attain center line dimension. Drill through (3) outer holes in arches with $1/4^{"}$ or letter "F" (only) drill bit. Insert $1/4^{"}$ x $3/8^{"}$ drive rivets into holes and hammer rivet pins in until it is flush with head.
- 6) Using the arch assembly detail as a guide, attach (3) 5" clamps to each arch using ⁵/₈" x 1 ¹/₂" BHCS w/pin (with gray anti-seize). NOTE: *Refer to your 2-D Plan for clamp identification*. The 5" clamps will be positioned on top of the drive rivets and arch ends. Refer to the arch assembly details for proper location of each clamp. NOTE: *The 5" clamps with clamp surfaces, will need to be adjusted when outriggers are attached to the structure.*
- 7) Place the fully assembled arches in footing holes. Refer to the Site Plan for proper location of arches. NOTE: Rope may be used to tie off the arches. The use of rope will help keep the arches in plumb position, while attaching outriggers. Tie a rope (not supplied) on each side of the top 5" clamp. The rope should be long enough to attach to a ground stake (not supplied). When the arches are in plumb position, pull the ropes tight, and attach to ground stakes. Refer to sheet 4.

SECTION 12 93 00

SITE FURNISHINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Documents, as listed in the Table of Contents, and applicable parts of Division 1, General Requirements shall be included in and made a part of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 SCOPE OF WORK

- A. The work of this Section consists of all site improvements and related items as indicated on the Drawings and/or as specified herein and includes, but is not limited to, the following:
 - 1. Trash Receptacles
 - 2. Big Belly Kiosk
 - 3. Picnic Tables Standard and ADA Compliant
 - 4. Game Tables
 - 5. Benches All types
 - 6. Signage
 - 7. Shade Shelter
 - 8. Mounting Hardware
- B. Refer to the back of this section for manufacturer's data.

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. SECTION 31 00 00 EARTHWORK
 - 2. SECTION 03 30 00 CAST IN PLACE CONCRETE

1.04 EXAMINATION OF CONDITIONS

- A. The Contractor shall fully inform himself of existing conditions of the site before submitting his bid, and shall be fully responsible for carrying out all site work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed.
- 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'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 therein.

1.05 SCHEDULING

A. The Contractor shall submit to the Owner's Representative, for approval by the Owner, a progress schedule for all work as specified herein.

1.06 QUALITY ASSURANCE

- A. Materials and methods of construction shall comply with the following standards:
 - 1. ASTM: American Society for Testing and Materials
 - 2. ANSI: American National Standards Institute
 - 3. FS: Federal Specifications
 - 4. IMI: International Masonry Institute
 - 5. PCA: Portland Cement Association
- B. Qualifications of Workers: Use adequate numbers of skilled workers who are trained in the necessary crafts and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this Section.
- C. Layout: After staking out the work, and before beginning final construction, obtain the Owner's Representative's approval for layout. Contractor shall make adjustments as determined by the Owner's Representative. Owner's Representative may make adjustments to layout as is required to meet existing and proposed conditions without additional cost to the contract price.

1.07 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for all specified items in accordance with Division 1 requirements.
- B. Product Information: Provide manufacturer's data showing installation and limitations in use. Supply Certificates of Compliance for all materials required for fabrication and installation, certifying that each material item complies with, or exceeds, specific requirements.

PART 2 – PRODUCTS

- 2.01 TRASH RECEPTACLE
 - A. Trash receptacles shall be model # LR305P, each furnished with an in-ground post package model # LR100N and plastic liner model # LR310N manufactured by Wabash Valley Manufacturing, Inc., 505 East Main Street, Silver Lake, IN or approved equal. Receptacle shall be secured and installed per manufacturer's recommendations. Receptacle color shall be BLACK.

2.02 BIG BELLY KIOSK (1 Total - Furnished and Installed by the Contractor)

- A. The Contractor furnish and install 1 Big Belly Solar "Kiosk" as manufactured by BigBelly Solar, Inc., 85 Wells Avenue, Suite 305 Newton, MA 1-888-820-0300, or approved equal, Model #BigBKiosk1" consisting of a Big Belly Trash Compactor, and a SmartBelly Recycling Collector.
 - 1. Each unit shall be approximately 50.4" in height, 25" in width, and 27" in depth.
 - a. Compactor shall have a 33 gallon bin volume.
 - b. Recycling Collector shall have a 50 gallon bin volume.
 - Units shall have a fully automated IC processor controlled system which senses trash level, fullness, and machine status, with LED status indicator. System voltage shall be a low voltage system, 12 Volts DC, with a spill-proof maintenance free 12 V battery. Units shall be cordless, self-powered requiring no wiring.
 - 3. Materials shall be RoHS compliant, galvanized sheet metal steel interior and exterior construction, with a TGIC powder-coat exterior finish. Interior bins shall be leak proof.
 - 4. Units shall have locked front trash removal door, and fully interlocked access doors, with separately keyed service access.
 - 5. Units shall be designed to prevent access to compaction area.
 - 6. The Big Belly trash compactor
 - a. Compaction force shall be 1250 lbs max.
 - b. Gear motor shall be heavy duty chain drive (non-hydraulic).
 - c. Users shall be able to deposit trash even during cycle time.

2.03 PICNIC TABLES- STANDARD AND ADA COMPLIANT

- A. Standard Picnic Table
 - Picnic Tables shall be recycled plastic picnic tables Model 100-80PL manufactured by DuMor Inc. 138 Industrial Circle, Mifflintown, PA 17059, Phone: 800-598-4018, or approved equal. Tables shall be surface mounted and the recycled plastic color option of redwood.
- B. ADA Compliant Picnic Table
 - ADA Compliant Picnic Tables shall be recycled plastic picnic tables Model 100-68- 1PL manufactured by DuMor Inc. 138 Industrial Circle, Mifflintown, PA 17059, Phone: 800-598-4018, or approved equal. Tables shall be surface mounted and the recycled plastic color option of redwood.

2.04 GAME TABLES

A. The Standard Café Table shall be model # 78-32PL Independent Post Table with two (2) benches. Tables shall be manufactured by DuMor Inc. 138 Industrial Circle, Mifflintown, PA 17059, Phone: 800-598-4018, or approved equal. Table shall include a 25 ¼" square table top, shall be constructed of 3"-inch x 4-inch nominal recycled plastic slats and fabricated metal components that are steel powdercoated. Table top shall have an inset 16 ¼" x 16 ¼" aluminum checkerboard. Tables and chairs shall be in-ground mounted. All recycled plastic elements shall be redwood color.

2.05 BENCHES- ALL TYPES

- A. TYPE 1: Metal Bench with Back
 - 1. Backless Benches shall be model # 118-80 manufactured by DuMor Inc. 138 Industrial Circle, Mifflintown, PA 17059, Phone: 800-598-4018, or approved equal. Finish shall be a powder coated black finish. All benches shall be surface mounted and include two end arm-rests.
- B. TYPE 2: Bench Backless
 - 1. Metal benches with back shall be model # 163-80PL manufactured by DuMor Inc. 138 Industrial Circle, Mifflintown, PA 17059, Phone: 800-598-4018, or approved equal. Recycled plastic shall be redwood color with powder coated black supports. All benches shall be surface mounted.

2.06 SIGNAGE

A. Signage will be furnished by Owner and installed by Contractor.

2.07 SHADE SHELTER

- A. Shade shelter shall be the Ramada sixteen feet (16') width x thirty four feet (34') Shade Shelter as manufactured by Poligon, a Product of Porter Corp, 4240 N 136th Ave., Holland, MI, 49424; 616.888.3500; E-mail: info@poligon.com; www.poligon.com or approved equal. Shelters shall be anchored to concrete footings and secured below finish concrete slab elevation. Shelter shall be designed, engineered, secured and installed per manufacturer's recommendations. Shelter shall include,
 - 1. Custom round steel columns. Color shall be almond.
 - 2. Standing seam metal roof with a roof slope of 4/12. Color shall be patina green.
 - 3. Standard POLI 5000 finish
 - 4. Framing color shall be almond.
 - 5. Lightning protection kit

2.08 MOUNTING HARDWARE

A. All bolts, screws, nuts, washers, and other mounting hardware required for the installation of surface mounted site furnishings shall be stainless steel. All surface

mounted site furnishes shall be installed in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The installer shall examine previous work, related work, and conditions under which this work is to be performed and notify the Contractor in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means installer accepts substrates, subgrades, previous work, and conditions.
- B. All tables, trash receptacles and other site furnishings shall be assembled in accordance with the manufacturer's instructions. Components that are chipped, dented, scratched or otherwise damaged shall not be accepted and must repaired or replaced in a manner acceptable to the Owner's Representative.
- C. All mounting bolts for site furnishings shall be cut down to extend no further than $\frac{1}{4}$ " above any nuts, washers or other fasteners.

END OF SECTION

model no:

LR305P, LR305R

ACCESSORIES

32 GAL. DOOR RECEPTACLES

customer service:

ASSEMBLERS: If you find any parts missing or damaged, or if you're having difficulty assembling your furniture/equipment, call us at:

* Before calling, have your product model number available.

1-800-253-8619 (Inside U.S.A.) 260-352-2102 (Outside U.S.A.) Monday thru Friday, 8:00 AM - 4:30 PM Eastern Time (EXCEPT HOLIDAYS)

Any correspondence concerning our product should be sent directly to our Customer Service Manager at:

Wabash Valley Manufacturing, Inc. 505 E. Main Street P.O.Box 5 Silver Lake, IN 46982 U.S.A. FAX: 260-352-2160

maintenance:

Regular inspection and maintenance of all parts, and fasteners is necessary. Tighten all bolts and nuts. Inspect Tops, Seats, Legs, Braces and Fasteners periodically for wear or vandalism. Replace broken or worn parts immediately or take equipment out of service until repairs are made. Use genuine Wabash Valley replacement parts.

To restore plastisol coating to its luster after prolonged use, wash/rinse/dry and use Armor-All ® or similiar quality vinyl protectant.

KEEP THIS ASSEMBLY/SPECIFICATION SHEET FOR FUTURE REFERENCE.

specifications: NOTE: We reserve the right to change specifications without notice.

Heat fused poly-vinyl coating, finished on inner-metal structure, to an approximate 3/16" thickness. Framework assemblies are finished with powder coating; electrostatically applied and oven cured according to powder manufacturer's specifications. Fasteners are stainless steel to resist corrosion.

TRASH RECEPTACLES:

Rib panel is 10 gage and perforated panel is 12 gage sheet metal. A 3/4" diameter steel tube is used to add support at the top and bottom. The door panels are 12 gage sheet metal. The bottom is 14 gage sheet steel.

GROUND SPACE REQUIRMENTS: Ground space requirments are 25 3/8" diameter x 34 7/8" – Perf and 34 1/2" – Rib, tall. With door open to remove liner the width is 36 3/8". If a leg is used the height will be an additional 6".

LIDS:

FT100N and FT110N consist of 18 gage steel. FT100N overall diameter is 22 7/8" and 1 3/4" tall with opening of 8" diameter. FT110N overall diameter is 22 7/8" and 1 3/4" tall with opening of 14" diameter. AL100N is a cast aluminum ash and trash lid.

DT100N consist of 3/16" thick injection molded structural thermo plastic. Dome is 10" high x 18" in diameter. Hole opening is 10" x 7 1/2" with spring loaded swing type door. The base is 22 3/4" in diameter with a skirt length of 1 5/8".

SB100N and AB100N consist of FT100N top with solid bonnet or ash tray on it. TB100N consist of FT110N top with tray return, made of 14 gage galvaneal. The shelf is 14" deep, 18" wide and is 8" above the flat top. Trim material is flexible embossed vinyl metal core.

LEG PACKAGES: Leg packages LR100N and LR105N consist of 2 3/8" od x 12 gage galvanized structural steel tubing and use 14 gage sheet steel for the mounting plate and gussets to add support. The surface mount leg uses 1/4" plate steel for its surface mount plate.



349





installation: WARNING: The proper installation for Wabash Valley products may depend upon many factors unique to the site, location, or use of a particular product. Consult with your contractor or other professional to determine your specific installation requirements.







Smartbelly[®] Standard Capacity Station



Configurations: Mixed waste or single-stream recycling (with appropriate markings)

Materials

RoHS compliant

Galvanized sheet metal steel interior and exterior construction

Heavy duty plastic side panels for dent and scratch resistance (recycled content)

Interior Bin: Single bin is leak proof made out of low density polyethylene plastic

Power & Electronics

Polycrystalline silicon cell PV module (20 watts). (30 watts HE [high energy] upgrade available)

PV panel protected by polycarbonate bubble

Spill-proof, sealed maintenance-free battery

Self-powered unit requires no wiring

Technical Specifications

Overall Machine Dimensions

Height: 49.8" (1264mm)

Width: 25" (635mm)

Depth: 26.8" (681mm)

Weight: 175 lbs (80kg); Shipping weight: 205 lbs (136kg)

Insertion Opening: Can be configured for multiple recycling or waste streams.

Bin Volume: 50 gallons (227L)

Features

Fully automated, microprocessor controlled system senses fullness and machine status

LED status indicate fullness level, machine status and error codes

GPRS wireless data link for remote monitoring and management

GPS assisted location service

Safety Features

CE approved

Fully interlocked access doors protect users and service personnel

Locked front trash removal door. (Locked rear door option available)

Separately keyed service access

Durability

Weather resistant, UV stabilized polyester powder-coat finish on all exterior parts

Electronic components temperature range of -40°F to +185°F (-40°C to +85°C)

Fully weatherized, but in the event of a flood, Smartbelly can withstand up to 40" (1.06m) of water without harming electronics

Info_TechSpecs(SB5)_2015Jun

Bigbelly Solar, Inc. 150 A Street – Suite 103 Needham, MA 02494 USA



Sales@Bigbelly.com Bigbelly.com Toll-free: +1 888.820.0300 International: +1 781.444.6002 FAX: +1 781.444.5651

Station Dimensions



Bigbelly single station Approximately 270 lbs (123kg)



Bigbelly & Smartbelly double station Approximately 445 lbs (202kg)



Bigbelly & Smartbelly triple station Approximately 610 lbs (277kg)

Overall Dimensions	Bigbelly [®] High Capacity	Smartbelly [®] Standard Capacity	Smartbelly [®] Companion
Height	49.8" (1264mm)	49.8" (1264mm)	49.8" (1264mm)
Width	25" (635mm)	25" (635mm)	25" (635mm)
Depth	26.8" (681mm)	26.8" (681mm)	26.8" (681mm)
Handle Height	43.1" (1095mm)	-	-
Weight	270 lb (122kg)	175 lb (80kg)	164 lb (75kg)
Shipping Weight	300 lb (136kg)	205 lb (93kg)	205 lb (93kg)
System Voltage	12V	12V	-
Insertion Opening (see below)	6" x 17" (15.2cm x 43.2cm)	Can be configured for multiple recycling or waste streams.	Can be configured for multiple recycling or waste streams.
Bin Volume	33 gallons (125L) compacted; 150 gallons uncompacted	50 gallons (227L)	50 gallons (227L)
Other			
Liner Bags	Custom Bigbelly Liner Bags (#BBS-CB4647) are available for purchase. Contact WasteZero at 800.866.3954 or <i>www.WasteZero.com/Bigbelly.</i> The black bags are 47"H x 46"W (120cm x 117cm) and 2.5mil (64µ) thick.	Custom Smartbelly Liner Bags (#BBS-RB4255) are available for purchase. Contact WasteZero at 800.866.3954 or <i>www.WasteZero.com/Bigbelly.</i> The clear bags are 55"H x 42.5"W (140cm x 108cm) and 1.25mil (32µ) thick.	Custom Smartbelly Liner Bags (#BBS-RB4255) are available for purchase. Contact WasteZero at 800.866.3954 or <i>www.WasteZero.com/Bigbelly.</i> The clear bags are 55"H x 42.5"W (140cm x 108cm) and 1.25mil (32µ) thick.





PLEASE NOTE: Green hoppers, faceplates or flaps require additional 6 weeks to process.

Smartbelly Flaps



Smartbelly Faceplates



Bigbelly® High Capacity Compactor



Configurations: Mixed waste or single-stream recycling (with appropriate markings) Above example shown with Foot Pedal.

Materials

RoHS compliant

Galvanized sheet metal steel interior and exterior construction

Heavy duty plastic side panels for dent and scratch resistance (recycled content)

Interior Bin: Single bin is leak proof made out of low density polyethylene plastic

Power & Electronics

Polycrystalline silicon cell PV module (22 watts). (40 watts HE [high energy] upgrade available).

PV panel protected by polycarbonate bubble

Spill-proof, sealed maintenance-free battery

Self-powered unit requires no wiring

Technical Specifications (BB5)

Overall Machine Dimensions

Height: 49.8" (1264mm)

Width: 25" (635mm)

Depth: 26.8" (681mm)

Handle Height (ADA Compliant): 43.1" (1095mm)

Weight: 270 lbs (122 kg); Shipping weight: 300 lbs (136.08kg)

Hopper Opening: 6" x 17" (152mm x 432mm)

Bin Volume: 33 gallons (125L) compacted trash; approximately 150 gallons (568L) uncompacted trash

Compactor Features

Compaction: Up to 5-to-1 compaction ratio

Fully automated, microprocessor controlled system senses fullness and machine status

3-color LED status lamps indicate compacted trash level, machine status and error codes

GPRS or CDMA wireless data link for remote monitoring and management

GPS assisted location service

Safety Features

CE approved

Fully interlocked access doors protect users and service personnel

Locked front trash removal door. (Locked rear door option available)

Separately keyed service access

Fault-tolerant design for hopper insertion door prevents access to compaction area

Durability

Weather resistant, UV stabilized polyester powder-coat finish on all exterior parts

Electronic components temperature range of -40°F to +185°F (-40°C to +85°C)

Fully weatherized, but in the event of a flood, Bigbelly can withstand: •Up to 20" (508mm) of water without harming the electronics

■Up to 36" (915mm) of water with only minor damage to electronics

Bigbelly Solar, Inc. 150 A Street – Suite 103 Needham, MA 02494 USA



Toll-free: +1 888.820.0300 International: +1 781.444.6002 FAX: +1 781.444.5651

Sales@Bigbelly.com Bigbelly.com

Info_TechSpecs(BB5)_2016Mar

Station Dimensions



Bigbelly single station Approximately 270 lbs (123kg)



Bigbelly & Smartbelly double station Approximately 445 lbs (202kg)



Bigbelly & Smartbelly triple station Approximately 610 lbs (277kg)

Overall Dimensions	Bigbelly [®] High Capacity	Smartbelly [®] Standard Capacity	Smartbelly [®] Companion
Height	49.8" (1264mm)	49.8" (1264mm)	49.8" (1264mm)
Width	25" (635mm)	25" (635mm)	25" (635mm)
Depth	26.8" (681mm)	26.8" (681mm)	26.8" (681mm)
Handle Height	43.1" (1095mm)	-	-
Weight	270 lb (122kg)	175 lb (80kg)	164 lb (75kg)
Shipping Weight	300 lb (136kg)	205 lb (93kg)	205 lb (93kg)
System Voltage	12V	12V	-
Insertion Opening (see below)	6" x 17" (15.2cm x 43.2cm)	Can be configured for multiple recycling or waste streams.	Can be configured for multiple recycling or waste streams.
Bin Volume	33 gallons (125L) compacted; 150 gallons uncompacted	50 gallons (189L)	50 gallons (189L)
Other			
Liner Bags	Custom Bigbelly Liner Bags (#BBS-CB4647 or #BBS-RCB4647) are available for purchase. Contact WasteZero at 800.866.3954 or <i>www.WasteZero.com/Bigbelly.</i> The black or clear bags are 47"H x 46"W (120cm x 117cm) and 2.5mil (64µ) thick.	Custom Smartbelly Liner Bags (#BBS-RB4255) are available for purchase. Contact WasteZero at 800.866.3954 or <i>www.WasteZero.com/Bigbelly.</i> The clear bags are 55"H x 42.5"W (140cm x 108cm) and 1.25mil (32µ) thick.	Custom Smartbelly Liner Bags (#BBS-RB4255) are available for purchase. Contact WasteZero at 800.866.3954 or <i>www.WasteZero.com/Bigbelly.</i> The clear bags are 55"H x 42.5"W (140cm x 108cm) and 1.25mil (32µ) thick.

Bigbelly Hoppers



PLEASE NOTE: Green hoppers, faceplates or flaps require additional 6 weeks to process.

Smartbelly Flaps



Smartbelly Faceplates





				PAR	IS LIST FOR S-2	
		ITEM	QTY	PART NO	DESCRIPTION	
		1	2	0-100-00-01/S-2	TABLE TOP SUPPORT FOR SUR	FACE
		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, HANDICAP	PED
		5	5	0-100-681PL-1	3" X 4" X 95" INT'R TABLE SLAT.	PLASTIC
<u>NOTE:</u>	TOOLS REQ'D	6	1	0-100-681PL-2	95" RIGHT EDGE TABLE SLAT, P	LASTIC
1.) DURING ASSEMBLY PROCEDURE;	3/4" WRENCH	7	2	0-100-681PL-3	3" X 4" X 65" INT'R SEAT SLAT.	PLASTIC
2) THE ACTUAL DARTS WILL NOT DE NUMPERED	9/16" WRENCH	8	2	0-100-681PL-4	65" RIGHT EDGE SEAT SLAT, PL	ASTIC
NUMBERS ONLY APPLY TO DRAWING.	1/4 ALLEN WRENCH 1/2" MASONRY DRILL BIT	9	1	0-100-681PL-8	95" LEFT EDGE TABLE SLAT. PL	ASTIC
3.) UPON COMPLETION OF ASSEMBLY SQUARE	DRILL	10	2	0-100-681PL-9	65" LEFT EDGE SEAT SLAT. PL	ASTIC
ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.		11	46	1-13-016	3/8" X 2" SS BTN SKT HD LA	G SCR
4.) MOUNT AND ANCHOR AS SPECIFIED.		12	46	1-22-024	3/8" SS FLAT WASHER	
		13	2	5-48-076	3/8" X 1 1/2" SWIVEL GLI	DE
				KITS	PROVIDED FOR S-2	
		ITEM	η το	PART NO	DESCRIPTION	
		14	3	K-ANC0860-4	1/2" X 3 3/4" SS ANCHOR KIT	(4PC)
		15		K-RI0632-48		
		16		K-CL0624-2	3/8 LAG HARDWARE KII (40	P() D(C)
		10		K-0L0024-2	3/8 X 1 1/2 GLIDE KIT (20	PUS)
1 ATTACH GLIDES TO TABLE TOP BRACE.						
ATTACH SLATS & BRACES TO SUPPORTS.						
3 UNSCREW SWIVEL GLIDE SO IT FITS AGAINST SUPPORT POST TUBE AND	TIGHT TIGHTEN.		Ð		13	
ASSEM DuMor, inc. INSTRUC	IBLY DATE DRAWN : DRAWN BY : A DTIONS DATE REV. : 0 REV. BY : ESS	04/01/ WH 1/14/14	/96 R	ev. drawing NUMBER 1	00-68-1 PL	SHEET 2 OF 2


				PART	S LIST FOR S-2	
		ITEM	QTY	PART NO	DESCRIPTION	
		1	2	0-100-00-01/S-2	TABLE TOP SUPPORT FOR SUR	FACE
		2	4	0-100-00-02/S-2	SEAT SUPPORT FOR SURFACE	MT
NOTE:	TOOLS REQ'D	3	1	0-100-60-05	6' TABLE TOP BRACE	
1.) DURING ASSEMBLY PROCEDURE;	3/4" WRENCH	4	2	0-100-60-06	6' SEAT BRACE	
DO NOT COMPLETELY TIGHTEN HARDWARE.	1/4" ALLEN WRENCH	5	7	0-88-60PL-02	3" X 4" X 71" INT'R SLAT PL	ASTIC
2.) THE ACTUAL PARTS WILL NOT BE NUMBERED.	1/2" MASONRY DRILL BIT	6	6	0-88-60PL-03	71" FDGE SLAT. PLASTIC	
NUMBERS ONLY APPLY TO DRAWING.	DRILL	7	39	1-13-016	3/8" X 2" SS BTN SKT HD LAC	SCR
ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.		8	39	1-22-024	3/8" SS FLAT WASHER	
4.) MOUNT AND ANCHOR AS SPECIFIED.				KITS	PROVIDED FOR S-2	
		ITEM	ΩΤΥ	PART NO	DESCRIPTION	
		9	3	K-ANC0860-4	1/2" X 3 3/4" SS ANCHOR KIT	(4PC)
		10	1	K-BL0632-40	3/8" LAG HARDWARF KIT (40)	(11 0) PC)
				ev. DRAWING		SUFFT
DuMor, inc. INSTRUC	DRAWN BY : A DATE REV. : 0 REV. BY : ESS	WH 1/14/14	E F)O SERIES PL	SHEET 2 OF 2







NOTEC				PΔR	TS LIST FOR S-2	
	100LS KEQ D	ITEM	0TY			
DO NOT COMPLETELY TIGHTEN HARDWARE.	J/4 WIKENUT 1/4" ALLEN WRENCH	2	3	0-37-00-02/5-2	SUPPORT FOR SURFACE MOU	NT
2.) THE ACTUAL PARTS WILL NOT BE NUMBERED.	1/2" MASONRY DRILL BIT		1	0-163-80PI-01	8' SFAT ASSEMBLY PLASTIC	 }
NUMBERS ONLY APPLY TO DRAWING.	DRILL	3	12	1-13-038	5/16" X 2" SS HEX HD LAG	× SCR
ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.		4	12	1-22-017	5/16" SS FLAT WASHER	501
4.) MOUNT AND ANCHOR AS SPECIFIED.		L		KITS	PROVIDED FOR S-2	
		ITEM	OTY	PART NO	DESCRIPTION	
		5	2	K-ANC0860-3	1/2" X 3 3/4" SS ANCHOR KIT	(JPCS)
		6	2	K-HL0532-8	5/16" LAG HARDWARE KIT (8	PC)
ASSE	DATE DRAWN BY : C			EV. DRAWING NUMBER	163-80PI	SHEET
DuMor, inc. INSTRU	CHONS DATE REV. : 1 REV. BY : JSE	0/26/1 3	<u> </u>			2 OF 2





Product Guide Specification

DIVISION 107300 SPECIALTIES MANUFACTURERS OF PROTECTIVE COVERS

PART 1 - GENERAL

[reference CSI 2004 MasterFormat[™] Division 10 (Specialties Manufacturers) category 7300 (Protective Covers)]

1.1 DESCRIPTION OF PRODUCT

- A. RAM 16x34 (Rectangular Hip) with 16" Standing Seam Metal Roof.
- B. ROOF SLOPE: 4/12.
- C. Minimum Clearance Height (MCH): **7.5 in ft.** Minimum clearance height under the structure indicates the lowest height of a member from finish grade for clearance under the structure. This is generally the clearance under roof eave or frame, whichever is lower.

1.2 REFERENCES

- A. REFERENCE STANDARDS:
 - 1. AISC American Institute of Steel Construction Manual of Steel Construction.
 - 2. ASTM American Society for Testing and Materials.
 - 3. AWS American Welding Society.
 - 4. LEED Leadership in Energy and Environmental Design.
 - 5. OSHA Occupational Safety and Health Administration Steel Erection Standard 29 CFR 1926 Subpart R-Steel Erection.
 - 6. PCI Powder Coating Institute.
 - 7. SSPC The Society for Protective Coatings.
 - 8. LPI Lightning Protection Institute 175 (2008 Edition of Standards of Practice).
 - 9. NFPA National Fire Protection Association 780 Booklet (2008 Standard for the Installation of Lightning Protection Systems.

1.3 SUBMITTALS

A. Submit 4 sets of submittal drawings and 2 sets of calc books, both signed and sealed by a Professional Engineer licensed in the State of MA.

B. PRODUCT DESIGN REQUIREMENTS:

- The building shall meet the following design requirements as shown on the drawings:
- 1. Building Code: Massachusetts State Building Code 9th Edition.
- 2. Ground Snow Load (Pg): 55.
- 3. Basic Wind Speed (V): **105**.
- 4. Seismic Design: See drawings.

C. SUBMITTAL REQUIREMENTS:

Calculations and Submittal drawings shall include, at a minimum:

- 1. Calculations:
 - a. References to building codes and design manuals used for calculations.
 - b. Identification of lateral force resisting system.
 - c. Formulas used for determining snow, wind, and seismic loads to specific project location.
 - d. Three dimensional modeling input, model geometry, and analysis results.
 - e. Member design results and controlling load combinations.
 - f. Connection design for structural bolts, welds, plate thicknesses, and anchorage to the foundation.
 - g. Foundation designs shall include the required combinations of gravity and lateral loads.
- 2. Submittal Drawings:
 - a. Anchor bolt layout.
 - b. Foundation design.
 - c. Three dimensional views of frame.
 - d. Member sizes and locations.
 - e. Structural connection details, including bolt sizes and plate thicknesses.
 - f. Roof trim and connection details for installation clarity.
- D. FOUNDATION DESIGN:
 - 1. The shelter shall be set on foundations designed by manufacturer.
 - 2. Foundation materials shall be provided by contractor.
 - 3. Owner shall provide manufacturer with complete information about the site including soil bearing capacity and lateral load capacity.
 - 4. If soil data are not provided, foundations will be designed to the minimum values identified in the governing building code.
- E. ANCHOR BOLTS:

Anchor bolts shall be provided by manufacturer.

- F. LEED SUBMITTALS:
 - 1. LEED SS Credit 7.1: Sustainable Sites, Heat Island Effect/Non-Roof.
 - 2. LEED SS Credit 7.2: Sustainable Sites, Heat Island Effect/Roof.

1.4 QUALITY ASSURANCE

- A. MANUFACTURER QUALIFICATIONS:
 - 1. Minimum of (10) years in the shelter construction industry.
 - 2. Full time on-staff Licensed Engineer.
 - 3. Full time on-staff AWS Certified Associate Welding Inspector.
 - 4. Full time on-staff Quality Assurance Manager.
 - 5. Full time on-staff LEED AP.
 - 6. All welders AWS Certified.
 - 7. Manufacturer owned and controlled finishing system to include shot blast, pretreatment, primer, and top coat.
 - 8. Published Quality Management System.
 - 9. Annual audit of Quality System and Plant Processes by Third Party Agency.
 - 10. Annual audit of powder coat finish system by Third Party Agency (PCI).

B. MANUFACTURER'S CERTIFICATONS:

- 1. PCI 4000 S Certified, Certification thru Powder Coating Institute for original equipment manufacturers (OEMs) to evaluate process on entire finish system to add powder coat over steel.
- 2. City of Los Angeles, CA Approved Fabricator Type I Steel.
- 3. Clark County, NV Approved Fabricator steel.
- 4. City of Houston, TX Approved Fabricator Structural Steel and Structural Insulated Panels.
- 5. Miami Dade County Certificate of Competency for Structural Steel and Miscellaneous Metal Products and Assemblies.
- 6. State of Utah Approved Fabricator for Medium and High Strength Steel.
- 7. City of Riverside, CA Approved Fabricator Type I Steel.
- 8. City of Phoenix, AZ Approved Steel Fabricator.

1.5 FIELD OR SITE CONDITIONS

A. Foundations shall be at the same elevation unless specifically noted otherwise on the drawings.

1.6 MANUFACTURER WARRANTY

- A. Shelter must have a (10) year limited warranty on steel frame members.
- B. Shelter must have a (10) year limited warranty on paint system.
- C. Pass through warranty of Metal Roof manufacturer shall be provided upon request.

PART 2 - PRODUCTS

2.1 SHELTER SYSTEM AND MATERIALS

- A. MANUFACTURERS:
 - Acceptable Manufacturer: Poligon, a Product of Porter Corp, 4240 N 136th Ave., Holland, MI, 49424; 616.888.3500; E-mail: <u>info@poligon.com</u>; <u>www.poligon.com</u>. Receive pricing from Meghan O'Brien at M.E. O'Brien & Sons, Inc., 93 West Street, MEDFIELD, MA 02052.
 - 2. The product shall be designed, produced, and finished at a facility operated and directly supervised by the supplier who has a minimum of (10) years in the business of making pre-manufactured shelters.
- **B. SUBSTITUTION LIMITATIONS:**
 - 1. Substitutions must be approved a minimum of (10) days before bid. All approved manufacturers shall be notified in writing before the bid date and shall not be allowed to bid without written notification.
 - 2. Alternate suppliers must meet the qualifications and provide proof of certifications listed under Section 1.4 QUALITY ASSURANCE.
 - 3. Alternate suppliers must provide an equivalent paint system to Poligon's Poli-5000 listed under Section 2.1 C. 8. FINISHES.
 - 4. Staff members' cumulative experience in fabrication will not be an acceptable alternative for manufacturer's experience in the shelter construction industry.

C. PRODUCT REQUIREMENTS AND MATERIALS:

1. GENERAL:

The pre-engineered package shall be pre-cut unless otherwise noted and prefabricated which will include all parts necessary to field construct the shelter. The shelter shall be shipped knocked down to minimize shipping expenses. Field labor will be kept to a minimum by pre-manufactured parts. Onsite welding is not necessary.

- 2. REINFORCED CONCRETE:
 - a. Concrete shall have minimum 28-day compressive strength of 3,000 psi and slump of 4" (+/- 1"), unless otherwise noted on the drawings.
 - b. Reinforcing shall be ASTM A615, grade 60.
- 3. STEEL COLUMNS:
 - a. Hollow structural steel tube minimum ASTM A500 grade B with a minimum wall thickness of 3/16".
 - b. Unless columns are direct buried, columns shall be anchored directly to concrete foundation with a minimum of four anchor rods to meet OSHA requirement 1926.755(a)(1).
 - CUSTOM STEEL COLUMNS:
 Custom columns will replace the standard columns. Columns will be Poligon column model:
 K1008 8" Round (Plain round column).
- 4. STRUCTURAL FRAMING: Hollow Structural Steel tube minimum ASTM A500 grade B, "I" beams, tapered columns or open channels shall not be accepted for primary beams. Frame will have a **STANDARD POLI-5000** finish. Color chosen from manufacturer's standard color chart: **Almond.**
- 5. COMPRESSION MEMBERS:

Compression Rings of structural channel or welded plate minimum ASTM A36 or compression tubes of structural steel tube minimum ASTM A500 grade B shall only be used.

- 6. CONNECTION REQUIREMENTS:
 - a. Anchor bolts shall be ASTM F1554 (Grade 36) unless otherwise noted.
 - b. Structural fasteners shall be zinc plated ASTM A325 high strength bolts and A563 high strength nuts.
 - c. Structural fasteners shall be hidden within framing members wherever possible.
 - d. No field welding shall be required to construct the shelter.
 - e. All welds shall be free of burrs and inconsistencies.
 - f. Exposed fasteners shall be powder coated by manufacturer prior to shipment to match frame or roof colors as applicable.
 - g. Manufacturer shall provide extra structural and roofing fasteners.
- 7. ROOFING MATERIALS:
 - a. PRIMARY ROOF DECK OF STANDING SEAM METAL ROOFING (SS):
 - 1) Standing seam metal roofing shall be 24 gauge galvalume 16" wide with ribs 1 3/4" high.
 - 2) Roof surface shall be painted with Kynar 500 to the manufacturer's standard color: **Patina Green.** Ceiling surface shall be a "wash coat" primer.
 - 3) Angles shall be cut in the field.
 - 4) Metal roofing trim shall match the color of the roof and shall be factory made of 26 gauge Kynar 500 painted steel.
 - 5) Trim shall include panel ridge caps, hip caps, eave trim, splice channels, rake trim, roof peak cap, and corner trim as applicable for model selected. Trim may need to be cut to length and notched. Installation drawings shall have detailed information on how to cut and affix roof trim.
 - 6) Ridge, hip, and valley caps shall be pre-formed with a single central bend to match the

roof pitch and shall be hemmed on the sides.

- 7) Roof peak cap shall be pre-manufactured.
- 8) Manufacturer shall supply painted screws and butyl tape.
- 8. FINISHES:
 - a. STANDARD POLI-5000 FINISH:
 - 1) Steel shall be cleaned, pretreated and finished at a facility owned and directly supervised by the manufacturer.
 - 2) Steel shall be shot blasted to SSPC-SP10 near-white blast cleaning. SSPC-SP2 hand tool cleaning will not be an acceptable alternative.
 - 3) Parts shall be pretreated in a 3 stage iron phosphate or equal washer.
 - 4) Epoxy primer powder coat shall be applied to parts for superior corrosion protection.
 - 5) Top coat of Super Durable TGIC powder coat shall be applied over the epoxy primer.
 - 6) Finish shall not have any VOC emissions.
 - 7) Sample production parts shall have been tested and meet the following criteria:
 - a) Salt spray resistance per ASTM B 117/ ASTM D 1654 to 10,000 hours with no creep from scribe line and rating of 10.
 - b) Humidity resistance per ASTM D2247-02 to 5,000 hours with no loss of adhesion or blistering.
 - c) Color/UV resistance per ASTM G154-04 to 2,000 hours exposure, alternate cycles with results of no chalking, 75% color retention, color variation maximum 3.0 E variation CIE formula (before and after 2,000 hours exposure).
 - 8) The manufacturer shall be PCI 4000 S Certified.
 - 9) Exposed fasteners for frame and ornamentation shall be powder coated to match structure.
- 9. ACCESSORIES:
 - a. LIGHTNING PROTECTION KIT:
 - All lightning protection material shall conform to Class I requirements (materials necessary to protect ordinary buildings not exceeding 75' in height) as outlined in the LPI Standard of Practice, LPI - 175 (2004 Edition Standards of Practice) and NFPA 780 Booklet (2008 Standard for the Installation of Lightning Protection Systems).
 - 2) Air terminal(s) shall be solid copper, $\frac{1}{2}$ diameter with tapered top and threaded base.
 - 3) Terminal receiver shall be horizontal mount threaded bronze base unit.
 - 4) Wire shall be 28 strand, 14 AWG, ¹/₂" minimum rope lay copper cable connected with brass or bronze couplers.
 - 5) Ground rod shall be 5/8" x 8' copper clad minimum.
 - 6) Contractor to ensure lightning protection is in compliance with local building codes.

PART 3 - EXECUTION

3.1 INSTALLERS STORAGE AND HANDLING

- A. Protect building products after arrival at destination from weather, sunlight, and damage.
- B. Installer shall store product elevated to allow air circulation and to not introduce mold, fungi decay or insects to the product.
- C. Product must be handled with protective straps or padded forks if lifting with mechanical equipment. Use of chain or cable to lift product into place will not be accepted and may void manufacturer's

3.2 ERECTION

A. INSTALLATION:

Install all components according to manufacturer's installation instructions and these specifications.

B. GENERAL CONTRACTOR:

Interface with other work is to be coordinated by the customer or the customer's agent. Certain designs have electrical or other plumbing requirements that are not supplied by Poligon.

C. TOLERANCES:

Tolerances on steel structural members are set according to AISC construction practices, abided in the factory, and cannot be increased. No field slotting or opening of holes will be allowed. It is therefore essential that contractors conform to the tolerances specified on the installation drawings for anchor bolt or column layout details.

D. OSHA COMPLIANCE:

OSHA Compliance to Steel Erection Standard 29CRF 1926 Subpart R-Steel Erection.

3.3 REPAIR

A. Do not attempt any field changes without first contacting Poligon.

3.4 FIELD OR SITE QUALITY CONTROL

A. Field or Site Tests and Inspections are not required by Poligon but may be required by the customer or by the local building inspector.

END OF SECTION

Poligon Product Specification Form

PROJECT NAME:	
PROJECT LOCATION:	
CUSTOMER NAME:	
E-MAIL:	
COMPANY:	
ADDRESS:	
ADDRESS 2:	
CITY:	
STATE:	ZIP:
PHONE:	FAX:
WIND LOAD:	SNOW LOAD:
SEISMIC DESIGN:	BLDG CODE:

Shelter Options

SELECT APPLICABLE ROOF TYPE:

- MR (Metal Roof) SPMR (Structural Panel under Metal Roof) TGMR (Tongue & Groove under Metal Roof)

- TGMR (Tongue & Groove under Metal Roof) SS (Standing Seam Roof) SPSS (Structural Panel under Standing Seam) TGSS (Tongue & Groove under Standing Seam) SPAS (Structural Panel under Asphalt Shingles) SPCS (Structural Panel under Cedar Shingles) SPCH (Structural Panel under Milled Cedar Shingles) TGAS (Tongue & Groove under Asphalt Shingles) TGCS (Tongue & Groove under Cedar Shingles) TGCH (Tongue & Groove under Milled Cedar Shingles) TGCH (Tongue & Groove under Milled Cedar Shingles) TGCH (Tongue & Groove under Milled Cedar Shingles) TGCH (Santa Fe metal stick style) TRELLIS
- TRELLIS

FRAME COLOR:_

ROOF COLOR:

SELECT MODIFICATIONS TO A STANDARD:

by **PORTER**CORP PORTERCORP, 4240 N. 136th AVE, HOLLAND, MI 49424

www.poligon.com 800-354-7721

- INCREASE UPB HEIGHT: _____ ADD ELECTRICAL CUTOUTS:_
- ADD CUPOLA:
- ADD ORNAMENTATION:
- ADD BENCHES:
- ADD HANDRAILS:

SELECT CUSTOMIZATION:

- INCREASE UPB MORE THAN 2': _
- CUSTOM COLUMNS:
- CUSTOM PITCH:_
- ADD E-COATING FRAME:
- ADD GALVANIZING FRAME:_

Sheet Index

COVER SHEET / ORDER FORM ELEVATION VIEWS STRUCTURAL FRAME

ANCHOR LAYOUT

Rectangle Standard Sizes

BIN	W	L	BAY SIZE
RAM	8	12	10
RAM	8	20	18
RAM	8	28	26
RAM	12	18	16
RAM	12	22	20
RAM	12	32	30
RAM	12	42	20
RAM	16	24	20
RAM	16	34	30
RAM	16	44	20
RAM	16	64	20

BIN	w	
RAM	20	
RAM	24	1
RAM	30	
RAM	30	

Refer to www.poligon.com download area for:

- FOOTING AND ANCHOR • INFORMATION
- COLUMN STYLE OPTIONS
- CUPOLA OPTIONS •
- ORNAMENTATION STYLE OPTIONS •
- INTEGRATED BENCH OPTIONS •
- MISCELLANEOUS OPTIONS ٠
- COLOR CHARTS •

PORTERCORP MANUFACTURES AND DELIVERS PRODUCT IN STRICT COMPLIANCE TO GOVERNING BUILDING CODES.



		BAY					BAY	
	L	SIZE		BIN	W	L	SIZE	
	24	20		RAM	30	64	20	49424
	34	30		RAM	30	84	20	LAND, MI
	44	20		RAM	30	104	20	ORP HOL
	64	20		RAM	40	44	20	ORTERCC
	34	30		RAM	40	64	20	HT 2007 Pr
	44	20		RAM	40	84	20	OPYRIGH
	64	20		RAM	40	104	20	DING C
	84	20		RAM	50	64	20	ENTS PEN
	104	20		RAM	50	70	20	/OR PAT
	34	30		RAM	50	90	20	TED AND
	44	20		RAM	50	110	20	PATEN
SHELTER MODEL: RAMADA RAM								
				scale: 1:100	REV LEVEL	: C A	DATE: 1/10/20)11
PARK ARCHITECTURE								
Designs and calculations of Poligon buildings are protected under copyright laws and patents and may not be used in the construction or design of a building that is not supplied by Poligon.								
by PORTER CORP								

PORTERCORP, 4240 N. 136th AVE, HOLLAND, MI 49424 www.poligon.com 800-354-7721

COVER SHEET

Copyright laws protect the style and visual appearance of the structure while patents may protect other parts of the design.











NOTE: THIS IS A

PLANNING LEVEL DRAWING.

THE STRUCTURE SHOWN IS SUBJECT TO ON-GOING DESIGN REVIEW AND UPDATE. EXPECT SOME CHANGES TO MATERIAL SIZES AND GENERAL DIMENSIONS. ONLY USE DRAWINGS PROVIDED WITH ENGINEERED STRUCTURES FOR CONSTRUCTION.

REFER TO ANCHOR AND FOOTING DOWNLOAD SHEETS FOR GENERAL INFORMATION ON BOTH ANCHOR ATTACHMENT AND TYPICAL FOOTING TYPES. ANCHOR ATTACHMENT AND FOOTING DESIGNS ARE SITE AND SITUATION SPECIFIC AND ARE INTEGRAL TO THE FINAL SHELTER DESIGN.

DO NOT POUR FOOTING OR INSTALL ANCHOR BOLTS WITHOUT JOB SPECIFIC ANCHOR AND FOOTING DESIGN DRAWINGS.

ALL POLIGON COLUMN ANCHORING SYSTEMS ARE OSHA COMPLIANT.

Copyright laws protect the style and visual appearance of the structure while patents may protect other parts of the design.

SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall make excavations of normal depth in earth for trenches and structures, shall backfill and compact such excavations to the extent necessary, shall furnish the necessary material and construct embankments and fills, and shall make miscellaneous earth excavations and do miscellaneous grading.

1.02 RELATED WORK:

1.03

Α.	Section 31 05 13.13, LOAM BORROW (TOPSOIL)			
В.	Section 31 05 19.13A, FILTER FABRIC			
С.	Section 31 05 19.13B, GEOTEXTILE FABRICS			
D.	Section 31 11 00, CLEARING AND GRUBBING			
E.	Section 31 13 13, TREE PRUNING			
F.	Section 31 23 19, DEWATERING			
G.	Section 31 50 00, SUPPORT OF EXCAVATION			
REFERENCES	:			
	American Society for Testing and Materials (ASTM)			
ASTM C13	L Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.			
ASTM C13	Method for Sieve Analysis of Fine and Coarse Aggregates.			
ASTM C33	Specification for Lightweight Aggregate for Structural Concrete.			
ASTM D15	56 Test Method for Density of Soil in Place by the Sand Cone Method.			
ASTM D15	Test Methods for Moisture-density Relations of Soils and Soil Aggregate Mixtures Using Ten-pound (10 Lb.) Hammer and Eighteen-inch (18") Drop.			
ASTM D29	Test Methods for Density of Soil and Soil-aggregate in Place by Nuclear Methods (Shallow Depth).			

Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges.

Code of Massachusetts Regulations (CMR) 310.40.0032 Contaminated Media and Contaminated Debris

Code of Massachusetts Regulations (CMR) 520 CMR 14.00 Excavation & Trench Safety Regulation

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Samples of all materials proposed for the project shall be submitted to the Engineer for review. Size of the samples shall be as approved by the Engineer.

- 1.05 PROTECTION OF EXISTING PROPERTY:
 - A. The work shall be executed in such manner as to prevent any damage to facilities at the site and adjacent property and existing improvements, such as but not limited to streets, curbs, paving, service utility lines, structures, monuments, bench marks, observation wells, and other public or private property. Protect existing improvements from damage caused by settlement, lateral movements, undermining, washout and other hazards created by earthwork operations.
 - B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at its own expense, make good such damage or injury to the satisfaction of, and without cost to, the Owner. Existing roads, sidewalks, and curbs damaged during the project work shall be repaired or replaced to at least the condition that existed at the start of operations. The Contractor shall replace, at his own cost, existing benchmarks, observation wells, monuments, and other reference points, which are disturbed or destroyed.
 - C. Buried drainage structures and pipes, observation wells and piezometers, including those which project less than eighteen inches (18") above grade, which are subject to damage from construction equipment shall be clearly marked to indicate the hazard. Markers shall indicate limits of danger areas, by means which will be clearly visible to operators of trucks and other construction equipment, and shall be maintained at all times until completion of project.

1.06 DRAINAGE:

A. The Contractor shall provide, at its own expense, adequate drainage facilities to complete all work items in an acceptable manner. Drainage shall be done in a manner so that runoff will not adversely affect construction procedures or cause excessive disturbance of underlying natural ground or abutting properties.

1.07 FROST PROTECTION AND SNOW REMOVAL:

A. The Contractor shall, at its own expense, keep earthwork operations clear and free of accumulations of snow as required to carry out the work.

B. The Contractor shall protect the subgrade beneath new structures and pipes from frost penetration when freezing temperatures are expected.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. GRAVEL BORROW:

Gravel Borrow shall satisfy the requirements listed in MassDOT Specification Section M1.03.0, Type b.

B. CRUSHED STONE:

Crushed stone shall satisfy the requirements listed in MassDOT Specification SectionM2.01.

C. SAND BORROW:

Sand Borrow shall satisfy the requirements listed in MassDOT Specification Section M1.04.0.

D. PEASTONE:

Peastone shall be smooth, hard, naturally occurring, rounded stone meeting the following gradation requirements:

Passing 5/8 inch square sieve opening-100%Passing No. 8 sieve opening-0%

E. BACKFILL MATERIALS:

1. Class B Backfill:

Class B backfill shall be granular, well graded friable soil; free of rubbish, ice, snow, tree stumps, roots, clay and organic matter; with 30 percent or less passing the No. 200 sieve; no stone greater than two-third (2/3) loose lift thickness, or six inches, whichever is smaller.

2. Select Backfill:

Select backfill shall be granular, well graded friable soil, free of rubbish, ice, snow, tree stumps, roots, clay and organic matter, and other deleterious or organic material; graded within the following limits:

Percent Finer by Weight
100
30-95

No. 40	10-70
No. 200	0-10

- F. SPECIAL PIPE BEDDING MATERIAL
 - 1. The special pipe bedding material shall consist of a filter fabric installed on the trench bottom before backfilling with crushed stone as specified and as shown on the contract drawings. Filter fabric shall be as specified in Section 02071, GEOTEXTILE FABRICS.
- G. PROCESSED GRAVEL:
 - Processed gravel shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.
 - 2. The gradation shall meet the following requirements:

Sieve Designation	Percentage Passing
3 in.	100
1 1/2 in.	70-100
3/4 in.	50-85
No. 4	30-60
No. 200	0-10

- 3. The approved source of bank-run gravel material shall be processed by mechanical means. The equipment for producing crushed gravel shall be of adequate size with sufficient adjustments to produce the desired materials. The processed material shall be stockpiled in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.
- H. STONE FILL FOR GABIONS:
 - 1. The stone for gabions shall be hard, angular to round, durable and of such quality that they will not disintegrate on exposure to water or weathering during the life of the structure. Gabion rocks shall range between 4-inches and 8-inches. The range in sizes may allow for a variation of 5 percent oversize and/or 5 percent undersize rock, provided it is not placed on the gabion-exposed surface. The size shall be such that a minimum of two layers of rock must be achieved then filling the gabion.

PART 3 - EXECUTION

3.01 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION:

- A. Contractor shall take the necessary steps to avoid disturbance of subgrade during excavation and filling operations, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials, dewatering and other acceptable control measures.
- 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 a minimum 12-inch layer of compacted crushed stone wrapped all around in non-woven filter fabric. Costs of removal and replacement shall be borne by the Contractor.
- C. The Contractor shall place a minimum of 12-inch layer of special bedding materials and crushed stone wrapped in filter fabric over the natural underlying soil to stabilize areas which may become disturbed as a result of rain, surface water runoff or groundwater seepage pressures, all at no additional cost to the Owner. The Contractor also has the option of drying materials in-place and compacting to specified densities.

3.02 EXCAVATION:

- A. GENERAL:
 - 1. The Contractor shall perform all work of any nature and description required to accomplish the work as shown on the Drawings and as specified.
 - 2. Excavations, unless otherwise required by the Engineer, shall be carried only to the depths and limits shown on the Drawings. If unauthorized excavation is carried out below required subgrade and/or beyond minimum lateral limits shown on Drawings, it shall be backfilled with gravel borrow and compacted at the Contractor's expense as specified below, except as otherwise indicated. Excavations shall be kept in dry and good conditions at all times, and all voids shall be filled to the satisfaction of the Engineer.
 - 3. In all excavation areas, the Contractor shall strip the surficial topsoil layer and underlying subsoil layer separate from underlying soils. In paved areas, the Contractor shall first cut pavement as specified in paragraph 3.02 B.1 of this specification, strip pavement and pavement subbase separately from underlying soils. All excavated materials shall be stockpiled separately from each other within the limits of work.
 - 4. The Contractor shall follow a construction procedure, which permits visual identification of stable natural ground. Where groundwater is encountered, the size of the open excavation shall be limited to that which can be handled by the Contractor's chosen method of dewatering and which will allow visual observation of the bottom and backfill in the dry.
 - 5. The Contractor shall excavate unsuitable materials to stable natural ground where encountered at proposed excavation subgrade, as required by the Engineer. Unsuitable material includes topsoil, loam, peat, other organic materials, snow, ice, and trash. Unless specified elsewhere or otherwise required

by the Engineer, areas where unsuitable materials have been excavated to stable ground shall be backfilled with compacted special bedding materials or crushed stone wrapped all around in non-woven filter fabric.

B. TRENCHES:

- 1. Prior to excavation, trenches in pavement shall have the traveled way surface cut in a straight line by a concrete saw or equivalent method, to the full depth of pavement. Excavation shall only be between these cuts. Excavation support shall be provided as required to avoid undermining of pavement. Cutting operations shall not be done by ripping equipment.
- The Contractor shall satisfy all dewatering requirements specified in Section 31 23 19 DEWATERING, before performing trench excavations.
- 3. Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes, and depths of cover indicated on the Drawings. Trench widths shall be as shown on the Drawings or as specified.
- 4. Where pipe is to be laid in bedding material, the trench may be excavated by machinery to, or just below, the designated subgrade provided that the material remaining in the bottom of the trench is not disturbed.
- 5. If pipe is to be laid in embankments or other recently filled areas, the fill material shall first be placed to a height of at least 12-inches above the top of the pipe before excavation.
- 6. Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed.
- 7. If, in the opinion of the Engineer, the subgrade, during trench excavation, has been disturbed as a result of rain, surface water runoff or groundwater seepage pressures, the Contractor shall remove such disturbed subgrade to a minimum of 12 inches and replace with crushed stone wrapped in filter fabric. Cost of removal and replacement shall be borne by the Contractor.
- 8. The Contractor shall obtain a trench permit from the municipality where the trench is located prior to making any excavations of trenches (any subsurface excavation greater than three (3) feet in depth and fifteen (15) feet or less between soil walls as measured from the bottom).
- 9. All trenches required to be permitted must be attended, covered, barricaded, or backfilled. Covers must be road plates at least ¾-inch thick or equivalent, barricades must be fences at least 6-feet high with no openings greater than 4-inches between vertical supports and all horizontal supports required to be located on the trench-side of the fencing.

C. BUILDING AND FOUNDATION EXCAVATION:

- 1. Excavations shall not be wider than required to set, brace, and remove forms for concrete, or perform other necessary work.
- 2. After the excavation has been made, and before forms are set for footings, mats, slabs, or other structures, and before reinforcing is placed, all loose or disturbed material shall be removed from the subgrade. The bearing surface shall then be compacted to meet the requirements of this specification.
- 3. If, in the opinion of the Engineer, the existing material at subgrade elevation is unsuitable for structural support, the Contractor shall excavate and dispose of the unsuitable material to the required width and depth as required by the Engineer. If, in the opinion of the Engineer, filter fabric is required; the Contractor shall place filter fabric, approved by the Engineer, as per manufacturer's recommendations. Crushed stone shall then be placed in lifts and compacted to required densities. Backfill shall be placed to the bottom of the proposed excavation.
- D. EXCAVATION NEAR EXISTING STRUCTURES:
 - 1. Attention is directed to the fact that there are pipes, manholes, drains, and other utilities in certain locations. An attempt has been made to locate all utilities on the drawings, but the completeness or accuracy of the given information is not guaranteed.
 - 2. As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and excavation shall be done by means of hand tools, as required. Such manual excavation, when incidental to normal excavation, shall be included in the work to be done under items involving normal excavation.
 - 3. Where determination of the exact location of a pipe or other underground structure is necessary for properly performing the work, the Contractor shall excavate test pits to determine the locations.

3.03 BACKFILL PLACEMENT AND COMPACTION:

- A. GENERAL:
 - 1. Prior to backfilling, the Contractor shall compact the exposed natural subgrade to the densities as specified herein.
 - 2. After approval of subgrade by the Engineer, the Contractor shall backfill areas to required contours and elevations with specified materials.
 - 3. The Contractor shall place and compact materials to the specified density in continuous horizontal layers, not to exceed nine (9) inches in uncompacted lifts. The degree of compaction shall be based on maximum dry density as determined

by ASTM Test D1557, Method C. The minimum degree of compaction for fill placed shall be as follows:

	Percent of
Location	Maximum Density
Below pipe centerline	95
Above pipe centerline	92
Below pavement (upper 3 ft.)	95
Embankments	95
Below pipe in embankments	95
Adjacent to structures	92
Below structures	95

- 4. The Engineer reserves the right to test backfill for conformance to the specifications and Contractor shall assist as required to obtain the information. Compaction testing will be performed by the Engineer or by an inspection laboratory designated by the Engineer, engaged and paid for by the Contractor. If test results indicate work does not conform to specification requirements, the Contractor shall remove or correct the defective Work by recompacting where appropriate or replacing as necessary and approved by the Engineer, to bring the work into compliance, at no additional cost to the Owner. All backfilled materials under structures and buildings shall be field tested for compliance with the requirements of this specification.
- 5. Where horizontal layers meet a rising slope, the Contractor shall key each layer by benching into the slope.
- 6. If the material removed from the excavation is suitable for backfill with the exception that it contains stones larger than permitted, the Contractor has the option to remove the oversized stones and use the material for backfill or to provide replacement backfill at no additional cost to the Owner.
- 7. The Contractor shall remove loam and topsoil, loose vegetation, stumps, large roots, etc., from areas upon which embankments will be built or areas where material will be placed for grading. The subgrade shall be shaped as indicated on the Drawings and shall be prepared by forking, furrowing, or plowing so that the first layer of the fill material placed on the subgrade will be well bonded to the subgrade.
- 8. Where called for on the Drawings, Lightweight Fill shall be placed and compacted as recommended by the manufacturer. The exact number of passes shall be approved by the Engineer to insure stability of the layer. As soon as the compaction of each layer has been completed, the next layer shall then be placed. The Contractor shall take all necessary precautions during construction activities in operations on or adjacent to the Lightweight Fill to insure that the material is not over-compacted. Construction equipment, other than for compaction, shall not operate on the exposed Lightweight Fill. The top surface of the Lightweight

Fill lying directly below the gravel course shall be chinked by additional rolling of the Lightweight Fill to prevent infiltration of fines.

- B. TRENCHES:
 - 1. Bedding as detailed and specified shall be furnished and installed beneath the pipeline prior to placement of the pipeline. A minimum bedding thickness shall be maintained between the pipe and undisturbed material, as shown on the Drawings.
 - 2. As soon as practicable after pipes have been laid, backfilling shall be started.
 - 3. Unless otherwise indicated on the Drawings, select backfill shall be placed by hand shovel in 6-inch thick lifts up to a minimum level of 12-inches above the top of pipe. This area of backfill is considered the zone around the pipe and shall be thoroughly compacted before the remainder of the trench is backfilled. Compaction of each lift in the zone around the pipe shall be done by use of power-driven tampers weighing at least 20 pounds or by vibratory compactors. Care shall be taken that material close to the bank, as well as in all other portions of the trench, is thoroughly compacted to densities required.
 - 4. Class B backfill shall be placed from the top of the select backfill to the specified material at grade (loam, pavement subbase, etc.). Fill compaction shall meet the density requirements of this specification.
 - 5. Water Jetting:
 - a. Water jetting may be used when the backfill material contains less than
 10 percent passing the number 200 sieve, but shall be used only if
 approved by the Engineer.
 - b. Contractor shall submit a detailed plan describing the procedures he intends to use for water jetting to the Engineer for approval prior to any water jetting taking place.
 - c. Compaction of backfill placed by water jetting shall conform to the requirements of this specification.
 - 6. If the materials above the trench bottom are unsuitable for backfill, the Contractor shall furnish and place backfill materials meeting the requirements for trench backfill, as shown on the drawings or specified herein.
 - 7. Should the Engineer order crushed stone for utility supports or for other purposes, the Contractor shall furnish and install the crushed stone as directed.
 - 8. In shoulders of streets and road, the top 12-inch layer of trench backfill shall consist of processed gravel for sub-base, satisfying the requirements listed in MassDOT standard specification M1.03.1.

C. BACKFILLING UNDER BUILDINGS AND FOUNDATIONS:

Material to be used as structural fill under structures shall be special bedding material or gravel borrow, as shown on the Drawings or as required by the Engineer. Where gravel borrow fill is required to support proposed footings, walls, slabs, and other structures, the material shall be placed in a manner accepted by the Engineer. Compaction of each lift shall meet the density requirements of this specification.

D. BACKFILLING ADJACENT TO STRUCTURES:

- 1. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads to which they will be subjected. Excavated material approved by the Engineer may be used in backfilling around structures. Backfill material shall be thoroughly compacted to meet the requirements of this specification.
- 2. Contractor shall use extra care when compacting adjacent to pipes and drainage structures. Backfill and compaction shall proceed along sides of drainage structures so that the difference in top of fill level on any side of the structure shall not exceed two feet (2') at any stage of construction.
- 3. Where backfill is to be placed on only one side of a structural wall, only handoperated roller or plate compactors shall be used within a lateral distance of five feet (5') of the wall for walls less than fifteen feet (15') high and within ten feet (10') of the wall for walls more than fifteen feet (15') high.

3.04 DISPOSAL OF SURPLUS MATERIALS:

- A. Surplus excavated materials, which are acceptable to the Engineer, shall be used to backfill normal excavations in rock or to replace other materials unacceptable for use as backfill. Upon written approval of the Engineer, surplus excavated materials shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions; or shall be neatly deposited for other purposes as indicated by the Owner, within its jurisdictional limits; all at no additional cost to the Owner.
- B. Surplus excavated material not needed as specified above shall be hauled away and disposed of by the Contractor at no additional cost to the Owner, at appropriate locations, and in accordance with arrangements made by him. Disposal of all rubble shall be in accordance with all applicable local, state and federal regulations.
- C. No excavated material shall be removed from the site of the work or disposed of by the Contractor unless approved by the Engineer.
- D. The Contractor shall comply with Massachusetts regulations (310 CMR 40.0032) that govern the removal and disposal of surplus excavated materials. Materials, including contaminated soils, having concentrations of oil or hazardous materials less than an otherwise Reportable Concentration and that are not a hazardous waste, may not be disposed of at locations where concentrations of oil and/or hazardous material at the

receiving site are significantly lower than the levels of those oil and /or hazardous materials present in the soil being disposed or reused.

END OF SECTION

SECTION 31 05 13.13

LOAM BORROW (TOPSOIL)

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers all labor, materials, and equipment necessary to furnish and place Loam Borrow and all related work as indicated on the drawings and as herein specified.
- B. Existing on-site topsoil that has been stockpiled may be re-used provided it meets these specifications. The Contractor shall be solely responsible to determine if adequate quantities of on-site topsoil exist that may potentially be reused.

1.02 RELATED WORK:

- A. Section 31 00 00, EARTHWORK
- B. Section 32 91 19, LOAMING & SEEDING
- C. Section 32 93 00, TREES, SHRUBS, GROUNDCOVERS, AND LANDSCAPING

1.03 QUALITY ASSURANCE:

- A. For each particular source of loam, the Contractor shall send representative samples totaling approximately 10 pounds of Loam Borrow to an approved State-certified testing laboratory.
- B. Loam shall be subject to tests for Soluble Salts (1:2 soil-water ratio), Nitrogen (including nitrate and ammonium Nitrogen), Phosphorous, Potassium, Sulfate, Calcium, Magnesium, Aluminum, and Ferric Iron concentrations.
- C. Loam shall also tested for heavy metals concentration, which shall include Boron, Cadmium, Zinc, Chromium, Copper, Lead, Manganese, and Nickel.
- D. Mechanical gradation (textural analysis) as per USDA Soil Classification System and determine Organic matter content and the pH (1:1 soil-water ratio).
- E. All tests shall be at the Contractor's expense. Laboratory test results shall state whether the Loam Borrow is acceptable as a planting medium, whether it needs to be amended, or if it fails to meet accepted requirements. Test results shall also include soil amendment and fertilizing recommendations and shall be forwarded to the Engineer at least 1month before any loaming is to be undertaken.
- F. Samples and tests shall continue to be made at the Contractor's expense until Loam Borrow to be provided is found to be acceptable to the Engineer.
- 1.04 SUBMITTALS:

In accordance with requirements of general specifications, the Contractor shall submit the following:

- A. Six copies of information detailing the soil amendments including limestone, fertilizers, organic material amendments, and the name and address of the supplier and origin of Loam Borrow shall be submitted to the Engineer for approval.
- B. Six copies of soils test results shall be submitted to the Engineer for review.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. LOAM BORROW:
 - 1. Loam Borrow shall consist of, fertile, friable natural topsoil, typical of productive soils in the vicinity, obtained from naturally well-drained areas that have never been stripped. Loam Borrow shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.
 - Loam Borrow shall be classified as a sandy loam by the USDA textural classification system as determined by sieve and pipette or hydrometer analysis. Loam Borrow shall have the following mechanical analysis:

Textural Class	Percent of Total Weight	Avg. Percentage
Sand(0.05 – 2.0mm range)	45 – 75	60
Silt (0.002 – 0.05mm range)	15 – 35	25
Clay (less than 0.002mm)	5 – 20	15

- 3. Loam Borrow shall contain not less than 4 percent or more than 7 percent organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F.
- 4. Loam Borrow shall not be excessively acid or alkaline, and shall not contain any phytotoxic materials or unacceptable concentration levels of any substance harmful to plant growth as determined by the soils testing laboratory. Loam Borrow shall have a pH value range between 5.0 and 6.5. Maximum soluble salt index shall be 100. The electrical conductivity (EC2) of a 1:2 soil-water suspension shall be less than or equal to 1.0 millimhos/cm. Aluminum concentration levels shall be less than 200ppm.
- 5. Loam Borrow shall not be worked, excavated, or delivered in a frozen or muddy condition. Soil structure shall not be destroyed through excessive and unnecessary handling or compaction.

- 6. Existing on-site topsoil may be re-used as Loam Borrow provided it meets these specifications.
- 7. All amendments to Loam Borrow shall be approved by the Engineer and shall be made in accordance with recommendations from the soils testing laboratory for use of Loam Borrow as a plant-growing medium and these specifications.

B. LIMESTONE:

Lime shall be an approved agricultural limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide). The material will be ground such that 50 percent of the material will pass through a No. 100 mesh sieve and 98 percent will pass a No. 2 mesh sieve. Lime shall be uniform in composition, dry and free-flowing and shall be delivered to the site in the original sealed containers, each bearing the manufacturer's guaranteed analysis.

C. FERTILIZER:

- 1. Fertilizer shall be a complete, standard commercial fertilizer, homogeneous and uniform in composition, dry and free-flowing, and shall be delivered to the site in the manufacturer's original sealed containers, each bearing the manufacturer's guaranteed analysis and marketed in compliance with State and Federal Laws. All fertilizer shall be used in accordance with the manufacturer's recommendations.
- 2. For Fertilizers containing Nitrogen, at least 50 percent of the nitrogenous elements shall be Urea-form or derived from organic sources and contain no less than 3 percent water-soluble Nitrogen.
- 3. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes, containing not less than 18 percent available phosphoric acid.

D. ORGANIC MATERIAL AMENDMENTS:

- 1. Organic compost shall be a standard commercial product comprised of fully decomposed, 100 percent plant-derived, natural organic matter. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Compost shall be free of sticks, stones, weed seeds, roots, mineral or other foreign matter and delivered air dry. It shall be free from excessive soluble salts, heavy metals, phytotoxic compounds, and/or substances harmful to plant growth and viability. Organic compost shall have an acidity range of 4.5 to 7.0 pH.
- 2. Sphagnum Peat Moss shall be a standard commercial product. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Peat moss shall be free of sticks, stones, weeds or weed seeds, roots, mineral or other foreign matter. It shall be free from toxic substances and/or compounds harmful to plant growth and viability. It shall be

delivered air dry in standard bales and shall have an acidity range of 3.5 to 5.5 pH.

- 3. Humus shall be natural humus, reed peat, or sedge peat. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Humus shall be free of sticks, stones, weeds, roots, mineral or other foreign matter and/or toxic substances harmful to plant growth and viability. It shall be low in wood content, free from hard lumps and excessive amounts of zinc and delivered air dry in a shredded or granular form. The acidity range for humus shall be 5.5 to 7.5 pH, and the organic matter content shall be not less than 85 percent, as determined by loss on ignition. The minimum water holding capacity shall be 200 percent by weight on an oven-dry basis.
- 4. Manure shall be well-rotted, leached, cow manure not less than 8 months or more than 2 years old. It shall be free of sawdust, shavings, or refuse of any kind and shall not contain more than 25 percent straw. It shall contain no substances harmful to plant growth. The Contractor shall furnish information regarding chemical disinfectants, if any, that may have been used in storage of the manure.

PART 3 - EXECUTION

- 3.01 After approval of rough grading, the sub-base shall be raked to a depth of 3 inches to remove stones, rock or other foreign materials 3-inches or larger in dimension. The Engineer shall inspect the work for approval, prior to placing of Loam Borrow.
- 3.02 Loam Borrow shall be placed and spread to the required depths over the locations approved by the Engineer.
- 3.03 Lime shall be uniformly applied in accordance with the soil testing laboratory recommendations, or as required by the Engineer, at a maximum rate of 100 pounds per 1000 square feet per application, in necessary quantities to achieve the pH range requirements for Loam Borrow.
- 3.04 Fertilizer shall be uniformly applied in accordance with the soil testing laboratory recommendations, or as required by the Engineer. At slopes exceeding 25 percent gradient, fertilizer shall be applied manually in a manner approved by the Engineer. Fertilizer shall not be applied between June 15 and August 31.
- 3.05 Loam Borrow shall be worked by tilling or power raking to a minimum depth of 3-inches, thoroughly incorporating the lime and fertilizer into the soil. The Loam Borrow shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing between 75 and 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines, grades and depths indicated on the plans.

END OF SECTION

31 05 13.13-4

SECTION 31 05 19.13

FILTER FABRIC

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall furnish all labor, materials and equipment and install the filter fabric in locations shown on the plans, in the specifications or as required by the Engineer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS/MATERIALS:

The filter fabric shall be Tencate Mirafi 140N as manufactured by Tencate Geosynthetics Americas, Pendergrass, GA; Foss-65, as manufactured by Foss Manufacturing Co., Hampton, NH; US 120NW, as manufactured by US Fabrics, Cincinnati, OH; or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

The filter fabric shall be installed in the final graded trench bottom prior to placement of the crushed stone bedding. The filter fabric in place shall cover the entire trench bottom and trench sides as shown on the drawings. Each width of filter fabric shall be overlapped by the subsequent width in accordance with manufacturer's recommendations, but not less than two feet, to ensure no intrusion of soil fines into the bedding.

END OF SECTION

SECTION 31 05 19.14

GEOTEXTILE FABRICS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers furnishing of all labor, materials, and equipment necessary to install specified geotextile fabrics in locations shown on the drawings and as required by the Engineer.

1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Six (6) sets of shop drawings or working drawings and material specifications shall be submitted to the Engineer for review for each type of geotextile fabric furnished. General installation practices and installation schedule shall be included.

PART 2 - PRODUCTS

- 2.01 EROSION CONTROL FABRIC "A":
 - A. Erosion control fabric "A" shall be composed of continuous-filament fibers bonded together to form a sheet. The fabric shall be an average of 20 mils thick and possess the pore-size distribution of Tencate Mirafi 600X Fabric.
 - B. Erosion Control fabric "A" shall be Tencate Mirafi 600X as manufactured by Tencate Geosynthetics, Pendergrass, GA; or approved equal.
- 2.02 EROSION CONTROL FABRIC "B":
 - A. Erosion Control Fabric "B" shall be of the best quality proven design and construction and shall be entirely suitable in every respect for the intended service.
 - B. Erosion Control fabric "B" shall be Tencate Miramesh as manufactured by Tencate Geosynthetics, Pendergrass, GA; Enkamat Soil Erosion Matting as manufactured by Bonar, Asheville, N.C.; Tenax Radix Erosion Control Netting as manufactured by Tenax Corp., Baltimore, MD or approved equal.

2.03 SOIL REINFORCEMENT FABRIC:

A. The soil reinforcement fabric shall be an integrally formed structure with aperture geometry and rib thickness sufficient to permit mechanical interlock with the surrounding particle media. The soil reinforcement fabric shall have flexural rigidity and high tensile modulus with continuity of tensile strength through all ribs and junctions of the structure. The fabric shall be composed of polypropylene stabilized with carbon black to resist ultraviolet degradation and be resistant to biological and chemical

degradation due to all naturally occurring organisms or reagents normally encountered in natural soil environments.

B. The soil reinforcement fabric shall be a Tensar SS-2 (BX1200) Geogrid, by Contech Construction Products Inc., Marlboro, MA; Tencate Mirafi 500X fabric, by Tencate Geosynthetics, Pendergrass, GA; or approved equal.

2.04 SOIL REINFORCEMENT GRID:

- A. The soil reinforcement grid shall permit free passage of moisture, be of sufficient strength to prevent deformation and impairment of function when subjected to wheel loads, and interact with overlying soil to stabilize the overburden on slopes as steep as three to one.
- B. Soil reinforcement grid shall by Tencate Mirafi Miragrid, by Tencate Geosynthetics; or approved equal.

2.05 FILTER/DRAINAGE FABRIC:

- A. The filter/drainage fabric shall be composed of continuous-filament fibers bonded together to form a sheet. The fabric shall be an average of 20 mils thick and possess the characteristics of Tencate Mirafi 140N.
- B. The filter/drainage fabric shall be Tencate Mirafi 140N as manufactured by Tencate Geosynthetics, Pendergrass, GA; Foss-65 by Foss Manufacturing Co., Hampton, NH; US 120NW, as manufactured by US Fabrics, Cincinnati, OH, or approved equal.

2.06 GEOTEXTILE LINER PROTECTOR:

- A. The geotextile liner protector shall be a non-woven, needle punched polyester or extruded polypropylene, not less than 110 mils thick.
- B. The geotextile liner protector shall be Tencate Mirafi 180 N, by Tencate Geosynthetics, Pendergrass, GA; or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. GENERAL:

Installation of geotextile fabrics shall be strictly in accordance with manufacturer's instructions and specific layout plans and details reviewed by the Engineer.

B. EROSION CONTROL FABRIC "A":

Erosion control fabric "A" shall be installed on detention basin slopes and at drainage swale ends prior to placement of riprap and at other locations as shown on the drawings or as required by the Engineer. The fabric in place shall cover the entire riprap area.

31 05 19.13-2
Each width of fabric shall be overlapped by the subsequent width a minimum of two feet. The Contractor shall follow the manufacturer's installation recommendations to ensure proper completion of the fabric installation, including top toe-in and bottom toe wrap.

C. EROSION CONTROL FABRIC "B":

Erosion control fabric "B" shall be placed over the prepared surface in drainage swales and other locations as required by the Engineer. The fabric shall be unrolled, placed in the direction of water flow, overlapped, pinned down with wood stakes, and seeded. All installation work shall be in accordance with manufacturer's recommendations or as required by the Engineer.

D. SOIL REINFORCEMENT FABRIC:

The soil reinforcement fabric shall be installed on the prepared subgrade prior to placement of the gravel base and bituminous concrete pavement. The fabric in place shall be beneath the entire proposed paved area. Each width of fabric shall be overlapped by the subsequent width a minimum of two feet. The Contractor shall follow the manufacturer's installation recommendations.

E. SOIL REINFORCEMENT GRID:

The soil reinforcement grid shall be placed on the flexible membrane liner, securely fastened at the top of all slopes and interlocked to form a continuous grid below the supports, all in accordance with manufacturer's recommendations and specific project details. The reinforcement grid shall provide stability for the overlying soil drainage layer, while permitting free passage of moisture.

- F. FILTER/DRAINAGE FABRIC:
 - 1. The filter/drainage fabric shall be installed in the final graded trench bottom prior to placement of the crushed stone bedding and at other locations shown on the drawings or designated by the Engineer. The drainage fabric in place shall cover the entire trench bottom and trench sides as shown on the drawings. Each width of drainage fabric shall be overlapped in accordance with manufacturer's recommendations, but not less than 2 feet, to prevent intrusion of soil fines into the bedding.
 - 2. On landfill projects, the filter/drainage fabric shall be installed over the drainage layer prior to loaming and seeding, per manufacturer's installation recommendations.
- G. GEOTEXTILE LINER PROTECTOR:

The geotextile liner protector shall be installed on top of the gas-venting layer and shall be covered by the flexible membrane liner. The protector shall provide a smooth

surface to support the liner and protect against liner damage due to projections. The installation shall be strictly in accordance with manufacturer's recommendations.

3.02 FINAL INSPECTION AND ACCEPTANCE:

- A. The Contractor shall, at his expense, have a manufacturer's representative inspect the work at completion of the installation. Any work found to be unsatisfactory shall be corrected at the Contractor's expense.
- B. The Engineer, at the Contractor's expense, reserves the right to have a manufacturer's representative inspect the installation process at any time during construction.

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Contractor shall do all required clearing and grubbing as indicated on the drawings or herein specified in the area required for construction operations on the Owner's land or in the Owner's permanent or temporary easements and shall remove all debris resulting therefrom.
- B. Unless otherwise noted, all areas to be cleared shall also be grubbed.
- C. The Contractor <u>shall not</u> clear and grub outside of the area required for construction operations.

PART 2 - PRODUCTS: NOT APPLICABLE

PART 3 - EXECUTION

3.01 RIGHT TO WOOD AND LOGS:

The Owner shall have the right to cut and remove logs and other wood of value in advance of the Contractor's operations. All remaining logs and other wood to be removed in the course of clearing shall become the property of the Contractor.

3.02 CLEARING:

- A. Unless otherwise indicated, the Contractor shall cut or otherwise remove all trees, saplings, brush and vines, windfalls, logs and trees lying on the ground, dead trees and stubs more than 1-foot high above the ground surface (but not their stumps), trees which have been partially uprooted by natural or other causes (including their stumps), and other vegetable matter such as shags, sawdust, bark, refuse, and similar materials.
- B. The Contractor <u>shall not</u> remove mature trees (4-inches or greater DBH) in the Owner's temporary easements.
- C. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and stubs to be cleared shall be cut as close to the ground as practicable but not more than 6-inches above the ground surface in the case of small trees, and 12-inches in the case of large trees. Saplings, brush and vines shall be cut close to the ground.
- 3.03 GRUBBING:

- A. Unless otherwise indicated, the Contractor shall completely remove all stumps and roots to a depth of 18-inches, or if the Contractor elects to grind the stumps, they shall be ground to a minimum depth of 6-inches.
- B. Any depression remaining from the removal of a stump and not filled in by backfilling shall be filled with gravel borrow and/or loam, whichever is appropriate to the proposed ground surface.
- 3.04 DISPOSAL:

All material collected in the course of the clearing and grubbing, which is not to remain, shall be disposed of in a satisfactory manner away from the site or as otherwise approved. Such disposal shall be carried on as promptly as possible and shall not be left until the final clean-up period.

SECTION 31 12 00.13

SELECTIVE CLEARING, INVASIVE SPECIES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The work of this Section includes the following:
 - 1. Pruning, to include all existing trees located within the designated areas of the Project. Work shall also include the removal of limbs as necessary to provide appropriate clearances for various site features, facilities, and park users.
 - 2. Removal of selected living trees and removal of all dead, dying or diseased vegetation from within the project limits in accordance with the contract documents specifications.
 - 3. Removal of invasive species and undesirable undergrowth in accordance with these specifications.
- B. Refer to the Contract Drawings for the general quantity and locations of existing trees that require pruning or removal. Trees shall be pruned in conformance with this specification. Tree removals shall be limited to areas as denoted on the plans and shall include the removal of individual trees that would impede the construction of proposed facilities or those that are dead or dying.
- C. Prospective bidders are advised to complete a site visit to review the extent of work required and to confirm existing conditions, access issues, terrain and the general nature of the work of the Section.

1.02 QUALIFICATIONS OF CONTRACTOR:

- A. This work 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. Eligible contractors must derive a majority of their income from arboricultural work. The Owner may require proof of these qualifications.
- B. All work shall be conducted by qualified and trained personnel under the direct supervision of a Massachusetts Certified Arborist (MCA) in the Contractor's employ.
- 1.03 PERSONNEL:
 - A. The Contractor shall submit each employee's name and title prior to the commencement of work. The Contractor shall advise the Owner of any changes in personnel assigned to this contract.

31 12 00.13-1

- B. A crew shall consist of one (1) tree trimmer/climber, and one (1) ground person (one of whom shall be a crew foreman). The crew foreman shall have a minimum of five (5) years climbing/pruning experience. At least one (1) crew person shall be an MCA and shall be certified in CPR.
- C. Each trimmer shall be experienced and highly qualified with the necessary tree worker skills to successfully complete the work of this Section, including the ability and training to perform aerial rescue. Said skill shall also include worker safety and ability in compliance with current OSHA and ANSI Z-133.1 Standards.

1.04 SPECIAL REQUIREMENTS:

- A. Trees: The trees to be removed shall be those shown on the plans or designated by the Engineer/Arborist.
- B. Undergrowth: All plants less than 4-inches in diameter, measured at a height of 4 feet 6-inches above the ground, shall be classified as undergrowth. All undergrowth shall be removed from areas shown on the plans, described in the special provisions, or designated by the Engineer; except for those plants designated by the Engineer to be preserved.
- C. General: When specified in the special provisions, stumps shall be treated with a herbicide immediately after cutting to prevent sprouting. The herbicide to be used, and the method and rate of application shall be as specified in the special provisions. The Contractor shall follow all applicable instructions, warnings, and safety precautions stated on the manufacturer's label, and shall comply with all laws and regulations governing herbicides that are in effect at the time of use. When work is performed properly in accordance with these specifications, no subsequent recutting of sprouts or seeding growth will be required. All trees and undergrowth cut shall be disposed of in accordance with the applicable requirements of Section 2.03 Demolition of these specifications.
- D. Dutch Elm diseased wood shall be disposed of in accordance with provisions of General Laws, Chapter 87, Section 5, and Chapter 132, Sections 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.
- E. No burning shall be permitted on the project site.
- F. Prior to commencing work, the Contractor shall submit a plan to the Owner for legal disposal of removed materials, in conformance with State and Federal regulations.

1.05 STANDARDS AND DEFINITIONS:

A. All pruning work shall conform to the following:

- 1. The ANSI A300 'Standard Practices for Trees, Shrubs, and Other Wood Plant Materials' of the Secretariat: National Arborist Association, Post Office Box 1094, Amherst, New Hampshire 03031.
- 2. American National Standards Institute (ANSI) Standard Z-133.1.
- B. The term 'Owner' shall mean the Owner's designated representative charged with carrying out the requirements of this Project –'Landscape Architect', 'Arborist', 'Engineer', 'Planner', or 'Tree Warden' as referenced herein, rendering approvals for the Owner.
- C. The Engineer will monitor job progress throughout the project and approve all payments. A site walk will be conducted before work begins between the Contractor and the Engineer. Specific trees, undergrowth and invasive species may be identified at this time for removal/eradication.

1.06 EXAMINATION OF SITE AND DOCUMENTS:

A. The Contractor shall be responsible for having a clear understanding of the existing site conditions and shall be responsible for fully carrying out the work of this Section, regardless of actual site conditions encountered.

1.07 ORDER OF WORK:

A. Based on the site conference, the Contractor shall submit a schedule of work for the Owner's review and approval prior to beginning work. Unless otherwise authorized by the Owner, failure of the Contractor to comply with the approved removal schedule shall be sufficient cause to give notice that the Contractor is in default of the contract.

1.08 PROTECTION OF THE VEGETATION TO BE PRESERVED:

- A. The Contractor shall protect all existing trees, shrubs, lawns and other site features designated to remain. The placement of protection devices, such as snow fence enclosures, shall, however, be at the Contractor's discretion.
- B. Damage no plant to remain by burning, pumping water, cutting of live roots or branches, or any other means. Neither vehicles nor equipment shall be parked within the dripline of trees to remain, or where ever 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 trees, shrub, lawn or other features to remain, and shall immediately report to the Owner. Damaged shrubs or lawns shall be restored or replaced to match existing to remain to the satisfaction of the Owner.
- D. The Contractor shall compensate the Owner for damages by installing replacement tree(s) of the size and species approved by the Owner and of sufficient quantity such that the sum of the caliper inches for replacement trees equals the total caliper inches of the damaged tree(s). Damaged shrubs shall be replaced with shrubs(s) of the same

31 12 00.13-3

size, species, and quantity, unless determined otherwise by the Owner.

- E. Any plants that are damaged to such an extent as to destroy their value for landscape purposes shall be cut and disposed of, and grass that is damaged shall be reseeded and re-mulched as necessary by the Contractor at no cost to the Department when so required by the Engineer.
- F. The Contractor shall conduct his operations in such a manner to prevent injury to trees, shrubs, grass, or other types of vegetation that are to remain growing, and also to prevent damage to adjacent property.
- G. When any such injuries to trees or shrubs occur, broken branches shall be removed and rough edges of scarred areas shaped and made smooth in accordance with generally accepted horticultural practice.

1.09 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 and/or otherwise cleaned of all materials related to the work operation. Degree of clean-up required will be described by the Owner and will be based upon the character of the work area.
- C. All trimmings or any other form of debris (except diseased materials or trimmings from Elms) shall be collected and chipped. The Contractor shall remove all materials and shall dispose of such materials off site in a legal manner.
- D. The Contractor shall be fully and solely responsible for any damage to equipment or vehicles left at the site of the work. All necessary permits shall be obtained by the Contractor.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

- A. Equipment necessary for this Contract shall be properly maintained and in good operating condition to the Owner's satisfaction. The Contractor shall promptly remove and replace any equipment which the Owner deems to be in unsatisfactory condition or otherwise unsuitable.
- B. A disc chipper shall be used which will process material up to twelve (12) inches in diameter.

PART 3 - EXECUTION

3.01 TREE PRUNING:

- A. 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 same time of this contract and in accordance with tree pruning as specified herein.
- B. The work of this Section consists of all tree pruning work and related items as specified herein and includes, but is not limited to:
 - 1. Pruning throughout the designated areas and limb removal required to allow for the proper installation of all proposed improvements. Medium pruning efforts shall consist of the removal of dead, dying, diseased, interfering, objectionable and weak branches on the main trunks as well as those within the leaf area. An occasional branch one (1) inch or less in diameter may remain within the main leaf area where it is not practical to remove it.

3.02 TREE PRUNING DESCRIPTION OF WORK:

- A. Tree Pruning and trimming are generally described as the removal and disposal of limbs, branches and stubs which are either dead, potentially detrimental to the health of the tree or dangerous to pedestrians, visually deficient, interfering or otherwise objectionable as determined by the Owner.
- B. The limits of all trees to be pruned have been identified on the plans or referenced elsewhere in this specification section.
- C. Vehicle access shall be controlled and approved by the Owner.
- D. If the Contractor discovers tree(s) which have not been designated for removal, 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 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.
- E. All tree pruning shall be conducted in a manner that 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 that is a minimum of one-third (1/3) the size of the branch being removed, unless otherwise instructed by the Owner.
- F. The use of climbing spurs or spiked shoes shall not be permitted and their use will result in the immediate cancellation of the contract.
- G. All cuts shall be made sufficiently close to the parent stem so that wound closure can be readily started under normal conditions. Cuts shall, however, never be made through the branch collar. Slab cuts and rip cuts will result in cancellation of the contract.
- H. All limbs over two (2) inches in diameter to be removed shall be precut to prevent splitting. Any branches that by falling would injure existing trees to remain or other

31 12 00.13-5

objects shall be lowered to the ground by proper ropes.

- I. On trees known to be diseased and where there is known to be danger of transmitting the disease on tools, tools shall be disinfected with alcohol after each cut between trees.
- J. Lateral branches as well as occasional branch suckers may be retained. Complete removal of secondary laterals and branch suckers resulting in the stripping of major limbs, ("lion tailing") will not be permitted.
- All branches and limbs shall be manually lowered to the ground via rope and pulley.
 This practice must be consistent with the National Arborist Association Standards for Pruning. All grade-level artifacts and landscaping must be protected from damage.

3.03 REMOVALS:

A. The Contractor shall furnish all labor, materials, equipment and transportation required to complete all aspects of the removals work in accordance with all local, state, and federal regulations in force at the time of this contract and in accordance with tree and stump removals as specified herein.

3.04 REMOVALS DESCRIPTION OF WORK:

- A. Removal is generally described as the removal of groups and individual trees and shrubs which interfere with the growth of more desirable types of trees; the clearing away of lesser growth that may obscure outstanding trees; and thinning out to provide space for healthy growth by the elimination of thinner, weaker trees.
- B. For the purposes of this contract, removals shall also include all species that are dead, dying, or diseased, are undesirable or are considered to be invasive, as recognized by applicable entities of the Commonwealth of Massachusetts and Massachusetts Association of Arborists.
- C. 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 specification shall not relieve the Contractor of responsibility to correct or remedy unsatisfactory work.
- D. The Contractor shall only work on trees as designated by the contract documents and/or the Owner. No compensation will be made for work performed on any other tree or trees.
- E. Trees designated to be removed shall be taken down and all leaves, branches and trunks of trees properly disposed of by chipping and removal from the premises.
- F. Fell trees in a manner that allows all site features and those trees to be saved undamaged.

- G. Removal of all the parts of each tree shall be completed on the same day that the tree is cut.
- H. Stumps of trees removed shall also be removed to eighteen (18) inches below grade by grinding or other means acceptable to the Owner. The void from the stump removal operations shall be filled with ordinary borrow soil to within six (6) inches of finished grade. The top six (6) inches shall be filled with screened loam, moderately tamped to prevent future settling. In grass areas, the disturbed area shall be sown with grass seed of a mix appropriate to the location, as required by the Owner.
- I. Excavation or grading within the branch spread of trees to be saved shall be performed as required by the Owner.
- J. 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.
- K. 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 provide, erect, and maintain protective devices acceptable to the Owner, including but not limited to barricades, lights and warning signs.
- L. Any practice employed by the Contractor that is obviously hazardous as determined by the Owner shall be immediately discontinued by the Contractor upon receipt of either written or oral notice from the Owner to discontinue such practice.

3.05 SELECTIVE CLEARING AND INVASIVE SPECIES REMOVAL:

- A. The Contractor shall furnish all labor, materials, equipment and transportation required to complete all aspects of the selective clearing and invasive species work in accordance with all local, state, and federal regulations in force at the time of this contract and in accordance with selective clearing and invasive species removal as specified herein.
- 3.06 DESCRIPTION OF WORK-SELECTIVE CLEARING AND INVASIVE SPECIES REMOVAL:
 - A. As applicable, any part of tree trunks or base of plant material located on the Location Lines shall be considered within the State Highway Limits.
 - B. Densely wooded areas shall be thinned to provide space for healthy growth by eliminating thinner, weaker trees and the reduction of number of varieties.
 - C. The Contractor's attention is called to the requirements for work under this item. The desired appearance to be attained in certain areas of heavy growth may require three or more operations. First, the obvious dead, dying and diseased trees and undergrowth shall be cut and cleared out of the area. This work includes removal of any previously fallen trees, branches, uprooted stumps and other debris as required. Next, the area is to be thinned out, as directed, by removing the less desirable trees and brush which

interfere with the growth of the better plant material. Finally, clear out lesser growth which may obscure outstanding trees, tree groups or scenic views.

- D. Tree up-branching and shaping under this item will be restricted to trees which have limbs and branches restricting sight distance, extending over roadways, shoulders, turn outs, etc. Up-branching or trimming will be required to produce a 6 meter minimum vertical clearance over all locations described hereinbefore, and the removal of limbs and branches involved in this operation shall be accomplished as outlined hereafter.
- E. Invasive species removal shall be performed using the Cut & Dab method. The cut and dab method essentially combines a mechanical and chemical treatment together. The goal is to avoid large ground disturbance caused by digging up routes and instead apply a chemical treatment to cut stems or roots. A 25-35% solution of the active ingredient should be used. Stems should be cut as close to the ground as possible and herbicide should be applied directly to the cut surface. This application should be done as soon as possible after the plant is cut to ensure effectiveness of the herbicide. The herbicide can be applied in many different methods including spray bottle, rag, brush, or sponge. The idea is to thoroughly wet the cut surface so that the herbicide gets into the plant. This technique is most effective in late Summer or early Fall.

SECTION 31 13 13

TREE PRUNING AND TREE AND STUMP REMOVALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The work of this Section includes the following:
 - 1. Pruning Class II, including the removal of all limbs necessary to execute the field, playground and fence work required under this contract.
 - 2. Removal of trees and stumps.
- B. Refer to the Contract Drawings for general location of trees along the site perimeter. In general, all trees are to remain and be pruned in conformance with this Specification.
 Tree removals shall be limited to the area denoted on the plans and shall include the removal of individual trees that would impede the construction of proposed facilities.

1.02 QUALIFICATIONS OF CONTRACTOR:

- A. This work 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. The Owner may require proof of these qualifications.
- B. All work shall be conducted by qualified and trained personnel under the direct supervision of a Massachusetts Certified Arborist (MCA) in the Contractor's employ.

1.03 PERSONNEL:

- A. The Contractor shall submit each employee's name and title prior to the commencement of work. The Contractor shall advise the Owner of any changes in personnel assigned to this Contract.
- B. The crew foreman shall have a minimum of five (5) years climbing/pruning experience.At least one (1) crew person shall be an MCA and shall be certified in CPR.
- C. Each trimmer shall be experienced and highly qualified with the necessary tree worker skills to successfully complete the work of this Section, including the ability and training to perform aerial rescue. Said skill shall also include worker safety and ability in compliance with current OSHA and ANSI Z-133.1 Standards.

1.04 SPECIAL REQUIREMENTS:

A. Dutch Elm diseased wood shall be disposed of in accordance with provisions of General Laws, Chapter 87, Section 5, and Chapter 132, Sections 8 and 11 as amended; and in

31 13 13 -1

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 shall be permitted on the project site.
- C. Prior to commencing work, the Contractor shall submit a plan to the Owner for legal disposal of removed materials, in conformance with State and Federal regulations.

1.05 STANDARDS AND DEFINITIONS:

- A. All pruning work shall be performed in accordance with the following:
 - 1. The ANSI A300 'Standard Practices for Trees, Shrubs, and Other Wood Plant Materials' of the Secretariat: National Arborist Association, Post Office Box 1094, Amherst, New Hampshire 03031.
 - 2. American National Standards Institute (ANSI) Standard Z-133.1.
 - 3. The standards and practices of the International Society of Arborists.
 - 4. The standards and practices of the Massachusetts Arborist Association.
 - 5. The standards and practices of the American Association of Nurserymen.
- B. The term 'Owner' shall mean the Owner's designated representative charged with carrying out the requirements of this Project, Architect, Engineer, Planner, or Tree Warden as referenced herein, rendering approvals for the Owner.

1.06 EXAMINATION OF SITE AND DOCUMENTS:

- A. The Contractor shall be responsible for having a clear understanding of the existing site conditions and shall be responsible for fully carrying out the work of this Section, regardless of actual site conditions encountered.
- 1.07 ORDER OF WORK:
 - A. Based on the site conference, the Contractor shall submit a schedule of work for the Owner's review and approval prior to beginning work. Unless otherwise authorized by the Owner, failure of the Contractor to comply with the approved removal schedule shall be sufficient cause to give notice that the Contractor is in default of the contract.

1.08 PROTECTION OF THE VEGETATION TO BE PRESERVED:

- A. The Contractor shall protect all existing trees, shrubs, lawns and other site features designated to remain. The placement of protection devices, such as snow fence enclosures, shall, however, be at the Contractor's discretion.
- B. Damage no plant to remain by burning, pumping water, cutting of live roots or

branches, or any other means. Neither vehicles nor equipment shall be parked within the dripline of trees to remain, or where ever 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 trees, shrub, lawn or other site features to remain, and shall immediately report to the Owner. Damaged shrubs or lawns shall be restored or replaced to match existing to remain to the satisfaction of the Owner.
- D. The Contractor shall compensate the Owner for damages by installing replacement tree(s) of the size and species approved by the Owner and of sufficient quantity such that the sum of the Diameter at Breast Height (DBH) inches for replacement trees equals the total DBH inches of the damaged tree(s). Damaged shrubs shall be replaced with shrubs(s) of the same size, species, and quantity, unless determined otherwise by the Owner.

1.09 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 and/or otherwise cleaned of all material related to the work operation. Degree of clean-up required will be described by the Owner and will be based upon the character of the work area.
- C. All trimmings or any other form of debris (except diseased materials or trimmings from Elms) shall be collected and chipped. The Contractor shall remove all materials and shall dispose of such materials off site in a legal manner.
- D. No vehicles are to be stored on site. The Contractor shall be fully and solely responsible for any damage to equipment or vehicles left at the site of the work. All necessary permits shall be obtained by the Contractor.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

- 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 condition or otherwise unsuitable.
- B. Cutting tools shall be kept well sharpened to provide clean smooth cuts. Any tools utilized on any tree suspected to have cankers or other fungal, bacterial or viral diseases shall be sterilized or not used on any other specimen.
- C. A disc chipper shall be used which will process material up to twelve (12) inches in diameter.

PART 3 - EXECUTION

3.01 PRUNING:

- A. 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 same time of this Contract and in accordance with tree pruning as specified herein.
- B. The work of this Section consists of all pruning work and related items as specified herein and includes, but is not limited to:
 - 1. Pruning Class II throughout the designated areas and limb removal required to allow for the proper installation of all fields, play equipment and new fencing.

Class II pruning is defined as medium pruning and shall consist of the removal of dead, dying, diseased, interfering, objectionable and weak branches on the main trunks as well as those within the leaf area. An occasional branch one (1) inch or less in diameter may remain within the main leaf area where it is not practical to remove it.

3.02 DESCRIPTION OF PRUNING WORK:

- A. Pruning and trimming are generally described as the removal and disposal of limbs, branches and stubs which are either dead, potentially detrimental to the health of the tree or dangerous to pedestrians, visually deficient, interfering or otherwise objectionable as determined by the Owner.
- B. The limits of all trees to be pruned have been identified on the plans or referenced elsewhere in this specification section.
- C. Vehicle access shall be controlled and approved by the Owner.
- D. If the Contractor discovers tree(s) which have not 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 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.
- E. All pruning shall be performed in a manner that 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 that is a minimum of one third (1/3) the size of the branch being removed, unless otherwise instructed by the Owner.
- F. The use of climbing spurs or spiked shoes shall not be permitted and their use will result in the immediate cancellation of the contract.

- G. All cuts shall be made sufficiently close to the parent stem so that wound closure can be readily started under normal conditions. Cuts shall, however, never be made through the branch collar. Slab cuts and rip cuts will result in cancellation of the contract.
- H. All limbs over two (2) inches in diameter to be removed shall be precut to prevent splitting. Any branches that by falling would injure existing trees to remain or other objects shall be lowered to the ground by proper ropes.
- I. On trees known to be diseased and where there is known to be danger of transmitting the disease on tools, tools shall be disinfected with alcohol or bleach after each cut between trees.
- J. Lateral branches as well as occasional branch suckers ("water sprouts") may be retained. Complete removal of secondary laterals and branch suckers resulting in the stripping of major limbs, ("lion tailing") will not be permitted.
- K. Tree paint to seal pruning cuts shall not be used.
- L. All branches and limbs shall be manually lowered to the ground via rope and pulley. This practice must be consistent with the National Arborist Association Standards for Pruning. All grade-level artifacts and landscaping must be protected from damage.

3.03 REMOVALS:

A. The Contractor shall furnish all labor, materials, equipment and transportation required to complete all aspects of the removals work in accordance with all local, state, and federal regulations in force at the time of this contract and in accordance with tree and stump removals as specified herein.

3.04 DESCRIPTION OF REMOVAL WORK:

- A. Removal is generally described as the removal of groups and individual trees and shrubs which interfere with the growth of more desirable types of trees; the clearing away of lesser growth that may obscure outstanding trees; and thinning out to provide space for healthy growth by the elimination of thinner, weaker trees.
- 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 specification 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 tree or trees.
- D. Trees designated to be removed shall be taken down and all leaves, branches and trunks of trees properly disposed of by chipping and removal from the premises.

- E. Fell trees in a manner that allows all site features and those trees to be saved undamaged.
- F. Removal of all the parts of each tree shall be completed on the same day that the tree is cut.
- G. Stumps shall be ground to eighteen (18) inches below grade by grinding or other means acceptable to the Owner. The void from the stump removal operations shall be filled with ordinary borrow soil to within six (6) inches of finished grade. The top six (6) inches shall be filled with screened loam, moderately tamped to prevent future settling. In grass areas the disturbed area shall be sown with grass seed of a mix appropriate to the location, as required by the Owner.
- H. Excavation or grading within the branch spread of trees to be saved shall be performed as required by the Owner. Removal of pavement such as bituminous concrete in these zones shall be by hand tools and/or air spade to ensure root health for trees to remain.
- I. 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.
- J. 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 provide, erect, and maintain protective devices acceptable to the Owner, including but not limited to barricades, lights and warning signs.
- K. Any practice employed by the Contractor that is obviously hazardous as determined by the Owner shall be immediately discontinued by the Contractor upon receipt of either written or oral notice from the Owner to discontinue such practice.

SECTION 31 23 19

DEWATERING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section specifies designing, furnishing, installing, maintaining, operating and removing temporary dewatering systems as required to lower and control water levels and hydrostatic pressures during construction; disposing of pumped water; constructing, maintaining, observing and, except where indicated or required to remain in place, removing of equipment and instrumentation for control of the system.

1.02 RELATED WORK:

- A. Section 31 00 00, EARTHWORK
- B. Section 31 50 00, SUPPORT OF EXCAVATION

1.03 SYSTEM DESCRIPTION:

A. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation; increasing the stability of excavated slopes; preventing loss of material from beneath the slopes or bottom of the excavation; reducing lateral loads on sheeting and bracing; improving the excavation and hauling characteristics of sandy soil; preventing rupture or heaving of the bottom of any excavation; and disposing of pumped water.

1.04 QUALITY ASSURANCE:

- A. The Contractor is responsible for the adequacy of the dewatering systems.
- B. The dewatering systems shall be capable of effectively reducing the hydrostatic pressure and lowering the groundwater levels to a minimum of 2 feet below excavation bottom, unless otherwise required by the Engineer, so that all excavation bottoms are firm and dry.
- C. The dewatering system shall be capable of maintaining a dry and stable subgrade until the structures, pipes and appurtenances to be built therein have been completed to the extent that they will not be floated or otherwise damaged.
- D. The dewatering system and excavation support (see Section 31 50 00, SUPPORT OF EXCAVATION) shall be designed so that lowering of the groundwater level outside the excavation does not adversely affect adjacent structures, utilities or wells.

1.05 SUBMITTALS

A. Contractor shall submit six copies of a plan indicating how they intend to control the discharge from any dewatering operations on the project, whether it is discharge of groundwater from excavations or stormwater runoff during the life of the project.

PART 2 - PRODUCTS: NOT APPLICABLE

PART 3 - EXECUTION

3.01 DEWATERING OPERATIONS:

- A. All water pumped or drained from the work shall be disposed of in a manner that will not result in undue interference with other work or damage to adjacent properties, pavements and other surfaces, buildings, structures and utilities. Suitable temporary pipes, flumes or channels shall be provided for water that may flow along or across the site of the work. All disposal of pumped water shall conform to the provisions of Section 01 57 19 ENVIRONMENTAL PROTECTION and Section 00 31 43 PERMITS.
- B. Dewatering facilities shall be located where they will not interfere with utilities and construction work to be done by others.
- C. Dewatering procedures to be used shall be as described below:
 - 1. Crushed stone shall encapsulate the suction end of the pump to aid in minimizing the amount of silt discharged.
 - 2. For dewatering operations with relatively minor flows, pump discharges shall be directed into hay bale sedimentation traps lined with filter fabric. Water is to be filtered through the hay bales and filter fabric prior to being allowed to seep out into its natural watercourse.
 - 3. For dewatering operations with larger flows, pump discharges shall be into a steel dewatering basin. Steel baffle plates shall be used to slow water velocities to increase the contact time and allow adequate settlement of sediment prior to discharge into waterways.
 - 4. Where indicated on the contract drawings or in conditions of excess silt suspended in the discharge water, silt control bags shall be utilized in catch basins.
- D. The Contractor shall be responsible for repair of any damage caused by his dewatering operations, at no cost to the Owner.

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. Furnish all labor, materials, tools and equipment, and perform all operations necessary for erosion and sedimentation control work indicated on contract drawings and as specified herein.

1.02 PROJECT CONDITIONS:

- A. Earthmoving activities in the project area and the surrounding landfill area shall be conducted in such a manner as to prevent accelerated erosion and the resulting sedimentation.
- B. The Contractor shall implement and maintain erosion and sedimentation control measures as shown on the contract drawings or as required by the Owner or Engineer from the start of construction until provisional acceptance of seeded areas, to effectively prevent accelerated erosion and sedimentation.

1.03 SUBMITTALS:

A. The Contractor shall submit to the Engineer certification that the materials used for silt fence and hay bale construction meet the specifications.

1.04 GENERAL METHODOLOGY:

- A. Erosion and sedimentation control methods shall consider all factors which contribute to erosion and sedimentation including, but not limited to, the following:
 - 1. Topographic features of the Project area.
 - 2. Types, depth, slope and areal extent of the soils.
 - 3. Proposed alteration of the area.
 - 4. Amount of run-off from the Project area and the upgradient watershed areas.
 - 5. Staging of earthmoving activities.
 - 6. Temporary control measures and facilities for use during earthmoving.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Hay Bales shall consist of rectangular shaped bales of hay weighing at least 40 pounds per bale. They shall be free of primary noxious weed seeds.
- B. Silt Fence shall be a woven polypropylene and/or polyester material, which meets or exceeds the minimum average roll values requirements tabulated below:

Fabric Property	Test Method	Fabric Requirement
Tensile strength, lbs	ASTM D-4632 Grab	100 minimum
Elongation at 50% minimum tensile strength	ASTM D-4632 Grab	50% maximum
Permittivity, sec ⁻¹	ASTM D-4491	0.1 minimum
Apparent opening size, mm	ASTM D-4751	0.84 maximum
Ultraviolet degradation at 500 hours	ASTM D-4355	minimum 70% strength retained

C. Mulch, if used to protect the hydroseed from erosion, shall consist of cured straw free from primary noxious weed seeds, twigs, debris and rough or woody materials. Mulch shall be free from rot or mold and shall be acceptable to the Engineer or Owner. Alternately, mulch shall be specially processed cellulose homogeneous fiber containing no growth or germination-inhibiting factors. Processed cellulose fiber shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a slurry when sprayed on the ground. The material shall allow homogeneous absorption and percolation of moisture. The manufacturer to show the air-dry weight content shall mark each package of the cellulose fiber. Mulch shall be utilized on all newly graded subgrade and topsoil areas that cannot be seeded within five (5) days.

PART 3 - EXECUTION

3.01 CONSTRUCTION SEQUENCE:

A. Construction of erosion control measures as depicted on drawings will be completed prior to any site work.

- B. Sediment barriers shall be used at locations shown on the drawings. Sediment barriers are temporary berms, diversions, or other barriers that are constructed to retain sediment on-site by retarding and filtering stormwater runoff.
- C. All temporary erosion control measures will be maintained throughout the course of site construction activities until provisional acceptance of the site vegetation by the Engineer or Owner, at which time the Contractor shall remove all remaining temporary erosion control structures, and properly dispose of accumulated sediment on-site in areas approved by the Owner.
- D. The Engineer or Owner may order additional erosion and sediment controls be installed. The Contractor shall comply with Engineer or Owner's request and immediately install the required controls.

3.02 CONSTRUCTION METHODS:

- A. Silt fences and/or staked hay bales shall be installed at the site downgradient of work areas as required by Owner or Engineer in the field. The silt fence shall be installed in accordance with manufacturers instructions. Hay bales shall be staked at locations shown on the contract drawings or approved by the Engineer. The base of all hay bales and silt fencing shall be embedded to the depths shown on the contract drawings.
- B. Straw mulch, if used, shall be applied at a rate of 100-lbs/1000 ft².
- C. On slopes, the Contractor shall provide protection against washouts by an approved method. Any washout, which occurs either in the Contractor's work area or in areas topographically below his work, shall be regraded and reseeded at the Contractor's expense until an accepted vegetative stand is established.

SECTION 31 50 00

SUPPORT OF EXCAVATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers wood sheeting and bracing for support of excavations. The requirements of this section shall also apply, as appropriate, to other methods of excavation support and underpinning which the Contractor elects to use to complete the work.
- B. The Contractor shall furnish and place timber sheeting of the kinds and dimensions required, complying with these specifications, where indicated on the drawings or required by the Engineer.

1.02 RELATED WORK:

- A. Section 31 23 19, DEWATERING.
- B. Section 31 00 00, EARTHWORK.

1.03 QUALITY ASSURANCE:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Safety and Department of Labor, Division of Occupational Safety "Excavation & Trench Safety Regulation (520 CMR 14.00)" and "Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et seq.)." Contractors shall be familiar with the requirements of these regulations.
- B. The excavation support system shall be of sufficient strength and be provided with adequate bracing to support all loads to which it will be subjected. The excavation support system shall be designed to prevent any movement of earth that would diminish the width of the excavation or damage or endanger adjacent structures.

PART 2 - PRODUCTS

- 2.01 MATERIALS:
 - A. Timber sheeting shall be sound spruce, pine, or hemlock, planed on one side and either tongue and grooved or splined. Timber sheeting shall not be less than nominal 2-inches thick.
 - B. Timber and steel used for bracing shall be of such size and strength as required in the excavation support design. Timber or steel used for bracing shall be new or undamaged

used material which does not contain splices, cutouts, patches, or other alterations which would impair its integrity or strength.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Work shall not be started until all materials and equipment necessary for their construction are either on the site of the work or satisfactorily available for immediate use as required.
- B. The sheeting shall be securely and satisfactorily braced to withstand all pressures to which it may be subjected and be sufficiently tight to minimize lowering of the groundwater level outside the excavation, as required in Section 31 23 19, DEWATERING.
- C. The sheeting shall be driven by approved means to the design elevation. No sheeting may be left so as to create a possible hazard to safety of the public or a hindrance to traffic of any kind.
- D. If boulders or very dense soils are encountered, making it impractical to drive a section to the desired depth, the section shall, as required, be cut off.
- E. The sheeting shall be left in place where indicated on the drawings or required by the Engineer in writing. At all other locations, the sheeting may be left in place or salvaged at the option of the Contractor. Steel or wood sheeting permanently left in place shall be cut off at a depth of not less than two feet below finish grade unless otherwise required.
- F. All cut-off will become the property of the Contractor and shall be removed by him from the site.
- G. Responsibility for the satisfactory construction and maintenance of the excavation support system, complete in place, shall rest with the Contractor. Any work done, including incidental construction, which is not acceptable for the intended purpose shall be either repaired or removed and reconstructed by the Contractor at his expense.
- H. The Contractor shall be solely responsible for repairing all damage associated with installation, performance, and removal of the excavation support system.

SECTION 32 12 16.13

BITUMINOUS CONCRETE PAVEMENT

AND COLOR SEALCOAT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Under this Section, the Contractor shall furnish all necessary labor, materials, equipment, and transportation necessary to construct the following:
 - 1. The bituminous concrete pavement for the court and walks shall be composed of materials as specified herein and shall be constructed on a prepared base course to the depth, grade and cross-section shown on the plans, as specified herein and as required by the Engineer.
 - 2. Unless otherwise specified in the Contract Drawings, bituminous concrete pavement shall be composed of a one and a half (1.5) inch bituminous concrete binder course, and a one and a half (1.5) inch bituminous concrete dense mix course.
 - 3. Where an overlay is proposed, the depth of the bituminous concrete dense mix shall be typically one and one-half (1 ½) inches except that it shall be of greater depth in places to eliminate puddling. Tack coat shall be applied utilizing Type SS-1 asphalt emulsion.
 - 4. Crack repair of existing bituminous concrete pavements prior to installation of overlay pavement.
 - 5. Color sealcoating of bituminous concrete pavements as shown on the plans and as specified herein.

1.02 REFERENCE STANDARDS AND SPECIFICATIONS:

- A. Reference to the standards, specifications and tests of technical societies, organizations and governmental bodies are made in the Contract Documents.
 - 1. AASHTO American Association of State Highway and Transportation Officials (tests or specifications).
 - 2. ASTM American Society for Testing and Materials.
 - 3. MassDOT Standard Specs. Latest edition of the <u>Standard Specifications for</u> <u>Highways and Bridges</u>, Massachusetts Department of Transportation, hereinafter referred to as the "Massachusetts Standard Specifications."

32 12 16.13-1

1.03 SUBMITTALS:

- A. Asphalt emulsion Type SS-1 product and application specification.
- B. Color Sealcoat: The Contractor shall submit catalog cuts, manufacturer's specifications and color chips or charts.
- C. Field layout of color sealcoat must be approved by Engineer prior to installation.
- D. Submit catalog cuts and manufacturer's specifications for Airport Grade Asphalt Emulsion Mix and Aggregate.
- E. Compaction tests are required on all bituminous concrete base surfaces on a 5 foot grid interval or per Owner's direction. At the Contractor's expense, an independent testing agency must perform the work and submit the results directly to the Engineer.

1.04 QUALIFICATIONS/SPECIAL REQUIREMENTS – COLOR SEALCOAT APPLICATION:

- A. The Contractor shall engage the manufacturer's representative to inspect and monitor the application of the initial filler coat upon the prepared surfaces of all pavements to receive color sealcoat.
- B. If a latex-ite acrylic sealer/surfacer is to be utilized, the addition of silica by mechanical agitation on-site shall be inspected and monitored by the manufacturer's representative who is to be engaged by the Contractor at the Contractor's cost.
- C. Adequate means shall be provided to protect the color seal coating(s) from damage until such time that each layer has cured sufficiently and no seal will adhere to and be picked up by the tires of vehicles or by pedestrian traffic.
- D. No color seal coating shall be applied during any period within which rain or subapplication temperatures are predicted within forty-eight (48) hours, unless otherwise specified by the manufacturer.

1.05 GUARANTEE/WARRANTY:

A. The pavement and coatings shall be guaranteed against defects in workmanship or quality for a period of one (1) year after final acceptance. The Contractor shall replace, repair, recoat or otherwise make satisfactory to the Owner any unacceptable pavement and or coating at no additional cost to the Owner

PART 2 - PRODUCTS

- 2.01 BITUMINOUS CONCRETE PAVEMENT:
 - A. Bituminous Concrete Pavement shall consist of binder mix and dense mix courses constructed to the thicknesses shown on the plans and shall conform to the relevant provisions of Sections 460 and (M3.11.03) of the Massachusetts Standard Specifications,

32 12 16.13-2

unless specified otherwise hereinafter.

- B. <u>Base/Binder Courses</u>
 - 1. Base/Binder Courses shall be Bituminous Concrete Pavement, Dense Finish Course Type I-1.

C. <u>Leveling/Overlay Courses</u>

- Leveling/Overlay Courses may conform to "Surface Treatment" mix, Table A, Section M3.11.03 of the MassDOT Standard Specifications, comprised of Class I Dense Bituminous Concrete, Type ST or Dense Mix Type I-1, at the Contractor's option.
- 2. The general composition of the bituminous concrete mixture (the proportion of asphalt cement to mineral aggregate) shall be in accordance with MassDOT requirements.
- 3. The mineral aggregate composition for Type ST shall be as follows:

TYPE ST SIEVE ANALYSISMINERAL AGGREGATE		
0.5. Standard Sleve NO.	(per ASTM C-136)	
Size	Minimum	Maximum
3/8	100	-
4	96	100
8	85	100
16	55	85
30	25	60
50	15	40
100	3	15
200	2	7

2.02 ASPHALT EMULSION:

A. Asphalt emulsion tack coat shall be Type SS-1 or SS-1H as specified by the Asphalt Institute.

2.03 TROWELABLE ASPHALT FILLER/PATCH:

A. Airport grade asphalt emulsion mix and aggregate shall be used to repair gouges or cracks which can then be brought to grade to receive an overlay or color sealcoat.

2.04 COLOR SEALCOAT:

A. The layout and design of color sealcoating shall be installed per contract drawings.

- B. The two (2) filler coats shall be Plexipave as manufactured by California Products Corporation, 169 Waverly Street, Cambridge, Massachusetts, or approved equal. Colors shall be as indicated on the plans. The two (2) Plexipave filler coats shall be applied to the cleaned bituminous pavement as specified hereunder. It shall be non-flammable upon exposure to flame. The filler coats shall contain a minimum of 9 lb./gal. of Silica, 100 percent (100%) passing a 100% mesh as pre-mixed at the manufacturer's plant. No sand or silica shall be added to the emulsion in the field. The bituminous pavement shall cure for fourteen (14) days prior to applying the Plexipave Acrylic Color System.
- C. Water, if approved, may be added to the Plexipave emulsion mixes. In no case may the quantity of water in the filler coat emulsion mix exceed thirty-three percent (33%) of the emulsion volume. (One (1) part water: two (2) parts filler coat). In no case may the quantity of water in the finish coat emulsion mix exceed fifty percent (50%) of the emulsion volume. (One (1) part water: one (1) part finish coat). Water shall be potable and its temperature above forty degrees F (40°F) upon addition to the emulsions.
- D. The color emulsion coating shall be California Products Company's "Plexichrome" or an approved equal emulsion product. Colors shall match those of the Plexipave filler coats. The Plexichrome shall be applied lengthwise of the court with a wide type pushbroom.
- E. The base vehicle for the finish coat shall be an acrylic polymer dispersed in water and which has the ability to withstand extremes in temperature and general weathering. The film former shall provide a non-skid surface upon drying and under all weather conditions. Pigment dispersions in the color coating are to be of the best quality chrome oxides so as to obtain a permanent true color. The coating shall contain no material, which will cause cracking due to extremes in temperatures and is to be factory mixed and consistent in color. It shall be a one hundred percent (100%) acrylic emulsion containing no alkyds, butadiene styrene, or vinyls and shall be thinned with water. It shall not chalk or discolor any equipment.
- F. The finished surface shall be smooth and uniform, true to required grade and cross section, and free of depressions, ridges, or other irregularities.

PART 3 - EXECUTION

3.01 BITUMINOUS CONCRETE PAVEMENT:

- A. Bituminous concrete pavements shall be constructed on a prepared foundation of gravel in accordance with the Massachusetts Standard Specifications, Section 405, except where overlayment is over existing pavement.
- B. The bituminous mixtures shall be placed on the approved base only when, in the opinion of the Engineer, the course is sufficiently dry and weather conditions are suitable.
- C. Where walls, curbing, or other suitable permanent supports are not present, the Contractor shall secure proper alignment and adequate compaction of the binder and surface courses as shown on the Contract Drawings and finish all edges with a <u>neat</u>

32 12 16.13-4

tamped edge.

- D. The mixture shall be placed in two (2) courses as shown on the Contract Drawings. Each course shall be spread and finished as required in the Massachusetts Highway
 Department, Standard Specifications for Highways and Bridges, Section 460.63, latest edition.
- E. Prior to completion of bituminous concrete overlay, the Contractor shall have the existing patched surfaces tack coated and leveled to eliminate all "birdbaths" or extreme lows which may create ponding or drainage problems. Leveling course (surface treatment) bituminous concrete applied as necessary, shall be raked and feathered and be properly rolled and compacted. The Contractor shall apply "level" lines, screeds, or use other measures to achieve the proper leveling surface suitable for overlay.
- F. All adhesive fabric shall be in place and approved prior to completing this work.
- G. After completion, the bituminous concrete courses shall conform to the thickness shown on the Contract Drawings, smooth and even and of a dense and uniform structure. When tested with a sixteen (16) foot straight edge placed parallel to the centerline of the pavement, there shall be no deviation from a true surface in excess of one-quarter (1/4) inch.

3.02 ASPHALT EMULSION TACK COAT:

- A. Apply a single very thin (0.05 to 0.15 gallons per square yard) application of diluted asphalt emulsion (Type SS-1) to all existing surfaces to be paved against or overlaid to cover the entire surface of existing pavement.
- B. Essential qualities of coverage are (1) it must be very thin and (2) uniformly cover entire surface of existing pavement.
- C. Place only that amount of tack coat which can be overlaid with new pavement by the end of each day, and; **IF RAIN IS ANTICIPATED DO NOT APPLY TACK COAT.**

3.03 COLOR SEAL COAT:

- A. The bituminous concrete pavement shall cure for fourteen (14) days prior to applying the Color Sealcoat System where specified.
- B. The Contractor shall furnish and apply to the approved bituminous pavements so designated on the plans: two (2) filler coats and one (1) finish coat of acrylic emulsion color coating.
- C. Prior to application of the filler coats, all dirt, sand, dust, and other loose material shall be cleaned from the paved areas to be covered, by sweeping and pressure washing with water. All surfaces shall be dry prior to starting any color seal coating process. The Contractor shall take special precautions to assure that existing pavements are thoroughly cleaned and that all cracks or joints in existing pavements are repaired in

32 12 16.13-5

conformance with these specifications and to the satisfaction of the Owner. Limits or areas to be color coated shall be taped with minimum two (2) inch wide tape true as to alignment prior to application of the color coating material.

- D. The two (2) filler coats shall be applied so that both coats are of a total quantity and with a uniform spread at the rate of one (1) gallon per each one hundred (100) square feet of surface area. Additional filler coating material is to be used if necessary to complete the court surfaces satisfactory to the Supervisor. The first coat shall be applied length-wise of the court or drive and the second coat cross-wise of the court or drive.
- E. Apply one (1) acrylic color emulsion coating to the properly prepared surfaces with a uniform spread at the rate of one (1) gallon per each two hundred (200) square feet of surface area after the filler coat applications have been completed and approved. The color emulsion coating shall be California Products Company's "Plexichrome" or an approved equal emulsion product. Colors shall match those of the Plexipave filler coats. The Plexichrome shall be applied lengthwise of the court or drive with a wide type pushbroom.
- F. The entire system of two (2) filler coats and one (1) finish coat shall be applied with approved squeegees and hair-type pushbrooms, respectively. The material shall be thoroughly mixed by mechanical agitation and all work shall be done in a thorough and workmanlike manner. The emulsion shall be thoroughly stirred in its container as received, by stationery bucket power mixer, so that a creamy, smooth consistency of all the emulsion in the container is assured for ready application. The entire work of color coat surfacing shall be done in accordance with the recommendations of the material to spatter or flow beyond the perimeter of areas to be covered. The filler coats and finish coat shall not be applied in foggy or rainy weather, or when ambient temperature is below forty-five degrees F (45°F), nor shall they be applied if such conditions are anticipated during the next forty-eight (48) hours.
- G. The finished surface shall be smooth and uniform, true to required grade and cross section, and free of depressions, ridges, or other irregularities.

SECTION 32 15 40.13

STABILIZED STONE DUST PAVEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The work to be done under this Section shall be the furnishing, placement and compaction of stabilized stone dust surfacing as shown on the drawings and as specified herein. The Contractor shall be responsible for supplying the material, labor, equipment and transportation necessary to do the work.

1.02 RELATED WORK:

A. Section 31 00 00, EARTHWORK

1.03 SAMPLES:

- A. Prior to ordering and delivering materials to the site, (1) representative samples of stone dust shall be sent to the Engineer for approval. The material shall be analyzed by a certified testing laboratory and certified by the supplier as a byproduct of a stone quarry operation.
- B. The color shall be medium to dark gray when wet and consistent throughout.
 Samples must match that product which is to be installed.

PART 2 - PRODUCTS

2.01 STONE DUST:

- A. Stone dust shall be the product of a stone crusher and shall consist of inert materials that are hard, durable stone, free from surface coatings and deleterious materials.
- B. Gradation requirements shall be as follows:

<u>U.S. Sieve No.</u>	Percent Passing by Weight	
# 4	100	
# 8	96	
# 16	68	
# 30	43	
# 50	29	
# 100	17	
# 200	11	

2.02 STABILIZER:

- A. Non-toxic, non-staining water-activated soil stabilizer.
- B. "STABILIZER" by Stabilizing Solutions, Inc. Phoenix, AZ 1-800-336-2468 or approved equal.

PART 3 - EXECUTION

- 3.01 PLACING AND COMPACTING:
 - A. The stone dust shall be placed over a previously approved and installed compacted base of gravel or concrete slab as detailed and as specified under Section 31 23 00 of these Specifications.
 - B. The stone dust shall be placed to the line and grades shown on the plans and shall consist of a minimum of the detailed thickness after watering and compacting to ninety-five percent (95%) of the maximum dry density of the material as determined by the Standard AASHTO Test Designation T99 compaction test Method C at optimum moisture content as determined by the Engineer.
 - C. Compaction shall continue until the surface is even and true to the proposed lines and grades within a tolerance of three-eighths (3/8) inch above or below the required cross sectional elevations and to a maximum irregularity not exceeding three-eighths (3/8) inch under a ten (10) foot line longitudinally. Any specific area of material sub-base which, after being rolled, does not form a satisfactory, solid, stable foundation shall be removed, replaced and recompacted by the Contractor without extra compensation.

3.02 SOIL STABILIZER BLENDING:

A. The soil stabilizer shall be carefully measured and shall be subsequently blended with the stonedust at the manufacturers recommended rate for three (3) inch compacted stabilized stonedust pathways. (If 'STABILIZER' brand stabilizer is used the blending ratio shall be as follows: One (1) pound of 'STABILIZER' powder per one and one-quarter (1 ¼) cubic feet of stonedust OR as otherwise stated; one (1) pound of 'STABILIZER' powder per five (5) square feet of surface area for three (3) inch compacted depth stone dust.)

SECTION 32 18 00

POURED-IN-PLACE SAFETY SURFACING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and transportation required for the placement of poured-in-place rubber play surfacing throughout the playground. The surfacing shall be placed at all locations identified on the Contract Drawings to the indicated grades. Layout and design of color and pattern is to be installed per the contract drawings.

1.02 SUBMITTALS

- A. In accordance with the SUBMITTAL section of these specifications submit manufacturer's specification and detail sheets for all materials to be utilized under this section.
- B. Field layout of color and pattern of surfacing to be approved by Owner's Representative prior to installation.
- C. Provide poured-in-place surface color samples for final color selection approval as required by the Owner's Representative.
- D. Post installation testing will be required by the Owner at the Contractors expense. An independent testing agency shall test to ensure a HIC of 800, contractor is responsible for removal and reinstallation if the test results do not conform.
- E. Submit copies of testing procedures and results performed by an independent testing source, which demonstrates compliance with CSPS and ASTM guidelines. Supplier must certify that safety surface depth provided meets or exceeds ASTM and ADA requirements as referenced within this specification and U.S. Consumer Product Safety Commission's Technical Guidelines for:
 - "Recommendations When tested in accordance with suggested test method in ASTM F355 procedure C; A Surface should not impact a peak acceleration in excess if 200G's to an instrumented ANSI head-form dropped on a surface from the maximum fall height as delineated in the standard specification for Impact Attenuation if surface Systems Under and Around Playground Equipment Designated F1292-91."
 - 2. The surface shall meet the Head Injury Criteria (HIC) of less than 1000. Lab test shall be performed at (3) temperatures per ASTM F1292/F355E over concrete. Testing over aggregate will not be allowed.

- F. Supplier must provide copies of testing procedures and results (g-max and HIC score results) performed by independent testing source(s) which demonstrates compliance with C.P.S.C. Guidelines as referenced. Contractor shall submit test results for review and approval by the owner.
- G. Supplier must provide complete installation instructions.
- H. A certificate of insurance must be provided by the supplier which shall provide a coverage of products liability with limit of liability not less than \$1,000,000.00

1.03 QUALIFICATIONS

A. For installation of the poured-in-place play surface the contractor shall have a minimum of five (5) years experience provide evidence of successful completion of twenty-five (25) like surfaces installed during the past five (5) years with names of clients and phone numbers.

1.04 GUARANTEE AND ACCEPTANCE/LIABILITY

- A. Safety surface shall be guaranteed against failure or defect during normal use and operation for a period of one year.
- B. Any defective elements or areas shall be replaced in part or whole by the Contractor at no cost to the owner.
- C. The Contractor and the manufacturer shall hold the Owner and Landscape Architect/Engineer harmless from any damages or liability resulting from negligent acts or omissions on the part of the Contractor or Manufacturer or improperly installed material.

PART 2 - MATERIALS

2.01 POURED-IN-PLACE-PLAY SURFACE

- Poured-in-place play surface shall be "Playbound" by Surface America, "Everguard" poured-in-place rubber as manufactured by Evergreen Surfacing Inc., 25 Berry Hill Road, Oyster Bay, NY 11732; (516) 864-0550, www. Everguard.com or approved equal. The City will consider "Sprinkle Flex" from VitriTurf but this request MUST be made during the bid period so that appropriate unit pricing can be established.
- B. Play surface shall meet or exceed current Consumer Product Safety Commission (CPSC) guidelines issued in 'A Handbook for Public Playground Safety' (latest edition) for the minimum potential fall height of the play equipment, current Disabilities Act Guidelines (ADA) and current American Society for Testing Materials (ASTM) F-1292-91 requirements.

- 1. The Base Mat shall be a monolithic poured-in-place cushioned pad, made from a blend of recycled styrene butyrene rubber (SBR) and a polyurethane binder or approved equal. The depth of the SBR mat shall be such that in conjunction with the specified top-wearing course the total resilient surface system shall provide the required absorbency for the maximum potential fall from the specified play equipment. (Refer to Section 02886) SBR shall be mixed with the binder in a ratio of 88% SBR to 12% binder by weight to achieve maximum resilience.
- 2. The Top Surface shall be a monolithic poured-in-place top surface, ½" total thickness, made from a blend of ethylene propylene diene monomer (EPDM) colored rubber particles there will be up to FOUR separate colors and each shall include a custom combination of four colors with NO BLACK to be chosen by the owner's representative during the submittal process combinations indicated in manufacturer's brochures. Top surface shall have a tensile strength of two hundred (200) psi. The urethane binder shall be an aliphatic non-yellowing type.
- 3. Poured-in-place surfacing shall be placed throughout the full extent of the playlots. The total depth of poured-in-place surfacing shall sufficient to meet a HIC of not more than 800 at installation based on maximum fall height of play structure indicate on the plans and specifications.
- 4. Prefabricated shock pads will not be considered equal.

2.02 RUBBERIZED TILE SURFACING

- A. This work shall consist of furnishing and installing a resilient tile surface in high use zones under swing components and at the base of slides, as recommended by the manufacturer and/or supplier, and as directed by the Engineer. Play surface shall consist of factory-molded interlocking resilient playground tile surfacing.
- B. All products shall meet current Consumer Product Safety Commission and Americans with Disabilities Act guidelines, and ASTM F-1292-91 requirements.
- C. Rubberized tile surfacing shall be SofTILE KrosLOCK as manufactured by SofSURFACES, (800-263-2363), www.sofsurfaces.com and supplied by J. P. LaRue Inc., 1-800-986-3716, or approved equal. Depth shall be as required by the manufacturer given the fall heights and color shall match the poured-in-place. Final color to be selected by Owner's Representative. Depth shall be 3.5".

2.03 FILTER CLOTH/FABRIC

- A. Filter fabric shall be as specified under Section 31 05 19 of these Specifications.
- 2.04 BASE MATERIALS
- A. Crushed stone materials shall be as specified under Section 31 00 00 of these Specifications, or as otherwise indicated on the details.
- B. Bituminous concrete base material under sloped poured-in-place rubber conditions shall be as specified under Section 32 12 16 of these Specifications, or as otherwise indicated on the details.
- C. The Owner's Representative reserves the right to test backfill and base material for conformance to the specifications and Contractor shall assist as required to obtain the information. Compaction testing will be performed by the Owner's Representative or by an inspection laboratory designated by the Owner's Representative, engaged and paid for by the Contractor. If test results indicate work does not conform to specification requirements, the Contractor shall remove or correct the defective Work by recompacting where appropriate or replacing as necessary and approved by the Owner's Representative, to bring the work into compliance, at no additional cost to the Owner. All backfilled materials under structures and buildings shall be field tested for compliance with the requirements of this specification.
- Compaction tests are required on base material surfaces prior to rubber base course installation. Contractor shall provide testing at 3 locations at designer's direction or per Owner's direction. At the Contractor's expense, an independent testing agency must perform the work and submit the results directly to the Owner's Representative.
- 2.05 EDGING
 - A. Refer to Contract drawings for edging locations and details and Section 05 55 00 MISCELLANEOUS METALS.
 - B. Where the rubber surfacing meets bituminous concrete or landscaped areas, ¼" x4" steel edging with steel spikes shall be used such as that manufactured by Sure-loc Edging, 494 E. 64th Street, Holland, MI 49423 or approved equal. Color shall be black.

PART 3 - EXECUTION

3.01 PROCEDURES

- A. The Contractor shall deliver, spread and compact or place safety surfaces to conform to the lines and grades shown on the Contract Drawings. All work shall be done in accordance with the manufacturer's installation recommendations for Poured-in-Place Play Surfaces.
- B. The Base Mat for the Poured-in-Place Play Surface shall be installed in accordance with the manufacturer's instructions. The Base Mat shall exhibit a minimum installed thickness necessary to provide the required absorbency for the maximum potential fall from the proposed play equipment. At playlot edges, place a board between the end of the poured-in-place base pour and the concrete edge and remove the board after the base has sufficiently cured. Pour the top course of poured-in-place surfacing and allow

material to fill the void created by the board.

- C. The Top Surface shall be installed following installation of the cushion course, in accordance with the manufacturer's instructions. The minimum installed thickness of the top wearing course shall be ½". The contractor is responsible for insuring that no foot traffic is allowed on the surface before the curing is complete.
- D. Any tests of materials, and/or compaction shall be as ordered by the Owner's Representative, and paid for by the Contractor regardless of results.
- E. All safety surface tiles shall be installed according to manufacturer's and/or suppliers recommendation and/or specifications on a concrete base. Locations and installation methods shall be as shown as determined by the Owner's Representative.

PART 4 - GUARANTEE AND ACCEPTANCE/LIABILITY

- 4.01 All structural elements safety surface shall be guaranteed against failure or defect during normal use and operation for the entire warrantee period as established by the manufacturer.
- 4.02 Safety surfacing shall be free of defects due to workmanship or material for a minimum of two(2) years from date of installation. Any defective elements shall be replaced in part or whole by the Contractor at no cost to the Owner.
- 4.03 The Contractor and the manufacturer shall hold the Owner and Owner's Representative 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 improper resilient safety surface installation. Contractor shall be responsible for securing site from pedestrian traffic or vandalism while poured-in-place safety surface dries.
- 4.04 The Contractor is responsible for securing a Certified Playground Safety Inspector to ensure ASTM and CPSC compliance. A certificate of compliance will be issued to the Owner prior to final inspection.

END OF SECTION

SECTION 32 30 00

SITE IMPROVEMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Documents, as listed in the Table of Contents, and applicable parts of Division 1, General Requirements shall be included in and made a part of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.
- C. Refer to back of this section for manufacturer's data.

1.02 SCOPE OF WORK

- A. The work of this Section consist of all site improvements and related items as indicated on the Drawings and/or as specified herein and includes, but is not limited to, the following:
 - 1. Dasher Boards
 - 2. Basketball Post, Backboard, Rim and Nets
 - 3. Multigoal

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 31 00 00 Earthwork
 - 2. Section 03 30 00 Cast-In-Place Concrete

1.04 EXAMINATION OF CONDITIONS

- A. The Contractor shall fully inform himself of existing conditions of the site before submitting his bid, and shall be fully responsible for carrying out all site work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed.
- B. Plans, surveys, measurements and dimensions under which the work is to be performed are believed to be correct to the best of the Landscape Architect'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 therein.

1.05 SCHEDULING

A. The Contractor shall submit to the Landscape Architect, for approval by the Owner, a progress schedule for all work as specified herein.

1.06 QUALITY ASSURANCE

- A. Materials and methods of construction shall comply with the following standards:
 - 1. ASTM: American Society for Testing and Materials
 - 2. ANSI: American National Standards Institute
 - 3. FS: Federal Specifications
 - 4. IMI: International Masonry Institute
 - 5. PCA: Portland Cement Association
- B. Qualifications of Workers: Use adequate numbers of skilled workers who are trained in the necessary crafts and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this Section.
- C. Layout: After staking out the work, and before beginning final construction, obtain the Landscape Architect's approval for layout. Contractor shall make adjustments as determined by the Landscape Architect. Landscape Architect may make adjustments to layout as is required to meet existing and proposed conditions without additional cost to the contract price.
- D. The following standards including all current amendments form a part of these Specifications:
 - 1. American Society for Testing and Materials (ASTM):

A36	Structural Steel
A53	Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
A120	Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses
A307	Carbon Steel Externally and Internally Threaded Standard Fasteners
A325	High Strength Bolts for Structural Steel Joints
A500	Cold Formed Welded and Seamless Carbon Steel Structural Tubing Rounds and Shapes

2. American Welding Society (AWS):

- D1.1 Structural Welding Code
- 3. Steel Structures Painting Council (SSPC):

SSPC Surface Preparation Specifications

1.07 SUBMITTALS

- A. Shop Drawings: Submit shop drawings in accordance with Division 1 requirements.
 - 1. Dasher Boards
 - 2. Basketball Post, Backboard, Rim, and Nets
 - 3. Multigoal
- B. Product Information: Provide manufacturer's data showing installation and limitations in use. Supply Certificates of Compliance for all materials required for fabrication and installation, certifying that each material item complies with, or exceeds, specific requirements. Work includes but is not limited to:
 - 1. Dasher Boards
 - 2. Basketball Post, Backboard, Rim and Nets
 - 3. Multigoal
- C. Material Samples: Submit samples for each material for the following:
 - 1. Dasher Board paint submit one (1) sample

PART 2 - PRODUCTS

2.01 MANUFACTURERD DASHERBOARD SYSTEM

A. Contractor shall furnish and install one complete set of aluminum framed dasherboards as specified herein. The contractor shall be responsible for all necessary labor, materials, equipment, and services to complete the project. All materials and installation requirements shall conform to the Legacy[™] Pro Aluminum framed dasherboard system identical in design to Rink Systems, Inc., Albert Lea, Minnesota 1-800-944-7930, or approved equal.

2.02 BASKETBALL POST, BACKBOARD, RIM AND NETS

- Basketball standards shall be a two (2) 6' offset and one (1) 10' offset gooseneck posts manufactured by True Bounce (True Bounce, 56 Conduit St., New Bedford, MA 02745 PG Series Gooseneck, or equal.)
 - 1. Post shall be Schedule 40 steel pipe with a 6-layer galvanized finish, sized as shown on the Drawings.

- B. Basketball backboards shall be a sound deadening backboard, True Bounce XL7042 with low profile safety padding or equal.
 - 1. Backboard shall be 42" x 72" constructed of 1/2" thick resistant polycarbonate. Backboard shall have 1/2" hole pattern to allow for sound reduction.
 - 2. The shot box and perimeter shall be striped with enamel paint.
 - 3. Board shall have heavy duty "E" channeled aluminum with stainless steel fasteners
- C. Basketball goals shall have regulation size (18" diameter) 5/8" diameter double rim of high tensile steel powder coated orange official size goal, with nylon net, and all required attaching hardware. Rim shall have 7/16" round steel braces, and 12 net-tie net holders.
 - 1. Hardware shall be zinc-galvanized or stainless steel.

2.03 MULTIGOAL

A. The multisport goal shall be model # FRE2211 as manufactured by KOMPAN INC. 821
Grand Avenue Parkway Pflugerville, TX 78660 Phone: 1 (800) 426-9788
USSales@kompan.com, <u>www.kompan.us</u> or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The installer shall examine previous work, related work, and conditions under which this work is to be performed and notify the Contractor in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means installer accepts substrates, subgrades, previous work, and conditions.
- B. The Contractor shall be responsible for timing the delivery of all site improvement elements so as to minimize on-site storage time prior to installation. All stored materials must be protected from weather, careless handling and vandalism.
- C. The contractor to install all elements for Basketball Post, Backboard, Rim and Nets, and Sports Bleachers per manufacturer's instruction and recommendations.
- D. Contractor shall anchor sports bleachers and steel storage box to cement concrete pad using approved bolts and/or anchoring devices.

3.02 MANUFACTURED DASHERBOARD SYSTEM

A. Manufacturer shall construct, fabricate and deliver all materials to the job site per specifications under the direct supervision of a licensed professional engineer. All materials shall be installed to result in a complete aluminum frame dasher system with all boards and shielding to be straight and true in line and properly braced. All installation work shall be completed by a factory installation crew.

- B. Installation shall be in strict conformance with manufactures requirements and instructions. Erect units rigid, straight, level, plumb, and true with horizontal and vertical lines level, and securely anchored in place. Whether shown on the drawings or not, the contractor shall provide all accessory materials for a complete, finished installation. No defective, scratches, marred or otherwise equipment and materials shall be installed.
- C. Put all items of equipment and systems through at least five complete cycles of operation, verifying that each item is properly installed and properly operating, and making required adjustments to achieve optimum operation

3.03 BASKETBALL POSTS

- A. Install according to manufacturer's directions
- B. Install level and plumb

3.04 MULTIGOAL

- A. Install according to manufacturer's directions
- B. Install level and plumb

END OF SECTION



Legacy[™] Pro Aluminum (outdoor)

ENGINEERED DASHERBOARD SPECIFICATIONS

PART 1 - GENERAL

1.01 PROJECT SCOPE

A. Contractor shall furnish and install one complete set of aluminum framed dasherboards as indicated on the drawings and specified herein. The contractor shall be responsible for all necessary labor, materials, equipment, and services to complete the project.

1.02 SUBMITTALS

- A. The contractor shall upon receipt of contract from Owner, prepare a set of shop drawings which will itemize sizes and materials as well as construction details for installation. The manufacturer will submit drawings to the Contractor for review and submittal to the Engineer, Architect or Owner for approval prior to actual fabrication of materials.
- B. Polyethylene samples shall be submitted for Owner approval of color and quality.

1.03 QUALITY ASSURANCE

- A. All materials shall be per plans and specifications and constructed, manufactured, and installed per plans and specifications. All equipment and materials supplied under these specifications shall be new and of the highest grade material and construction.
- B. Any deviation form this specification, unless approved by the owner prior to bidding, found after installation will be back charged to the contractor at the Owner's discretion. The value of irregularities shall be determined and agreed to by both parties.
- C. Approved dasherboard systems, manufacturers and installers:
 - 1. *Legacy*[™] *Pro* Aluminum framed dasherboard system identical in design to Rink Systems, Inc., Albert Lea, Minnesota.
- D. To receive approval prior to bid, dasherboard contractors must:
 - 1. Provide evidence of at least five (5) installations identical in construction to the following specifications, each with a minimum of three (3) years operating experience prior to the bidding date. A list of these installations including names,

addresses, contacts, and telephone numbers is to be included with requests for prior approval.

- 2. Manufacturers wishing to obtain prior approval shall have a factory representative perform a site visit.
- 3. Submit a sample panel of proposed dasherboard system being bid showing exactly how the system will be manufactured. Samples shall show how shield mounting hardware will be attached to system, as well as samples of gate latches, hinges, and related hardware.
- 4. Submit certified test results from a nationally recognized testing laboratory showing that proposed system is equal to the Aluminum framed dasherboard system as manufactured by Rink Systems, Inc., Albert Lea, Minnesota.
- 5. Submit dasher shop drawings detailing systems design. Drawings must be prepared and approved by a licensed professional engineer.
- 6. Approval must be obtained at least 10 days prior to the bid date.
- E. Bids received from contractors without prior approval will be returned unopened.

1.04 GUARANTEE

A. Manufacturer shall warranty all equipment provided under this project against all defects in materials and/or workmanship for a period of three year from the date of completed installation.

1.05 DELIVERY

A. To be arranged to coordinate with completion date of the project. Delivery date shall allow for sufficient installation time prior to project completion date.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER/TYPE

A. As noted in 1.03 B above.

2.02 MATERIALS AND EQUIPMENT

- A. Demountable Frame Sections:
 - 1. Dasher panels shall be fabricated in demountable sections of nominal 8' lengths. The design of all panels, whether straight sections, curved sections, or sections in which a gate is located shall be fundamentally similar. Aluminum framing materials shall be light weight structural grade (6005A-T6)

- 2. At the front, each section shall be made of two horizontal 2" x 1" x 1/8" aluminum tubes used at the top and intermediate locations and one horizontal 2" x 1-1/2" x 5/32" aluminum channel used at the base location.
- 3. At the back, each section shall be made of one 2" x 1" x 1/8" aluminum tube used at the top location and one 2" x 1-1/2" x 5/32" aluminum channel used at the base location.
- 4. Where backer panels are specified, an additional 2" x 1" x 1/8" aluminum tube shall be used at the back intermediate location to aid in fastening and supporting the backer sheets.
- 5. All horizontal angles and tube shall be welded to end plates on each end of the panel. The end plates shall be made of a specially extruded 5" x 2" x 1/4" aluminum channel. Flat stock end plates shall not be acceptable.
- 6. Each end plate shall have three 9/16" matching holes to accommodate 1/2" through bolts.
- 7. All panels over 5' in length shall have an additional $3^{\circ} \times 1-1/2^{\circ} \times 1/8^{\circ}$ aluminum tube welded vertically at the center of the panel to add rigidity.
- 8. Standard size of dasher panel frame shall be 96" long x 41" high x 5" thick.
- 9. Dasherboard system shall be self supporting. Systems which require separate support posts to support the dasherboard system are not acceptable.
- B. Floor Anchors:
 - 1. The dasher contractor shall supply all new steel anchors and hardware, as detailed on the drawings, required for the installation of the dasherboards around the perimeter of the rink.
 - 2. The dasher contractor shall supply 1/2" x 4" x 3-1/2" aluminum hold down plates. Plates shall have a 3/4" slot to accept a 5/8" bolt and flat washer for securing the dasher panels to the 5/8" epoxy sleeve type floor anchors. Each panel shall be fastened to the floor with a minimum of two 5/8" anchors and bolts per 8' section.
 - 3. The dasher contractor shall supply a 1/4" thick aluminum or fiberglass spacer plate below the anchor plate to enhance surface water runoff.
- C. Dasher Facing:
 - 1. Dasherboard cladding shall be Rinkmaster Outboard[™] FRP facing.
 - 2. The facing shall be constructed of 1/4" UV stabilized solid fiberglass sheeting, color white, texture smooth
 - 3. Facing panels shall be one piece and cut to match length of demountable framing sections.

- 4. The facing material shall be attached to the horizontal and vertical frame members with 1/4" phillips flat head stainless steel tek screws. Spacing of fasteners shall not exceed 14" on center. All exposed fastener heads shall be painted to match facing color.
- D. Caprail:
 - 1. The caprail shall be constructed of 3/4" thick UV stabilized high density polyethylene. The caprail must have a textured or mat finish. A smooth finish shall be unacceptable.
 - 2. The 3/4" caprail shall be attached to the front horizontal frame member with 1/4" phillips flat head stainless steel tek screws. Spacing of fasteners shall not exceed 14" on center. All exposed fastener heads shall be painted to match caprail color.
 - 3. The caprail shall have smooth and radiused edges on the front and back edges.
 - 4. Caprail to be (red) (dark blue) in color.

E. Kickplate:

- 1. Kickplate shall be constructed of 1/4" thick x 6" high, solid fiberglass, and shall surround the entire rink.
- 2. The top edge of the kickplate shall be beveled.
- 3. The 1/4" kickplate shall be attached to the bottom of the dasher panel with 1/4" phillips flat head stainless steel tek screws. All fastener heads used to attach kickplate to dasher panels shall be painted to match the kickplate color.
- 4. Red center line and blue lines shall be flush or integral with the kickplate.
- 5. Kickplate shall be yellow in color.

F. Access and Players' Gates:

- 1. Access gates shall be 3'-0" wide and/or 4'-0" wide in quantity as specified in the drawings.
- 2. Players' gates shall be 2'-6" wide in quantity as specified in the drawings.
- 3. Gates shall be built into 8' dasher panels and shall be left or right hand swing as specified in the drawings.
- 4. Gate panels shall be constructed of the same materials and methods as the demountable frame panels.
- 5. The double bar gate latch mechanism shall be designed so the gate can be closed and latched in a single movement. The gate handle shall be designed so players

wearing hockey gloves can easily open the gates. Latches shall be of solid welded steel construction. Single bar, or spring loaded bolt latches shall be unacceptable.

- 6. Hinges for all gates shall be of steel construction and bolted to the frame for easy maintenance, two per gate door. Hinges to have ¼" horizontal, and ½" vertical adjustment. Hinges shall have 1/2" internal steel ball bearing, oilite bushings and grease fittings for lubrication purposes. Hinges shall be designed so gates can be lifted off and removed. Piano hinges, or hinges welded to the frame shall be unacceptable.
- 7. All single swing access and player gates shall have 3/8" x 3" x 4" door stops welded to the frame gate. All gate with shielding shall be equipped with push button releases located on the caprail on the rink side of the shielding. Latches shall be designed so players wearing hockey gloves can easily open the gates.
- 8. Gates with shielding shall be made to accept shield mounting hardware.
- 9. Thresholds for 3' and 4' access gates shall be approximately 2" above floor level.
- 10. Thresholds for players' and penalty box gates shall be 6" above floor level.

G. Equipment Gate:

- 1. Equipment gate shall be a double leaf gate with a 8'-0" opening. Each leaf shall be 4' wide.
- 2. Gate panels shall be constructed of the same materials and methods as the demountable frame panels.
- 3. Hinges for equipment gate shall be of steel construction and bolted to the frame for easy maintenance, two per gate door. Hinges to have ¼" horizontal, and ½" vertical adjustment. Hinges shall have 1/2" internal steel ball bearing, oilite bushings and grease fittings for lubrication purposes. Hinges shall be designed so gates can be lifted off and removed. Common bracket hinges, or hinges welded to the frame shall be unacceptable.
- 4. Equipment gate latch shall be the sliding bar type, constructed of 2" x 2" x 11 ga. square tubing for structural rigidity, with a large grasp handle. Slide bars fabricated from round tube shall be unacceptable. Two slide bars will be provided.
- 6. Each equipment gate shall be equipped with a sturdy, gas compensated, spring loaded, adjustable caster. For safety and component protection, the spring shall be totally enclosed in the caster mechanism, casters with exposed springs shall be unacceptable.
- H. Hardware:
 - 1. All steel hardware used during the construction or installation of the system shall be galvanized, stainless, or zinc plated for rust resistance.

- 2. Hardware shall include hinges, latches, nuts, bolts, washers, and miscellaneous fastening devices necessary to complete installation.
- I. Thresholds:
 - 1. Access and players' gates shall have 1/4" thick fiberglass, replaceable thresholds.
- J. Spectator Shielding (Tempered Glass):
 - 1. Shielding shall be clear float tempered glass, 1/2" thick on the ends and corner radii of the rink and 1/2" thick at the sides of the rink. Tempered glass shielding shall have the top two corners clipped and all edges ground to minimize breakage and for safety in handling. Seamed edges are not acceptable.
 - 2. All shielding shall be 48" wide except those at gates, or similar openings in the dasherboards.
 - 3. Height of spectator shielding shall be 6' above the dasher caprail at the ends and corners radii of the rink.
 - 4. Height of spectator shielding shall be 4' above the dasher caprail at the sides of the rink.
 - 5. Spectator shielding shall be installed behind and along side, but not in front of players boxes at a height of 4' above the dasher caprail.
 - 6. Spectator shielding shall be installed behind, along side, and in front of penalty boxes at a height of 4' above the dasher caprail.
 - 7. Spectator shielding shall be installed behind, along side, and in front of officials box at a height of 4' above the dasher caprail.
 - 8. Transition spectator shielding shall be installed to connect shields of differing heights.
 - 9. Specially designed vinyl covered foam safety pads shall be placed at all corners of spectator shielding inside rink to prevent injury. Color of padding shall match the caprail.
 - 10. All spectator shielding shall be mounted in aluminum support posts.
- K. Glass Shield Mounting Hardware:
 - 1. Spectator shield mounting supports shall be retangular (H-channel) in design and of one piece construction. Shield mounting supports shall be made of solid architectural grade aluminum (alloy #6061-T6). Supports shall be installed through a snug fitting contoured opening in the finished caprail and secured at the bottom with a support mounting bracket at the center horizontal tube of the dasher panel. Installation of shielding panels to be from the rink side with the vertical support posts

within the dimensions of the panels. No protruding anchors shall extend behind the boards. Total width of supports shall not exceed 2-1/2".

- 2. Spectator shield mounting supports shall be furnished with PVC gasketing to secure and cushion the shield panels.
- 3. Mounting hardware is to be removable so that the spectator shielding can be removed without demounting the dasher system. The round shield supports shall be attached at the center angle with rectangular mounting pocket that extends a minimum of 4" into the support post.
- 4. Gate shield mounting hardware shall be made of architectural grade extruded aluminum (alloy #6061-T6). It shall be of one piece design to allow the operation of the gate sections.
- 5. The height of the supports above the caprail shall be 2" below the height of the shielding.
- 6. The spectator shield supports shall be nominally 48" apart except at gates or similar openings in the dasherboards.
- 7. At postless shielding areas, shielding shall be mounted in recessed channels fastened into the framework of the dasherboard panels. Lexan clips shall be provided between tops of shielding sections.
- L. Spectator Shielding (Chain Link Fencing):
 - 1. Shielding shall be 6 gauge extruded vinyl coated chain link steel fence 2" x 2" mesh fabric mounted to vertical and horizontal fence post members. Fencing system shall be securely held in place with the appropriate hardware.
 - 2. Vertical fence posts shall be 1-7/8 schedule 20 galvanzed steel pipe located on 8' centers. Posts shall be installed through a snug fitting contoured opening in the finished caprail and secured at the bottom with a support mounting bracket at the center horizontal tube of the dasher panel.
 - 3. Horizontal top and bottom rails shall be 1-5/8" schedule 20 galvanzied steel pipe.
 - 4. Height of fencing shall be 6' above the dasher caprail at the ends and corners radii of the rink.
 - 5. Height of fencing shall be 4' above the dasher caprail at the spectator side of the rink.
 - 6. Fencing shall be installed behind and along side, but not in front of players' boxes at a height of 4' above the dasher caprail.
 - 7. Fencing shall be installed behind, along side, but not in front of penalty boxes at a height of 4' above the dasher caprail.

- 8. Fencing shall be installed behind, along side, and in front of officials' box at a height of 4' above the dasher caprail.
- 9. Specially designed vinyl covered foam safety pads shall be placed at all corners of spectator shielding inside rink to prevent injury. Color of padding shall match the caprail.

M. Boxes:

- 1. Boxes shall consist of two players boxes 24' in length, two penalty boxes 8' of length, and one official box 8' long. Box shall be 5' deep.
- 2. Incorporated into the players box areas shall be a shelf for the storage of water bottles, etc. This shelf shall be 1/4" white fiberglass identical in color of the 1/4" white facing material and be constructed as detailed on the drawings. The shelf shall be located between the players gates.
- 3. One 1" x 20" x 8'-0" polyethylene score's table shall be installed in the officials box as shown on the drawings. The color of the table shall be white.

N. Benches:

- 1. The benches used in the players and penalty boxes shall be constructed of 2" thick by 9-1/2" wide fluted aluminum planking. The use of thinner bench material requiring the use of steel or aluminum angle horizontal supports in not acceptable.
- 2. The players box benches shall be 24' in length. The penalty box benches shall be 6' in length. The scorekeepers bench shall be 6' in length.
- 3. The benches shall be supported using supports constructed of 8" x 8" x 1/4" steel plates welded to 2" x 2" x 11 ga. steel square tubing. Height of benches shall be as indicated on drawings.
- 4. The supports will not exceed 6'-0" on center and will be fastened to the bench material with 5/16" flat head bolts and 5/16" lock nuts.

O. Netting:

- 1. Spectator protective netting shall be black nylon, 1-1/2" mesh, 420 lb. break strength. Grommets shall be located every 18" on top and sides and at each shielding support location at tie bottom edge. Netting shall be coated for outdoor use.
- 2. Netting shall be 4' in height and extend the length of each end and radius of the rink and fastened to the shielding supports is such a way to prevent pucks from falling outside the rink area.
- 3. Glass shielding or fencing support posts shall be extended verticall to support netting. 1/8" galvanized aircraft cabling will be installed at the horizontally at the top and bottom of the net for support.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Manufacturer shall construct, fabricate and deliver all materials to the job site per plans and specifications under the direct supervision of a licensed professional engineer. All materials shall be installed to result in a complete steel frame dasher system with all boards and shielding to be straight and true in line and properly braced. All installation work shall be completed by a factory installation crew.
- B. Installation shall be in strict conformance with manufactures requirements and instructions. Erect units rigid, straight, level, plumb, and true with horizontal and vertical lines level, and securely anchored in place. Whether shown on the drawings or not, this contractor shall provide all accessory materials for a complete, finished installation. No defective, scratches, marred or otherwise equipment and materials shall be installed.
- C. Put all items of equipment and systems through at least five complete cycles of operation, verifying that each item is properly installed and properly operating, and making required adjustments to achieve optimum operation.

3.03 CLEANING

- A. Clean all surfaces removing all evidence of dirt, packaging materials and protective wrappings.
- B. Replace all damaged materials including scratched glass.

END OF SECTION

- 2.00" OD GALVANIZED VERTICAL FENCE POST P INK Systems 3/4" COLORED POLY 1-5/8" OD GALVANIZED B CAPRAIL FENCE POST CHAIN LINK -FENCING AL TUBE, 2 X 1 X 1/8 (FRONT) AL TUBE, 2 X 1 X 1/8 1/4" OR 3/8" WHITE -(BACK) 0 FIBERGLASS FACING 0 AL TUBE, 3 X 1-1/2 X 1/8 1/4" FIBERGLASS 0 **KICK PLATE** AL TUBE, 2 X 1 X 1/8 AL TUBE, 2 X 1 X 1/8 ENDPLATE, 5 X 2-1/4 X 3/16 (2X) AL CHAN, 2 X 1-1/2 X 5/32 (2X)
 - LEGACY PRO ALUMINUM POSTED W/FENCE







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3/8



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Beton Beton Concrete Hormigón Béton Cemento Beton Betong

0.2 m³





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Beton Beton Concrete Hormigón Béton Cemento Beton Betong







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Beton Beton Concrete Hormigón Béton Cemento Beton Betong

1.6 m³





Concrete







Concrete

17.7 cu.ft





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Concrete

56.5 cu.ft



The plan drawing shows a hatched area with a number (1, 2, 3, 4, 5, 6, etc.) at each of the marked centre points. The hatched area indicates the size of the foundation plate. Each hatched area is numbered, and the number refers to a drawing showing the size and depth of the hole and the amount of concrete to be used. The drawings are on the last page in the folder.

In der Planzeichnung ist an jedem markierten Mittelpunkt eine schraffierte Fläche angegeben, die nummeriert ist (1, 2, 3, 4, 5, 6 usw.). Die schraffierte Fläche zeigt die Größe der Fundamentplatte. Jeder schraffierte Bereich ist nummeriert, und die Zahlen verweisen auf eine Zeichnung, die die Größe und Tiefe des Loches sowie die erforderliche Betonmenge angibt. Die Zeichnungen befinden sich auf der letzten Seite in der Mappe.

Sur le plan, chaque point central est entouré d'une surface hachurée portant un numéro (1, 2, 3 4, 5, 6, etc.) qui renvoie à un plan indiquant les dimensions des fondations correspondantes (profondeur, longueur et largeur) ainsi que la quantité obligatoire de béton à employer. Ces plans se trouvent à la fin du dossier.

El la planta del equipo, está indicada en cada uno de los puntos centrales marcados, un área sombreada, con los números (1, 2, 3, 4, 5, 6, etc.). Estas áreas sombreadas indican la dimensión del fundamento. Cada área sombreada está numerada, y el número se refiere al diagrama, donde está indicada la dimensión y la profundidad de cada fundamento, además de la cantidad de hormigón que deberá ser utilizada. Los diagramas se encuentran en la última página de la carpeta.

På plantegningen er der ved hvert af de markerede centerpunkter angivet et skraveret område, som er nummereret (1, 2, 3, 4, 5, 6 osv.). Det skraverede område angiver fundamentpladens størrelse. Hvert skraveret område er nummereret, og nummeret henviser til en tegning, der viser hullets størrelse og dybde samt krav til, hvor meget beton, der skal anvendes. Tegninger findes på den sidste side i mappen.

Baton Beton Concrete Hormigón Baton Beton Beton Betong 8.8 m³











VFRE22113317 - 01.05



<u>461</u> 2/18






















10



Important! The concrete must be sufficiently hardened before the play item may be used.

Wichtig! Vor der Inbetriebnahme des Spielgeräts muß der Beton ausreichend abgebunden haben.

Important ! Le béton doit avoir suffisamment durci avant de mettre en service l'équipement de jeux.

¡Importante! El hormigón debe estar suficientemente endurecido antes de comenzar a utilizar el equipo de juego.

Importante! Prima di utilizzare le attrezzature da gioco, il cemento deve essere sufficientemente solidificato.

Belangrijk! Het beton moet voldoende gehard zijn voordat het speeltoestel in gebruik wordt genomen.

Viktigt! Betongen måste ha härdat tillräckligt innan lekredskapet börjar användas.

Vigtigt! Betonen skal være tilstrækkelig hærdet, før legeredskabet tages i brug.











FRE2211 16'25" Wide Multigoal (6 m)





The Wide Multigoal is a freestanding goal that incorporates panels and frames for use with other sports such as basketball, soccer, field hockey, and more.

Product Line	Multi Use Games Area
Category	Cosmos Multi Sport
Age from	3 - 16+
Total height (CM)	370

GATHERING



STICK

BALL

















* = Highest designated play surface. ** = Total height of product.

Weight/heaviest parts	kg.	Installation (Manpower)	Persons
Concrete required	NaN m3	Installation (Hours)	Hours
Foundation amount/footing	NaN	Excavation	NaN m3



To verify product ceritifcation, visit www.ipema.org

Highest designated play surface and space required are according to ASTM F1487. Equipment must be installed over resilient surfacing appropriate to the safety guidelines in your area. Product development is an ongoing process. We reserve the right to make modifications on all our products. This product may not be mirrored, scaled or altered in any way. Safety zones must be retained for proper placement of equipment. If any changes are required, please contact your KOMPAN representative at 1.800.426.9788.

SECTION 32 31 13

BLACK VINYL CLAD CHAIN LINK FENCE

PART I - GENERAL

1.01 SCOPE OF WORK

A. The work under this Section consists of furnishing and installing vinyl coated chain link fence fabric, hardware and framework of four-foot height as shown on the Contract Drawings and as specified herein including all labor, materials and equipment necessary to finish the work complete in place.

1.02 REFERENCE STANDARDS

- A. References herein to any technical society, organization, group or body is made in accordance with the following abbreviations:
 - 1. ASTM American Society for Testing Materials
 - 2. AWS American Welding Society

1.03 QUALITY ASSURANCE

- A. All fencing shall conform to the specifications of the Chain Link Fence Manufacturer's Institute and as specified herein.
- 1.04 SUBMITTALS

Per Section SPECIAL CONDITIONS of these Specifications, submit:

- A. Three (3) samples, approximately 3" long or 6" square of fabric material, post sections and typical accessories.
- B. Shop drawings or catalog cuts including details illustrating fence height, fence post spacing, and sizes of posts, rails, braces, footings and all accessories.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver material in manufacturer's original packaging with all tags and labels intact and legible. Handle and store material in such a manner as to avoid damage.

PART 2 - MATERIALS

- 2.01 VINYL CLAD STEEL POSTS, RAILS AND BRACES
 - A. <u>General</u>

- 1. All fence pipe for posts, rails, and all braces and appurtenances shall be vinyl clad, schedule 40 round, seamless hot dip galvanized pipe conforming to ASTM-A-120-1, or approved equal.
- 2. All structural shapes shall be vinyl clad, and galvanized in conformance with ASTM Designation A123.
- 3. All vinyl clad materials shall be fusion bonded in accordance with ASTM-F668 Class 2B.

B. End, Corner and Pull Posts

- 1. Fence up to and including 5'-0" in height: 2.375"O.D. pipe, 3.65 lbs. per linear foot.
- 2. Fence over 5'-0" in height: 2.875" O.D. pipe, 5.79 lbs. per linear foot.
- 3. Fence over 10'-0" in height: 4.00" O.D. pipe, 9.11 lbs. per linear foot.
- 4. Maximum Spacing 10'-0" on Center.

C. <u>Line Posts (10'-0" Maximum Spacing)</u>

- 1. Fence up to 5'-0" in height: 1.90" O.D. pipe, 2.28 lbs. per linear foot.
- 2. Fence over 5'-0" in height: 2.375" O.D. pipe, 3.12 lbs. per linear foot.
- 3. Fence over 10'-0" in height: 2.875" O.D. pipe, 5.79 lbs per linear foot.
- D. <u>Rails</u>
 - 1. All rails shall be 1.66" O.D. pipe weighing 2.27 lbs. per linear foot furnished in manufacturer's standard lengths of approximately 21'-0" with outside sleeve type couplings, at least six (6) inches long for each joint one (1) coupling in each five (5) to have expansion spring. Provide means for attaching rails securely to each corner, pull and end post. Rails shall form continuous brace from end to end of each run of fence.

E. <u>Post Bracing Assembly</u>

1.66" O.D. pipe weighing 2.27 lbs. per linear foot (for horizontal braces).
 Provide at each side of corner and pull posts and at end posts for fence six (6) feet or higher.

2.02 CHAIN LINK FABRIC (VINYL CLAD)

- Chain Link fence fabric shall be factory coated 6 gauge core wire (or 9 gauge in certain circumstances as indicated on the details) with a min .02 inch thick coating of plasticized polyvinyl-chloride applied by the fusion method over a thermoset plastic bonding agent. The bond shall exhibit equal or greater strength than the cohesive strength of the vinyl. All cut ends shall be coated with vinyl at the factory. Fabric shall be 2" mesh and black in color.
- B. Top and bottom of fabric shall have knuckled selvage, both sides.

2.03 FITTINGS AND ACCESSORIES (VINYL CLAD)

- A. All accessories shall be vinyl clad in accordance with paragraph 2.01 above, and galvanized in conformance with ASTM Designation A153.
- B. <u>Post Caps</u>

Furnish and install tight fitting pressed steel or malleable iron caps, designed as a weather tight closure cap. Provide one (1) pass-through looped cap for each line post, and one (1) acorn style cap for each end or corner post. Where top rail is used, provide looped cap tops to permit passage of top rail.

- C. <u>Tension Bars</u>
 - 1. One (1) piece lengths equal to full height of fabric with minimum cross section of 3/16" x 3/4", conforming to ASTM Designation A123. 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" x 12 gauge beveled, galvanized, sized to fit pipe sizes and furnished with galvanized fasteners.
 Galvanizing shall conform with ASTM Designations A123 or A153 as they pertain.

D. Rail Clamps

- 1. Rail clamps shall be standard clamps (boulevard clamps) furnished complete with fasteners with ASTM Designation A153.
- E. <u>Tie Wires for Tying Fabric</u>
 - 1. Tie wires shall be bvc shall be attached using a twist band and buckle system
 - 2. Bands shall be 6 gage thickness, 6 ½" long galvanized aluminum ties with a minimum breaking strength of 850 lbs.
- F. Fittings, lugs, clamps and other accessories shall be steel conforming to ASTM Designation F626 and galvanized in conformance with ASTM Designation A153.
- 2.04 ANCHORING CEMENT

- A. Cement for anchoring posts in sleeves embedded in concrete walls shall be "POR-ROK", as manufactured by Hallemite (Lehn and Fink Industrial Products, Division of Sterling Drugs, Inc.), Montage, New Jersey, or approved equal.
- B. "Sika Cola-Due" by the Sika Co.
- C. "Five Star Grout" the Five Star Co.

2.05 CEMENT CONCRETE

A. Cement concrete for post footings shall conform to Section 03 30 00 of these Specifications.

PART 3 - EXECUTION

3.01 POST INSTALLATION

- A. Install new vinyl coated chain link fence in the location(s) shown on the Contract Drawings, and as approved by the Landscape Architect.
- B. Excavation for post footings as herein before specified in Section 31 00 00 of these Specifications, shall be in firm undisturbed or compacted soil. Post footing diameters vary according to post sizes required and are in accordance with attached details. Excavate hole depths six (6) inches lower than post bottom with bottom of posts set not less than thirty-six (36) inches below surface when in firm, undisturbed soil. Where ledge is encountered, the Contractor shall notify the Landscape Architect to determine method of installation. Payment for any additional work required when installations are in ledge shall be in accordance with methods described in SPECIAL CONDITIONS of these Specifications.
- C. Place concrete around posts in a continuous pour, tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operation. Crown the top of the concrete footings to pitch water away from posts.
- D. Under bituminous pavements, tops of footings are to be finished smooth and are to pitch one (1) inch from the posts to the outside edge of the foundation.
- E. In mower strip locations, form top twelve (12) inches square and finish to match mower strip with 1/4" pitch away from posts.
 - 1. If applicable, top of fence footings at players' benches and cement concrete mower strips shall terminate six (6) inches below pavement finish grade.

3.02 FENCE ERECTION

A. <u>Top and Bottom Rails</u>

1. Top and bottom rails shall form a continuous brace from end to end of each fence run. In addition, all end and corner posts shall be braced to the nearest line post with center brace rails. Outside sleeve type top rail coupling shall be placed a maximum of twelve (12) inches from line posts.

B. <u>Middle Rails</u>

1. All chain link fencing ten (10) feet or more in height shall have a continuous middle rail.

C. <u>Brace Assemblies</u>

 Furnish and install braces and appurtenances so posts are plumb when diagonal rod is under proper tension. All "tension" assemblies shall conform to ASTM 567 and the MASS DPW Standard Specifications Section M.8.09

D. <u>Fabric</u>

- 1. The fabric shall be installed on the "public" side of the fence.
- 2. All fabric shall be aligned so that the top row of the fabric mesh is tied to the top rail, and so that the bottom selvage of fabric mesh stands one (1) inches above the finish grade of the lawns, pavements or concrete wall grade and that the bottom row of the fabric mesh is tied to the bottom rail.
- 3. Fabric shall be properly stretched and securely fastened to the posts and rails, and between posts the top and bottom of the fabric shall be fastened to the horizontal braces as herein specified, and approved by the Landscape Architect. Fabric shall be stretched uniformly taut and as tight as possible, true to line and grade and complete in all details. Install tension bars at corners.
- 4. The fabric shall be fastened to end and corner posts with tension bars and stretcher bar bands spaced at one (1) foot intervals.

E. <u>Stretcher Bars</u>

- 1. Thread through fabric and secure to posts with approved metal bands spaced not over twelve (12) inches O.C.
- F. <u>Wire Ties</u>
 - 1. Wire Ties shall be placed at the intervals indicated on the details and securely fastened to all fence posts.
 - 2. All ties shall be pulled tight as per manufacturer's recommended installation procedure. No sharp edges shall protrude from band-it buckles. Ties will be PVC coated, color to match fabric and framework.

32 31 13-5

G. <u>Fasteners</u>

1. Install nuts for tension band and hardware bolts on side of fence opposite fabric side unless directed otherwise by the Landscape Architect.

3.03 FINISH PROTECTION

A. During the fence installation, care shall be taken to avoid damaging the vinyl clad or galvanized surfaces of the fence components. All scratches and abrasions shall be thoroughly corrected in a manner satisfactory to the Landscape Architect before final acceptance.

END OF SECTION

SECTION 32 91 19

LOAMING AND SEEDING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers all labor, materials, and equipment necessary to do all loaming, seeding and related work as indicated on the drawings and as herein specified. All lawns disturbed by the Contractor's operations shall be repaired as herein specified.

1.02 RELATED WORK:

A. Section 32 93 00, TREES SHRUBS GROUNDCOVER AND LANDSCAPING

1.03 QUALITY ASSURANCE:

- A. For a particular source of loam, the Engineer may require the Contractor to send approximately 10 pounds of loam to an approved testing laboratory and have the following tests conducted:
 - 1. Organic concentration
 - 2. pH
 - 3. Nitrogen concentration
 - 4. Phosphorous concentration
 - 5. Potash concentration
- B. These tests shall be at the Contractor's expense. Test results, with soil conditioning and fertilizing recommendations, shall be forwarded to the Engineer.
- 1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Six sets of information detailing the seed mixes, fertilizers, mulch material, slope protection material (if required) and origin of loam shall be submitted to the Engineer for review.
 - B. Three sets of test results shall be submitted to the Engineer for review.

PART 2 - PRODUCTS

- 2.01 MATERIALS:
 - A. LOAM:

- 1. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity, obtained from naturally well-drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth. Loam shall not be delivered to the site in frozen or muddy condition and shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.
- The loam shall contain not less than 4 percent or more than 20 percent organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F.
- B. LIME:

Lime shall be standard commercial ground limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide), and 50 percent of the material must pass through a No. 100 mesh sieve with 98 percent passing a No. 2 mesh sieve.

C. FERTILIZER:

Fertilizer shall be commercial fertilizer, 10-10-10 fertilizer mixture containing at least 40 percent of organic nitrogen. It shall be delivered to the site in the original sealed containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it will be dry and free flowing. No fertilizer shall be used which has not been marketed in accordance with State and Federal Laws, relating to fertilizers.

- D. MULCH:
 - 1. Materials to be used in mulching shall conform to the following requirements:
 - 2. Straw Mulch Straw Mulch shall consist of stalks or stems of grain after threshing.
 - 3. Wood Fiber Mulch Wood Fiber Mulch shall consist of wood fiber produced from clean, whole uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.
- E. SEED:
 - 1. Seed shall be of an approved mixture, the previous year's crop, clean, high in germinating value, a perennial variety, and low in weed seed. Seed shall be

obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.

2. Grass seed for lawn areas shall conform to the following requirements:

	Proportion by Weight	Germination Purity	Purity Minimum
Chewing's Fescue	30%	70%	97%
Kentucky 31 Fescue	30%	90%	98%
Kentucky Blue Grass	20%	80%	85%
Domestic Rye Grass	20%	90%	98%

Grass seed for cross-country areas, slopes and other areas not normally mowed shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Purity Minimum
Creeping Red Fescue	50%	85%	95%
Kentucky 31	30%	85%	95%
Domestic Rye	10%	90%	98%
Red Top	5%	85%	92%
Ladino Clover	5%	85%	96%

F. TEMPORARY COVER CROP:

1. Temporary cover crop shall conform to the following requirements:

	% Weight	Germination Minimum
Winter Rye	80 min.	85%
Red Fescue (creeping)	4 min.	80%
Perennial Rye Grass	3 min.	90%
Red Clover	3 min.	90%
Other Crop Grass	0.5 max.	
Noxious Weed Seed	0.5 max.	
Inert Matter	1.0 max.	

- G. SLOPE EROSION PROTECTION:
 - 1. Erosion control blanket shall be 100% degradable plastic mesh with 100% degradable straw or straw/coconut fill. Fill shall be held together by degradable fastening. Weight shall be 0.50 lb. /sq. yd. Erosion control blankets shall be applied parallel to direction of water flow. The erosion control blankets shall be by North American Green, Evansville, IN or approved equal. For slopes 2:1 or

greater, Model SC150 shall be used. For slopes less than 2:1, Model S150 shall be used.

2. Six inch wire staples shall be placed according to manufacturer's recommendations to anchor the mesh material. Staples shall be designed to decompose.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

- A. After approval of rough grading, loam shall be placed on areas affected by the Contractor's operations. Loam shall be at least 6-inches compacted thickness.
- B. Lime shall be applied to bring the pH to 6.5 or, without a soil test, at the rate of 2-3 tons of lime per acre.
- C. Fertilizer shall be applied according to the soil test, or without a soil test, at the rate of 1000 pounds per acre.
- D. Loam shall be worked a minimum of 3-inches deep, thoroughly incorporating the lime and fertilizer into the soil. The loam shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be 6-inches after completion.

3.02 SEEDING:

- A. Seeding shall be done when weather conditions are approved as suitable, in the periods between April I and May 30 or August I5 to October I, unless otherwise approved.
- B. If there is a delay in seeding, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, the soil shall be lightly raked.
- C. Seed shall be sown at the approved rate, on a calm day by machine.
- D. One half the seed shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of I/4-inch and rolled with a roller weighing not more than I00 pounds per linear foot of tread.
- E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger

than 3 sq. ft., the Contractor shall reseed, roll, and water as necessary to obtain proper germination.

- F. The Contractor shall water, weed, cut and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.
- G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the Contractor or as required by the Engineer. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized and the permanent seed crop shall be sown as specified.

3.03 PLACING MULCH:

- A. Straw Mulch shall be loosely spread to a uniform depth over all areas designated on the plans, at the rate of 4-1/2 tons per acre, or as otherwise required.
- B. Straw Mulch may be applied by mechanical apparatus, if in the judgment of the Engineer the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. The apparatus shall be capable of spreading at least 80 percent of the hay or straw in lengths of 6-inches or more, otherwise it shall be spread by hand without additional compensation.
- C. Wood Fiber Mulch shall be uniformly spread over certain selected seeded areas at the minimum rate of 1,400 pounds per acre unless otherwise required. It shall be placed by spraying from an approved spraying machine having pressure sufficient to cover the entire area in one operation.

3.04 SEEDING AND MULCHING BY SPRAY MACHINE:

- A. The application of lime, fertilizer, grass seed and mulch may be accomplished in one operation by the use of an approved spraying machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of lime, fertilizer, grass seed and mulch shall be equal to the specified quantities.
- B. A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of limestone, fertilizer, grass seed and mulch per 100 gallons of water.
- C. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the spray operation are

unsatisfactory, the Contractor will be required to abandon this method and to apply the lime, fertilizer, grass seed and mulch by other methods.

3.05 INSPECTION AND ACCEPTANCE:

At the beginning of the planting season following that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense. The seeded areas shall be watered, weeded, cut and otherwise maintained by the Contractor until the end of that planting season, when they will be accepted if the sections show dense, vigorous growth.

END OF SECTION

SECTION 32 93 00

TREES, SHRUBS, GROUNDCOVERS, AND LANDSCAPING

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section includes furnishing all labor, materials, equipment, plants, and incidental materials necessary to perform all operations related to the planting of all trees, shrubs, vines, herbaceous plants, ground covers, and for all appurtenant work, complete in place, maintained, and accepted, in accordance with the Contract Drawings and Specifications.
- B. The Contractor shall bear the responsibility and cost of furnishing and applying water or any other substances, as necessary to ensure the sustainability of plant materials, as part of the work of this contract.

1.02 RELATED WORK:

- A. Section 31 05 13.13, LOAM BORROW
- B. Section 32 91 19, LOAMING & SEEDING

1.03 SUBMITTALS:

In accordance with requirements of the general specifications, the Contractor shall submit the following:

- A. Prior to planting, State nursery inspection certificates for all plant materials shall be submitted to the Engineer for review.
- B. Samples and six copies of the manufacturer's product data, as applicable, shall be submitted to the Engineer for review and approval for the following materials:
 - 1. Limestone.
 - 2. Fertilizer.
 - 3. Sphagnum Peat Moss.
 - 4. Humus.
 - 5. Organic Compost.
 - 6. Manure.
 - 7. Mulch.

- 8. Guying and Staking Apparatus.
- 9. Crepe Wrapping for tree trunks.
- 10. Anti-transpirant/Anti-desiccant.
- 11. Insecticides.
- 12. Herbicides.
- 13. Fungicides.

PART 2 - PRODUCTS

2.01 PLANT MATERIALS:

- A. The Contractor shall furnish and plant all plant materials as shown on the plans and in the quantities and sizes listed thereon. No substitutions shall be permitted without the written approval of the Engineer.
- B. Plants larger than those specified in the Plant List may be used if approved by the Engineer. However, use of such oversized plants shall not be considered grounds for any increase in the contract price. If the use of larger plants is approved, the required spread of roots or ball of earth shall be increased in proportion to the size of the plant and plant pits shall be increased as necessary.
- C. All plants shall be certified to have passed all required Federal and State inspection laws requiring ensuring freedom from plant diseases and insect infestations. The Contractor shall obtain clearance from applicable governing agencies, as required by law, before planting any plants delivered from outside the state in which they are to be planted.
- D. All plants shall be nursery-grown under climatic conditions and environmental stresses similar to those in the locality of the project. All plants shall originate from nurseries that are no more than one Hardiness Zone higher (as established by the Arnold Arboretum, Jamaica Plain, MA) than where the plant is to be installed. Plants also shall conform to the botanical names and standards of size, culture, and quality for the highest grades and standards as adopted by the American Association of Nurserymen, Inc. in the <u>American Standard for Nursery Stock, ANSI-Z60.1</u>, latest edition. All plants shall be legibly tagged with their proper botanical name.
- E. No heeled-in plants or plants from cold storage shall be used. All plants shall be typical of their species or variety and shall have a normal habit of growth. Plants shall be sound, healthy, and vigorous, well branched and densely foliated when in leaf; shall be free of disease, insects, eggs or larvae; and shall have healthy, well-developed root systems. All parts of the plant shall be moist and shall show active green cambium when cut.
- F. All nursery plants shall be balled and burlapped or container-grown and shall have been acclimatized for at least one growing season. Container-grown stock shall have been

grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole, after removal from the container. No plants shall be loose in the container. Container-grown plants shall have no girdling roots and shall not be in a root-bound condition. Plants shall remain in their container until planted.

- G. Care shall be exercised in digging and preparing field-grown plants for shipment and planting. Balled and burlapped materials shall have solid unbroken balls of earth of sufficient size to encompass all fibrous feeding roots necessary to ensure successful recovery and development of the plants. Balls shall be firmly wrapped in untreated biodegradable burlap and tied securely with wire cages and/or jute twine. Roots or balls of plants shall be adequately protected at all times from sun and drying winds. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during planting, or after the burlap, staves, wire cage, rope, or platform in connection with its transplanting have been removed. Soil characteristics (i.e., composition, texture, pH, etc.) of all field-grown plants shall closely match those of the soil where plant materials are to be planted.
- H. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the Plant List in the Drawings. The branching height for deciduous trees installed adjacent to or within walks shall be 7 feet minimum, having been pruned to this height at least 1 year prior to transplanting. Except when a clump is designated, the trunk of each tree shall be a single trunk growing from a single, unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks, or wounds resulting from abrasions, fire, or other causes. All pruning cuts shall comply with acceptable horticultural practices. No pruning wounds having a diameter of more than 1½-inches shall be present. Any such wounds must show vigorous bark growth on all edges. Evergreen trees shall be branched to within 1 foot of the ground. No tree that has had its leader cut or die shall be accepted.
- I. Caliper measurements for tree trunks shall be taken 6-inches above ground for trees up to and including 4-inch caliper size and at 12-inches above ground for larger sizes.
- J. Shrubs shall meet the requirements for spread and/or height stated in the Plant List on the Drawings. The measures for height are to be taken from the crown or root flare to the average height of the top of the shrub mass (not the longest branch). The fullness of each shrub shall correspond to the trade classification "No. 1". Single stemmed or thin plants will not be accepted. The side branches must be generous, well-twigged and the plant as a whole must be well-bushed to the ground. The plants must be in a moist, vigorous condition, free from dead wood, bruises or other root or branch injuries.
- K. Herbaceous plants, vines and groundcovers shall be of the size, age and/or condition designated in the Plant List on the Drawings.
- Plants shall be delivered only after preparations for planting have been completed.
 Plants shall be handled and packed in a horticulturally approved manner and all necessary precautions shall be taken to ensure that plants arrive on-site in a healthy vigorous condition. Trucks used for transporting plants shall be equipped with covers to

protect plants from windburn, desiccation, and overheating during transport. Plants that have not been thoroughly watered shall not be accepted at the planting site. Any plants delivered to the site in a dry or wilted condition shall be rejected and replaced at no expense to the Owner. All plant materials shall be protected, watered and otherwise maintained prior to, during, and upon delivery to the site.

M. Plants shall be subject to inspection and approval by the Engineer at the place of growth, or upon delivery, for conformity to specification requirements as to quality, size, variety, and condition. Inspection and selection of plants before digging shall be at the option of the Engineer. The Contractor, or his representative, shall be present, if requested by the Engineer, for inspection of plants at the Nursery. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of work, for size and condition of balls and roots, disease, insects and latent defects or injuries. Rejected plants shall be removed immediately from the site. Certificates of inspection of plant materials shall be furnished as may be required by Federal, State and other authorities to accompany shipments.

2.02 LOAM BORROW:

Loam Borrow shall be as specified in Section 31 05 13.13, LOAM BORROW.

2.03 SOIL ADDITIVES AND AMENDMENTS:

A. LIMESTONE:

Lime shall be an approved agricultural limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide). The material will be ground such that 50 percent of the material will pass through a No. 100 mesh sieve and 98 percent will pass a No. 2 mesh sieve. Lime shall be uniform in composition, dry and free-flowing and shall be delivered to the site in the original sealed containers, each bearing the manufacturer's guaranteed analysis.

B. FERTILIZER:

1. Fertilizer shall be a complete, standard commercial fertilizer, homogeneous and uniform in composition, dry and free-flowing, and shall be delivered to the site in the manufacturer's original sealed containers, each bearing the manufacturer's guaranteed analysis and marketed in compliance with State and

Federal Laws. All fertilizer shall be used in accordance with the manufacturer's recommendations.

2. Fertilizer for tree, shrub and groundcover plantings shall contain all major plant nutrients and minor trace elements essential to sustain plant growth and shall have the following analysis:

Nitrogen (N)	Phosphorous (P)	Potassium (K)
10%	10%	10%

- 3. As approved by the Engineer, a slow release root contact fertilizer installed at the time of planting, may be used in place of the above, at the discretion of the Contractor.
- C. Organic Compost shall be a standard commercial product comprised of fully decomposed, 100 percent plant-derived, natural organic matter. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Compost shall be free of sticks, stones, weed seeds, roots, mineral or other foreign matter and delivered air dry. It shall be free from excessive soluble salts, heavy metals, phytotoxic compounds, and/or substances harmful to plant growth and viability. Organic compost shall have an acidity range of 4.5 to 7.0 pH.
- D. Sphagnum Peat Moss shall be a standard commercial product. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Peat moss shall be free of sticks, stones, weeds or weed seeds, roots, mineral or other foreign matter. It shall be free from toxic substances and/or compounds harmful to plant growth and viability. It shall be delivered air dry in standard bales and shall have an acidity range of 3.5 to 5.5 pH.
- E. Humus shall be natural humus, reed peat, or sedge peat. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Humus shall be free of sticks, stones, weeds, roots, mineral or other foreign matter and/or toxic substances harmful to plant growth and viability. It shall be low in wood content, free from hard lumps and excessive amounts of zinc and delivered air dry in a shredded or granular form. The acidity range for humus shall be 5.5 to 7.5 pH, and the organic matter content shall be not less than 85 percent, as determined by loss on ignition. The minimum water holding capacity shall be 200 percent by weight on an oven-dry basis.
- F. Manure shall be well-rotted, leached, cow manure not less than 8 months or more than 2 years old. It shall be free of sawdust, shavings, or refuse of any kind and shall not contain more than 25 percent straw. It shall contain no substances harmful to plant

growth. The Contractor shall furnish information regarding chemical disinfectants, if any, that may have been used in storage of the manure.

2.04 PLANTING MIXTURE:

Planting mix shall consist of 7 parts loam borrow and 1 part organic compost, humus, sphagnum peat moss, or manure, thoroughly blended.

2.05 WATER:

Water shall be furnished by the Contractor, unless otherwise specified, and shall be suitable for irrigation and free from ingredients harmful to plant growth and viability. The delivery and distribution equipment required for the application of water shall be furnished by the Contractor, at no additional cost to the Owner.

2.06 MULCH:

Mulch shall be fibrous pliable shredded softbark mulch, not exceeding ½-inch in width. It shall be 98 percent organic matter with a pH range between 3.5 and 4.5 and a moisture content not to exceed 35 percent. It shall be free of weeds, weed seeds, debris, and other materials harmful to plant growth and viability. Organic mulch shall be aged no longer than 2 years.

2.07 MATERIALS FOR STAKING, GUYING, AND WRAPPING:

- A. Tree stakes shall be sound, untreated 2 x 3 (nominal) x 8-foot length Douglas Fir reasonably free of knots. No paint or stain shall be used in conjunction with tree stakes. Tying material shall be flexible braided nylon webbing, ¾-inch wide and have a tensile strength of 900 pounds. Webbing shall be 'ArborTie', or approved equal.
- B. Drive anchors and guy wire assemblies shall be suitable for protecting trees and shall be sized in accordance with the manufacturer's recommendations. No materials shall be used for guying that will girdle, chafe, or otherwise injure trees.
- C. Tree wrap shall be duplex, waterproof kraft paper crinkled to 33-1/3 percent stretch, 4 to 6-inch wide strips. Tying materials shall be jute twine, 2-ply for shrubs and trees less than 3-inch caliper; 3-ply for larger plants.

2.08 TREE PAINT:

Tree paint shall not be used.

2.09 ANTI-TRANSPIRANT/ANTI-DESICCANT:

Anti-transpirant or anti-desiccant shall be 'Wilt-Pruf', as manufactured by Nursery Specialty Products, Inc., Groton Falls, NY, or approved equal. It shall be delivered in original sealed

manufacturer's containers and used in accordance with the manufacturer's instructions.

2.10 INSECTICIDES:

- A. No insecticides shall be used on-site without the Contractor notifying and obtaining the prior approval of the Engineer.
- B. Insecticides shall be EPA registered and approved for use in public open spaces. All insecticides shall be handled by State licensed applicators only, delivered in the original sealed manufacturer's containers, and used in accordance with the manufacturer's instructions.
- C. Insecticide use shall be limited and selective, only to control specific insect infestations, as identified by the Contractor or the Owner's Representative that may result in the disfigurement, decline, or death of plant materials.

2.11 HERBICIDES:

- A. No herbicides shall be used on-site without the Contractor notifying and obtaining prior approval of the Engineer.
- B. Herbicides shall be EPA registered and approved for use in public open spaces. All herbicide shall be handled by State licensed applicators only, delivered in the original sealed manufacturer's containers, and used in accordance with the manufacturer's instructions.
- C. Herbicide for post-emergent application shall be glyphosate contact, 'Roundup', as manufactured by Monsanto, Inc., or approved equal.
- D. Herbicide use shall be limited and selective, only to control specific weed infestations that have been identified by the Contractor or the Owner's Representative.

2.12 FUNGICIDES:

- A. No fungicides shall be used on-site without the Contractor notifying and obtaining prior approval of the Engineer.
- B. Fungicides shall be EPA registered and approved for use in public open spaces. All fungicides shall be handled by State licensed applicators only, delivered in the original sealed manufacturer's containers, and used in accordance with the manufacturer's

instructions.

C. Fungicide use shall be limited and selective, only to control specific fungal pathogenic disease infestations, as identified by the Contractor or the Owner's Representative, that may result in the disfigurement, decline, or death of plant materials.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. All plants shall be subject to inspection and approval by the Engineer upon delivery to the site. No materials shall be planted until approval is received.
- B. All work shall be performed by skilled workers with a minimum of 2 years planting experience, in accordance with accepted horticultural/nursery practices, under the full-time supervision of a Certified Nurseryman or Arborist.
- C. All balled and burlapped plants that cannot be planted immediately upon delivery shall be set on the ground and the root balls shall be well protected with soil, wet moss, or other acceptable material. All foliage shall be protected and covered with perforated shade materials.
- D. The planting season for evergreen trees and shrubs shall extend from the time the soil becomes workable in the spring until new growth appears, and from September 15 until November 30 in the fall. Deciduous trees and shrubs shall be planted only when dormant, either prior to bud break and/or before leaves appear in the spring, or subsequent to their leaf drop in the fall. Ground covers shall be planted only after the last frost in the spring through mid-May. Planting season periods may be extended if weather and soil conditions permit only with the written approval of the Engineer. Extended or out-of-season planting requirements shall include application of antitranspirant and extra water as needed. Plant guarantee periods shall remain as stated below. Planting shall not be permitted in frozen ground.
- E. All plant locations and outlines for planting beds shall be staked out for review and potential adjustment by the Engineer before any excavation is begun. In the event that rock, underground construction work or obstructions are encountered in any proposed planting pit or bed, the Engineer may select alternate locations. Where locations cannot be changed, the obstruction shall be removed, subject to the Engineer's approval, to a depth of not less than 3 feet below grade and not less than 6-inches below the bottom of the root ball when plant is properly set at the required grade. Removal of boulders or obstructions greater than 1 cubic yard in size shall be subject to approval and will be paid for by the Owner. No ledge will be removed to create planting pits or beds
- F. All planting pits shall be excavated with sloped walls, wider at the top than at the bottom, and scarified to eliminate glazing. Tree pits shall be at least 2 feet greater in diameter than the root ball of earth or root system. Shrub pits shall be at least 1 foot

greater than the diameter of the root ball. Planting pits shall not be deeper than the height of the root ball.

- G. When excavation occurs in areas of heavily compacted earth, stones, concrete chunks or other foreign matter, pits shall be dug at least 3 times the width of the rootball.
 Excavated material from plant pits shall be disposed of as required.
- H. Container plants shall be removed from their growing container before planting. If roots are densely matted, the outer root mass shall be scored, sliced vertically, with a sharp knife to separate roots. All herbaceous plants and groundcovers shall be evenly spaced to produce a uniform effect and staggered in rows at intervals designated on the contract drawings.
- I. Shrubs and trees shall be set in the center of planting pits, plumb and straight, and at such a level that after settlement the crown of the roots will be 1-inch above the surrounding finished grade. Root ball masses shall not be loosened, broken or damaged. When balled and burlapped plants are set, planting mixture shall be compacted around bases of balls to fill all voids. All tying materials, twine and rope shall be cut and removed. Biodegradable burlap shall be laid back or cut away from the top half of the ball. If a wire basket is present, the upper 2/3 of the basket shall be cut away and removed. Do not remove the entire basket. Roots or bare root plants shall be properly spread out and planting mixture carefully worked in among them. Broken or frayed roots shall be cleanly cut.
- J. Backfill plant pits with planting mixture in layers of not more than 9-inches and firmly tamp each layer and water to sufficiently settle the backfilled soil before the next layer is put in place. When the planting pit is 2/3 backfilled, the hole shall be flooded and watered thoroughly so that the water level reaches the top of the planting pit. Allow water to soak in, then complete the backfilling operation. Immediately after planting pit is backfilled, a shallow basin 3-inches deep and slightly larger than the pit shall be formed with a ridge of soil for water retention. Form a common basin for plant materials throughout mass planting beds. After planting, lightly till the soil in planting beds between planting pits and rake smooth to eliminate compaction of soils.
- K. All planting hole basins shall be flooded with water twice within the first 24 hours of planting, and watered not less than twice per week until final acceptance of the work.
- L. All thin barked deciduous trees shall be wrapped after they are planted and before they are staked. Prior to wrapping, inspect trees for injury to trunks or improper pruning. Take corrective measures as necessary. Wrap trunks of all trees spirally from bottom to top with tree wrap and secure top and bottom at 2-foot intervals with jute twine. The wrapping shall overlap and entirely cover the trunk from the ground to the height of the second branches and shall be neat and snug. Overlap shall be approximately 2-inches.
- M. Stake trees immediately after planting as detailed. All staking apparatus shall be adequate to hold the tree in a vertical position under severe weather conditions. All

staking apparatus and tree trunk wrapping shall be removed and disposed of off-site by the Contractor at the end of one growing season.

- N. Immediately after planting and staking operations are complete, all plant pit basins and plant beds shall be covered with approved mulch to the depths designated on the plans. Mulch shall not contact tree bark, cover tree root flares, or shrub crowns. No mulch shall be applied prior to the first watering.
- O. The pruning of trees and shrubs shall only be permitted to remove dead or dying branch limbs and tips, sucker growth, water sprouts, crossing or rubbing branches, broken or damaged branches, diseased or insect infested limbs, and to preserve the natural character of the plant. Plant materials shall be pruned in accordance with American Nurserymen Association Standards and as required by the Engineer. Questionable weak limbs and branch removals that may disfigure the plant shall be left to the discretion of the Engineer. The tree leader shall never be permitted to be cut. Pruning shall be done with clean, sharp tools. All large pruning cuts that are ½-inch in diameter or larger shall be made along the bark branch ridge. Pruning cuts shall not breach or otherwise interfere with the branch collar. All pruning cuts less than ¼-inch diameter shall be made with hand pruners as close to the main stem as possible without damaging the cambium or bud. Tree paint shall not be used to cover pruning cuts.
- P. As the work proceeds, the Contractor shall remove all debris from the site, including but not limited to branches, rock, paper, and rubbish. All areas shall be kept clean, neat and in an orderly condition at all times. Prior to final acceptance, the Contractor shall cleanup the entire area to the satisfaction of the Engineer.

3.02 MAINTENANCE:

- A. Maintenance shall begin immediately after each plant is planted and shall continue until completion of the guarantee period and final acceptance of the project. Plants shall be watered, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected. Tree guys and stakes shall be tightened and repaired. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit.
- B. Settled plants shall be reset to proper grade and position, planting pits and common basins restored, and dead materials removed and replaced. Planting beds and individual basins shall be neat in appearance, maintained to their original layout lines and kept free of weeds. Mulch shall be replaced as required to maintain proper depths.
- C. Contractor shall make arrangements to provide sufficient water to maintain all trees, shrubs and plant materials until final acceptance. Plants shall be sprayed with anti-transpirant or anti-desiccant if required by seasonal conditions or as required by the Engineer.
- D. Planting areas shall be protected against trespass and damage of any kind during the maintenance period. This shall include the furnishing and installation of approved temporary fencing if necessary. If any plants become damaged during the maintenance

period, they shall be treated or replaced as required by the Engineer at no additional cost to the Owner.

3.03 INSPECTION AND PRELIMINARY ACCEPTANCE:

- A. Contractor shall provide written notice to the Engineer not less than 10 days before the anticipated date of inspection for preliminary acceptance. The Engineer shall recommend preliminary acceptance of the work of this Section only after completion and re-inspection of all necessary repairs, renewals or replacements.
- B. Inspection and acceptance of plantings may be requested and granted in part, provided the areas for which acceptance is requested are relatively substantial in size, and with clearly definable boundaries. Acceptance and use of these areas by the Owner shall not waive any other provisions of this Contract.

3.04 GUARANTEE:

- A. All plant materials shall be guaranteed for a period of one year after the date of completion of the specified maintenance period and preliminary acceptance of the project by the Owner.
- B. When the work is accepted in part, the guarantee period shall extend from each partial acceptance to the terminal date of the last guarantee period. All guarantee periods terminate at one time.
- C. Plants shall be healthy, free of pests and disease. Plants shall exhibit vigorous growth, shall bear foliage of normal density, size and color and shall have no less than seventy-five percent (75%) of their branches alive at the end of the guarantee period. If the leader of any single-leader species is dead, the entire plant shall be considered dead.
- D. Any plant required under this Contract that is dead or unsatisfactory, as determined by the Engineer, shall be removed from the site. These shall be replaced as soon as weather permits during the specified planting season, at no additional cost to the Owner, until the plants live through one year.
- E. All replacements shall be plants of the same kind and size as specified on the Plant List. They shall be furnished and planted as specified above.
- F. The guarantee of all replacement plants shall extend for an additional one-year period from the date of their acceptance as replacement.
- G. Guarantee shall not apply to the replacement of unacceptable plants resulting from the removal, loss, or damage due to occupancy of the project in any part; vandalism or acts
of neglect on the part of others; physical damage by animals, vehicles, etc.; and Acts of God, including but not limited to, catastrophic fire, hurricanes, riots, war, etc.

H. In the instance of curtailment of water by local water authorities (when supply was to be furnished by the Owner), the Contractor shall furnish all necessary water by water tanker, the cost of which will be approved and paid for by the Owner.

3.05 FINAL INSPECTION AND FINAL ACCEPTANCE:

- A. At the end of the guarantee period, the Contractor shall provide written notice to the Engineer not less than 10 days before the anticipated date of final inspection for final acceptance.
- B. The Engineer shall recommend final acceptance of the work of this Section only after completion and re-inspection of all necessary repairs, renewals or replacements.

END OF SECTION

SECTION 33 05 26.13

TRACER TAPE

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers the furnishing, handling and installation of tracer tape, as called for on the drawings.

- 1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Six sets of manufacturer's literature on the materials, colors and printing specified herein, shall be submitted to the Engineer for review.
 - B. Tape samples shall also be submitted to the Engineer for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

Tracer tape shall be by Reef Industries, Houston, TX; Empire Level, Mukwonago, WI; Pro-Line Safety Products Co., W. Chicago, IL; or approved equal.

- 2.02 TRACER TAPE:
 - A. Tracer tape shall be at least 3-inches wide.
 - B. Tracer tape for non-ferrous pipe or conduit shall be constructed of a metallic core bonded to plastic layers. The metallic tracer tape shall be a minimum 5-mil thick and must be locatable at a depth of 18-inches with ordinary pipe locaters.
 - C. Tracer tape for ferrous pipe or conduit shall consist of multiple bonded plastic layers. The non-metallic tracer tape shall elongate at least 500% before breaking.
 - D. The tape shall bear the wording: "BURIED DRAIN LINE BELOW" (with "DRAIN" replaced by "WATER, "SEWER", "ELECTRICAL", "GAS", "TELEPHONE", or "CHEMICAL" as appropriate), continuously repeated every 30-inches to identify the pipe.
 - E. Tape colors shall be as follows, as recommended by the American Public Works Association (APWA):

Electric	Red
Gas & Oil	Yellow
Communications	Orange
Water	Blue
Sewer & Drain	Green
Chemical	Red (not APWA)
	33 05 26.13-1

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Tracer tape shall be installed directly above the pipe or conduit it is to identify, approximately 12-inches below the proposed ground surface.
- B. The Contractor shall follow the manufacturer's recommendations for installation of the tape, as approved by the Engineer.

END OF SECTION

SECTION 33 39 13

PRECAST MANHOLES AND CATCH BASINS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers all precast manholes and catch basins complete, including, but not limited to, bases, walls, cones, mortar, inverts, frames and covers.

1.02 RELATED WORK:

A. Section 31 00 00, EARTHWORK

1.03 SYSTEM DESCRIPTION:

- A. Precast sections shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the drawings or as required by the Engineer.
- B. All manholes and catch basins shall have concrete bases. Concrete bases shall be precast unless otherwise specified. Invert channels shall be formed of brick and mortar upon the base.
- C. Catch basins shall have a **3-foot deep sump** unless otherwise specified. Leaching basins shall have a bottom opening as shown on the drawings.
- D. Riser and cone sections shall be precast concrete.

1.04 REFERENCES:

A. The following standards form a part of this specification as referenced:

American Society for Testing and Materials (ASTM)

ASTM	A48	Gray Iron Castings
ASTM	C32	Sewer and Manhole Brick
ASTM	C144	Aggregate for Masonry Mortar
ASTM	C207	Hydrated Lime for Masonry Purposes
ASTM	C478	Precast Reinforced Concrete Manhole Sections
ASTM	C923	Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes

ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M198 Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

Occupational Safety and Health Administration

OSHA 29 CFR 1910.27 Fall Prevention Protection

- 1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Six sets of manufacturer literature of the materials of this section shall be submitted to the Engineer for review.
 - B. Test reports as required shall be submitted to the Engineer.
 - C. Provide approved copies of manholes, frames, covers, catch basin rim / grates to Waltham Engineering.

PART 2 - PRODUCTS

2.01 PRECAST CONCRETE SECTIONS:

- A. All precast concrete sections shall conform to ASTM C478 with the following exceptions and additional requirements:
 - 1. The wall thickness of precast sections shall be as designated on the drawings, meeting the following minimum requirements:

Section Diameter (Inches)	Minimum Wall Thickness (Inches)
48	5
60	6
72	7
84	8

- 2. Type II cement shall be used except as otherwise approved.
- 3. Sections shall be steam cured and shall not be shipped until at least five days after having been cast.
- 4. Minimum compressive strength of concrete shall be 4000 psi at 28 days.

- 5. No more than two lift holes may be cast or drilled in each section.
- 6. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.
- 7. Acceptance of the sections will be on the basis of material tests and inspection of the completed product.
- 8. Circumferential steel reinforcement in walls and bases shall be a minimum of 0.12 sq. in./lin. ft. for 4-foot diameter sections and 0.15 sq. in./lin. ft. for 5- and 6-foot diameter sections. Reinforcing shall extend into tongue and groove.
- B. Conical reducing sections shall have a wall thickness not less than 5-inches at the bottom and wall thickness of 8-inches at the top. Conical sections shall taper from a minimum of 48-inches diameter to 24 or 30-inches diameter at the top, as shown on the drawings.
- C. Except where insufficient depth of cover dictates the use of a shorter base, bases shall be a minimum of 4 feet in height.
- D. Slab top sections and flat riser sections (Grade Rings) shall conform to the contract drawings, with particular attention focused upon the reinforcing steel and be designed to meet or exceed an HS-20 Loading requirement.
- E. The tops of the bases shall be suitably shaped by means of accurate ring forms to receive the riser sections.
- F. Precast sections shall be manufactured to contain wall openings of the minimum size to receive the ends of the pipes, such openings being accurately set to conform with line and grade of the sewer or drain. Subsequent cutting or tampering in the field, for the purpose of creating new openings or altering existing openings, will not be permitted except as required by the Engineer.
- G. "Drop-over" manholes shall be placed where indicated on the drawings. The Contractor shall accurately measure the diameter of the existing outlet pipe and inform the manufacturer of its size, so that the "Drop-over" type opening can be cut into the precast manhole base. The bottom shall be cast in place by the Contractor in accordance with Section 03 05 00, FIELD CONCRETE. The invert channel shall be formed of brick and mortar, as specified in this specifications section. The sub-base shall be a compacted, level foundation of crushed stone, at least 6-inches thick, as specified in Section 02300 EARTHWORK, but shall vary to the depth necessary to reach sound undisturbed earth.
- H. The exterior surfaces of all precast manhole bases, walls, and cones shall be given a minimum of one shop coat of bituminous dampproofing.
- I. The Engineer reserves the right to reject any unsatisfactory precast section and the rejected unit shall be tagged and removed from the job site immediately.

J. The Engineer may also require the testing of concrete sections as outlined under <u>Physical Requirements</u> in ASTM C478 with the Contractor bearing all testing costs.

2.02 BRICK MATERIALS:

- A. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Bricks shall comply with ASTM C32, for Grade SS, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight.
- B. Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.
- C. Mortar shall be composed of portland cement, hydrated lime, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as required by the Engineer and may vary from 1:1/4 for dense hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SS Brick shall be mixed in the volume proportions of 1:1/2:4-1/2; portland cement to hydrated lime to sand.
- D. Cement shall be Type II portland cement as specified for concrete masonry.
- E. Hydrated lime shall be Type S conforming to ASTM C207.
- F. The sand shall comply with ASTM C144 specifications for "Fine Aggregate," except that all of the sand shall pass a No. 8 sieve.

2.03 FRAMES, GRATES, COVERS AND STEPS:

- A. Castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined to prevent rocking of covers.
- B. All castings shall be thoroughly cleaned and may be subject to a careful hammer inspection at the Engineer's discretion.
- C. Castings shall be ASTM A48 Class 30B or better.
- D. The surface of the manhole covers shall have a diamond pattern with the cast words "WATER," "DRAIN" or "SEWER," whichever is appropriate.
- E. Manhole frames with 32-inch covers for 30-inch openings shall be 500 pounds minimum by EJ, No. V-1419; Quality Water Products, Style 47; Neenah Foundry Co., R1740B or approved equal.
- F. Watertight type manhole frames with 32-inch diameter covers (bolted and gasketed) shall be EJ, No. 2006APT 2008ZPT; Quality Water Products, Style C47WT; Neenah Foundry Co., R-1916-H or approved equal.

- G. Manhole frames with 26-inch covers for 24-inch openings shall be 475 pounds minimum by EJ No. 2110 (formerly LK110A); Neenah Foundry Co. R1720; Quality Water Products, Style 40; or approved equal.
- H. Watertight type manhole frames with 26-inch diameter covers (bolted and gasketed) shall be EJ No. 1268; Mechanics Iron Foundry Type A2073; Quality Water Products, Style 40WT; or approved equal.
- I. Frostproof manhole frames, with 30-inch diameter covers and inner lids, shall be R-1755 series by Neenah Foundry Co., Neenah, WI; 2006A1 2009Z by EJ, Brockton, MA; B-3045 (or similar) by Mechanics Iron Foundry, Boston, MA; or approved equal.
- J. 2-inch thick polystyrene insulation shall be firmly adhered to all frostproof inner lids.
- Catch basin frames and 23-7/8-inch square grates with 2-inch square openings shall be 8-inches in height minimum. They shall be Neenah Foundry Co. No. R3588-A; Quality Water Products No. 45-600; EJ 5548Z 5520M; or approved equal.
- L. Catch basin frames with bar grate openings and 23-7/8-inch square grates shall be 8-inches in height minimum. Bar grates shall not be used in areas where bicycle traffic could be present. They shall be Neenah Foundry Co. No. R-3589; Quality Water Products No. 45; EJ 5521Z 5520M3 BIKE GR LK121; or approved equal.
- M. Catch basin frames with cascade grate openings and 23-7/8-inch square grates shall be 8-inches in height minimum. They shall be Neenah No. R-3589; Quality Water Products LK121; EJ 5548Z 5520M; or approved equal.
- N. Catch basin frames set against curbing shall have three flanges only.

2.04 SEWER MANHOLE ACCESSORIES:

- A. Gasket materials shall be top grade (100% solids, vulcanized) butyl rubber and shall meet or exceed AASHTO M-198.
- B. Couplings at the manhole-pipe interface shall be made with a rubber seal system (with or without stainless steel straps) meeting the requirements of ASTM C923 and recommended for this type of connection.
- C. Stubs installed as specified and indicated on the drawings shall be short pieces of the same class pipe as that entering the manhole and shall have either stoppers or end caps as shown on the drawings. Stoppers or end caps shall be especially designed for that application.

2.05 MANHOLE FALL PREVENTION SYSTEMS:

A. Carrier rail assembly shall be 1-5/16-inch O.D. by 1-inch ID Type 6061-T6 aluminum notched; 0.875-inches by 0.875-inches by 5/32-inch at 6-inch centers; tapped 3/8-inch at 9-inch centers opposite notches.

33 39 13-5

- B. Manhole rung clamp assembly shall be constructed from 6061-T6 aluminum 11-inches long by 1.25-inches wide with 2 slots 7/16-inch by 1.25-inches at 9-inch centers and serrated on one side.
- C. Safety locking mechanism shall be cast of manganese bronze with stainless steel springs, and drop forged links and snap-locking pawl shall be minimum tensile strength of 110,000 psi. Roller bearing shall be killian type. Stainless steel springs shall comply with Military Specification QQ-W-423B.
- D. Safety harness shall be adjustable to fit waists 30-inch to 48-inch. Belt shall be nylon web equipped with 3 stainless steel 'D' rings.
- E. Fall prevention systems shall be manufactured by DBI/SALA, Safe Approach or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. PRECAST SECTIONS:
 - 1. Precast bases shall be supported on a compacted level foundation of crushed stone, as specified in Section 31 00 00 EARTHWORK, at least 6-inches thick, but shall vary to the depth necessary to reach sound undisturbed earth.
 - 2. Precast reinforced concrete sections shall be set vertical and with sections in true alignment.
 - Butyl rubber joint sealant shall be installed between each concrete section.
 Catch basin sections do not require joint sealant if so indicated on the drawings.
 - 4. All holes in sections used for handling the sections shall be thoroughly plugged with mortar. Mortar shall be one part cement to 1-1/2 parts sand, mixed slightly damp to the touch (just short of "balling"), hammered into the holes until it is dense and an excess of paste appears on the surface, and then finished smooth and flush with the adjoining surfaces.
- B. BRICK WORK:
 - 1. Bricks shall be moistened by suitable means, as required by the Engineer, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
 - 2. Each brick shall be laid as a header in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded as directed.
- C. CASTINGS:

- 1. Cast iron frames, grates and covers shall be as specified. The frames and covers shall be set by the Contractor to conform accurately to the grade of the finished pavement, existing ground surface, or as indicated on the drawings. Frames shall be adjusted to meet the street surface.
- 2. Cast iron manhole frames and covers not located in paved areas shall be set 6-inches above finished grade, at a height as required by the Engineer, or as indicated on the drawings. The top of the cone shall be built up with a minimum of 1 course and a maximum of 5 courses of brick and mortar used as headers for adjustment to final grade.
- 3. Frames shall be set concentric with the top of the concrete section and in a full bed of mortar so that the space between the top of the concrete section or brick headers and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the concrete shall be placed all around the bottom flange. The mortar shall be smoothly finished to be flush with the top of the flange and have a slight slope to shed water away from the frame.
- 4. Covers and/or grates shall be left in place in the frames, for safety reasons, except while work is being performed.
- D. ACCESSORIES:
 - 1. Accessories shall be installed in accordance with manufacturer's instructions.
 - 2. Stubs shall be set accurately to the dimensions indicated on the drawings. Stubs shall be sealed with suitable watertight plugs.
- E. MANHOLE FALL PREVENTION SYSTEM:

Carrier rail shall extend from the manhole invert shelf to within 18-inches of finish grade. The rail and manhole rung clamp assembly shall be rigidly connected utilizing 3/8-inch stainless steel bolts. Assembly shall be clamped to manhole steps at 2-foot centers or as recommended by the manufacturer.

3.02 LEAKAGE TESTS:

- A. Leakage tests shall be made by the Contractor and observed by the Engineer on each manhole. The test shall be by vacuum or by water exfiltration as described below:
- B. VACUUM TEST:
 - 1. The vacuum test shall be conducted in accordance with ASTM C1244. Test results will be judged by the length of time it takes for the applied vacuum to drop from 10 inches of mercury to 9 inches. If the time is less than that listed in Table 1 of ASTM C1244, the manhole will have failed the test. Test times from Table 1 are excerpted below.

TABLE 1

	Diameter (Inches)		
Depth (Feet)	48	60	72
	<u>Times (Seconds)</u>		
0-12	30	39	49
12-16	40	52	67
16-20	50	65	81
20-24	59	78	97
26-30	74	98	121

Minimum Test Times for Various Manhole Diameters

2. If the manhole fails the initial test, the Contractor shall locate the leaks and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material. If the manhole should again fail the vacuum test, additional repairs shall be made, and the manhole water tested as specified below.

C. WATER EXFILTRATION TEST:

- 1. After the manhole has been assembled in place, all lifting holes shall be filled and pointed with an approved non-shrinking mortar. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blow out. The test shall be made prior to placing the shelf and invert. If the groundwater table has been allowed to rise above the bottom of the manhole, it shall be lowered for the duration of the test.
- 2. The manhole shall be filled with water to the top of the cone section. If the excavation has not been backfilled and observation indicates no visible leakage, that is, no water visibly moving down the surface of the manhole, the manhole may be considered to be satisfactorily water-tight. If the test, as described above, is unsatisfactory as determined by the Engineer or if the manhole excavation has been backfilled, the test shall be continued. A period of time may be permitted if the Contractor so wishes, to allow for absorption by the manhole. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and a measuring time of at least 8 hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone, measuring the volume of water added. This amount shall be extrapolated to a 24-hour loss rate and the leakage determined on the basis of depth. The leakage for each manhole shall not exceed one gallon per vertical foot for a 24-hour period. If the manhole fails this requirement, but the leakage does not exceed 3 gallons per vertical foot per day, repairs by approved methods may be made as required by the Engineer to bring the leakage within the allowable rate of one gallon per foot per day. Leakage due to a defective section or joint or exceeding the 3 gallon per vertical foot per day, shall be cause for rejection of the manhole. It shall be the Contractor's responsibility to uncover the rejected manhole as necessary and to disassemble, reconstruct or replace it as required

by the Engineer. The manhole shall then be retested and, if satisfactory, interior joints shall be filled and pointed.

- 3. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc. It shall be assumed that all loss of water during the test is a result of leaks through joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the Engineer that the water table is below the bottom of the manhole throughout the test.
- 4. If the groundwater table is above the highest joint in the manhole, and there is no leakage into the manhole, as determined by the Engineer, such a test can serve to evaluate water-tightness of the manhole. However, if the Engineer is not satisfied with the results, the Contractor shall lower the water table and carry out the test as described hereinbefore.

3.03 CLEANING:

All new manholes shall be thoroughly cleaned of all silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

SECTION 33 41 13.22

CORRUGATED POLYETHYLENE [HDPE] DRAINAGE PIPE

PART 1 – GENERAL

- 1.01 WORK INCLUDED:
 - A. This section includes furnishing all materials, labor and equipment and installing corrugated polyethylene [HDPE] drainage pipe and fittings as shown on the drawings and as specified herein.
- 1.02 RELATED WORK:
 - A. Section 31 00 00 EARTHWORK
 - B. Section 31 50 00 SUPPORT OF EXCAVATION

1.03 REFERENCES:

A. The following standards form a part of this specification, as referenced:

American Society for Testing and Materials (ASTM

- ASTM D2321 Standard for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications
- ASTM F405 Standard Specification for Corrugated Polyethylene Pipe and Fittings
- ASTM F667 Standard Specification for Large Diameter Corrugated Polyethylene Pipe and fittings

American Association Of State Highway and Transportation Officials

- AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe
- AASHTO MP6 Standard Specification for Corrugated Polyethylene Pipe 42" and 48" Diameter

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

- A. Six sets of manufacturer's literature on the materials of this Section shall be submitted to the Engineer for review.
- B. Manufacturer's certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished.
- C. Provide approved copies of all piping to Waltham Engineering.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Pipe shall be packaged to withstand shipment without damage and handled carefully on the jobsite. Pipe shall be stored so that it is not exposed to sunlight.

PART 2 - PRODUCTS:

2.01 MATERIALS:

- A. This Section applies to corrugated polyethylene pipe with an integrally formed smooth interior.
- B. The nominal size for the pipe and fittings is based on the nominal inside diameter of the pipe.
- C. The pipe and fittings shall be free of foreign inclusions and visible defects. Fittings may be either molded or fabricated. Fittings supplied by manufacturers other than the supplier of the pipe shall not be permitted without the approval of the Engineer. The ends of the pipe shall be cut squarely and cleanly so as not to adversely affect joining.

2.02 MANUFACTURERS:

A. Pipe and fittings shall be manufactured by Ipex, Inc.; Plexco, Division of Chevron Chemical Co.; J-M Pipe Co.; Advanced Drainage Systems, Inc. (ADS) or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Pipe interiors, fitting interiors, and joint surfaces shall be thoroughly cleaned before installation. Pipes and fittings shall be maintained clean.
- B. Pipes shall be installed in the locations and to the required lines and grades shown on the drawings and provided in these Specifications, using an approved method of control.
- C. Excavations shall be maintained free of water during the progress of the Work. No pipes shall be laid in water, nor shall there by any joints made up in water.
- D. If any defective pipe is discovered after being placed, removal and replacement with sound pipe will be required at no additional cost to the Owner.

END OF SECTION

SECTION 33 44 14

CONNECTIONS TO EXISTING STRUCTURES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Contractor shall furnish materials, tools, labor and equipment to cut suitable openings into the existing manholes, make connections to existing and all other work necessary to direct the existing flow as indicated on the drawings and as herein specified.
- 1.02 RELATED WORK:
 - A. Section 33 39 13, PRECAST MANHOLES AND CATCH BASINS
- 1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:
 - A. Prior to start of work, submit details of the methods proposed for doing the work and for maintaining the sewage flow as herein specified.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

- 3.01 INSTALLATION:
 - A. The Contractor shall provide temporary plugs or provide other suitable means for maintaining the new free of flow until such time as it can be inspected and tested for leakage.
 - B. Connections to the new structure shall be made when required by the Engineer and only after the new pipeline has been inspected and has successfully passed the leakage test.
 - C. The Contractor shall modify each existing structure for installation of the necessary piping, but in so doing shall confine the cutting to the smallest amount possible consistent with the work to be done.
 - D. All new piping connected to existing structures shall be encased in concrete in a manner satisfactory to the Engineer.
 - E. All work shall be done with the proper tools and by careful workmen competent to do work.

F. The Contractor shall cut, reshape and fill the existing manhole tables and plug existing outlets as indicated on the drawings and as directed by the Engineer, to accommodate the new connections. Reshaped manhole invert channels shall be smoothly shaped to permit the flow of sewage. Manhole invert channels shall be reconstructed as specified under Section 33 39 13, PRECAST MANHOLES AND CATCH BASINS.

END OF SECTION – 33 44 14

SECTION 33 49 23

UNDERGROUND STORMWATER CHAMBER SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required and install all underground stormwater chamber systems and appurtenances in accordance with the Drawings and these specifications.
- 1.02 RELATED WORK:
 - A. Section 31 00 00, EARTHWORK
- 1.03 QUALITY CONTROL INSPECTION:
 - A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Engineer's acceptance level, if permitted, or removed and replaced, entirely at the Contractor's expense.
 - B. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.
 - C. Imperfections may be repaired, subject to the acceptance of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final acceptance.

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Shop Drawings

Structural design calculations and shop drawings shall be certified by a Professional Engineer retained by the system manufacturer or Contractor and licensed in the state where the system is to be installed. Six (6) copies of said shop drawings shall be submitted to the Engineer for review and approval.

B. Affidavit on patent infringement

The Contractor shall submit to the Engineer, prior to installation of the stormwater chamber system, an affidavit regarding patent infringement rights stating that any suit or claim against the Owner due to alleged infringement rights shall be defended by the Contractor who will bear all the costs, expenses and attorney's fees incurred thereof.

C. Performance Documentation

The following documentation must be submitted by the Contractor and approved by the Engineer prior to the manufacture and delivery of any materials.

1. Manufacturing Experience

The stormwater chamber supplier shall provide evidence of at least 5 years of successful product design and use. The supplier shall provide an installation list of projects, model sizes installed and installation dates where the same type systems as specified herein have been designed and produced by the supplier.

D. Operation and Maintenance Manuals

Furnish four copies of the operation and maintenance manuals for the stormwater treatment systems.

PART 2 - PRODUCTS

- 2.01 MATERIALS AND DESIGN:
 - A. Chamber, stone and fabric materials and design shall conform to those indicated the installation instructions provided by the system manufacturer.

2.02 MANUFACTURER:

- A. Each stormwater chamber system shall be of a type that has been installed and used successfully for a minimum of 5 years. The manufacturer of said system shall have been regularly engaged in the engineering design and production of systems for the physical collection of stormwater runoff during the aforementioned period.
- B. Each stormwater chamber system shall be SC-310 chambers as manufactured by StormTech, Inc., 70 Inwood Road, Suite 3, Rocky Hill, CT, 888-892-2694 or approved equal.

PART 3 - EXECUTION

- 3.01 INSTALLATION:
 - A. Each stormwater chamber system shall be constructed according to the sizes shown on the Drawings and as specified herein. Install at elevations and locations shown on the Drawings or as otherwise required by the Engineer.
 - B. Installation of Chambers, stone and fabric shall be completed as indicated in the manufacturer's installation instructions.

APPENDIX A













DRAWINGS

528



HILLCROFT PLAYGROUND LOCUS MAP





City of Waltham, Massachusetts

PLANS FOR THE IMPROVEMENTS TO Hillcroft Playground

25 Hillcroft Road Waltham, Massachusetts



ILLUSTRATIVE PLAN. FOR REFERENCE ONLY.

September 2018

85 Devonshire Street, 3rd Floor Boston, MA 02109 (617) 412-4480 (800) Sampson www.westonandsampson.com

CONSTRUCTION DOCUMENTS

SHEET INDEX

CV-1	COVER SHEET
L1.00	EXISTING CONDITIONS PLAN
L2.00	SITE PREPARATION PLAN
L3.00	MATERIALS PLAN
L4.00	LAYOUT PLAN
L5.00	GRADING, DRAINAGE & UTILITIES PLAN
L6.00	PLANTING PLAN
L7.00 - L7.05	CONSTRUCTION DETAILS

		/	
SION AND	SEDIMENT	CONTROL	NOTES

PROTECT EXISTING TREES TO

R&D EXISTING TREE, GRIND STUMP 24" BELOW GRADE, TYP.

R&D BITUMINOUS CONCRETE

EROSION CONTROLS

R&D EXISTING BASKETBALL HOOP

PROTECT EXISTING DRAINAGE

PROPOSED DMH, SEE GRADING,

LINES A & B TO CONNECT TO

DRAINAGE AND UTILITY PLAN

✓ R&D EXISTING DRAINAGE LINE,

R&D DMH, COMPLETE.

COMPLETE.

AND POST, COMPLETE

PAVEMENT, FULL DEPTH,

COMPLETE, TYP.

REMAIN, TYP.

L7.00

RIM = 98.38

R&D EXISTING TREE, GRIND

CLEAR & GRUB EXISTING

VEGETATION, COMPLETE

STUMP 24" BELOW GRADE, TYP.

R&D EXISTING DRAINAGE LINE

COMPLETE.

R&D EXISTING SIGN

JV.=94.8:

1. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE PUT INTO PLACE PRIOR TO BEGINNING ANY CONSTRUCTION OR DEMOLITION.

✓ 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTINUAL MAINTENANCE OF ALL EROSION CONTROL DEVICES THROUGHOUT THE DURATION OF THE PROJECT.

3. CONTRACTOR SHALL COMPLY WITH ALL OF THE COMMONWEALTH OF MASSACHUSETTS D.E.P. AND THE CITY OF WALTHAM'S WETLAND ORDINANCE REGULATIONS FOR SEDIMENT AND EROSION CONTROL, AT ALL TIMES, FOR THE COMPLETE PROJECT DURATION.

4. EXCAVATED MATERIAL STOCKPILED ON THE SITE SHALL BE SURROUNDED BY A RING OF UNBROKEN SEDIMENT AND EROSION CONTROL FENCE. THE LIMITS OF ALL GRADING AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE APPROVED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE OF THE LIMIT OF CONTRACT SHALL REMAIN TOTALLY UNDISTURBED UNLESS OTHERWISE APPROVED BY OWNER'S REPRESENTATIVE.

5. ALL CATCH BASINS AND DRAIN GRATES WITHIN LIMIT OF WORK SHALL BE PROTECTED WITH FILTER FABRIC DURING THE ENTIRE DURATION OF CONSTRUCTION.

5. EROSION CONTROL BARRIERS (STRAW WATTLES & SILT FENCE) TO BE INSTALLED AT THE TOE OF SLOPES. SEE GRADING & DRAINAGE PLANS, NOTES, DETAILS AND SPECIFICATIONS.

7. ANY AREA OUTSIDE THE PROJECT LIMIT THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.

8. THE CONTRACTOR SHALL PROVIDE DUST CONTROL FOR CONSTRUCTION OPERATIONS AS APPROVED BY OWNER.

9. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC/PRIVATE ROADS.

Project:
CITY OF WALTHAM
HILLCROFT PLAYGROUND 25 HILLCROFT RD WALTHAM. MA
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Veston&Sampsor
Veston & Sampsor 5 DEVONSHIRE STREET, 3RD FLOOR BOSTON, MA 02109 (617) 412-4480 (800) SAMPSON WWW.WESTONANDSAMPSON.COM
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SHALL COORDINATE WITH	C0 C7	70.686	45.000	090.0000		WALTHAM, MA
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	L4	53.724	S60° 09'	24.13"W		
	L5 L6	49.511	S86° 10'	' 36.61"W		
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SCALE: N.T.S.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	(
D	FINAL FILL : FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREF PAV MAT
С	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEC MAT COMP LIF WE [MAT NC
В	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLA

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STO ANGULAR NO. 4 (AASHTO M43) STONE".

2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVER 3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.

NOTES:

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- 1. SC-310 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- 2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL
- 3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EN
- 4. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH EXPECTED SOIL MOISTURE CONDITIONS.
- 5. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- 6. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE ENGINEER'S DISCRETION.

STORMTECH CHAMBERS

SCALE: N.T.S.

	Project: CITY OF WALTHAM
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	HILLCROFT PLAYGROUND 25 HILLCROFT RD WALTHAM, MA
- SC-310 END CAP	Weston&Sampson
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STONE INV= 96.00	Consultants:
TILE BETWEEN FOUNDATION STONE AND CHAMBERS IDE CONTINUOUS FABRIC WITHOUT SEAMS	
COMPACTION / DENSITY REQUIREMENT	
EPARE PER SITE DESIGN ENGINEER'S PLANS. AVED INSTALLATIONS MAY HAVE STRINGENT ATERIAL AND PREPARATION REQUIREMENTS.	
EGIN COMPACTIONS AFTER 12" (300 mm) OF ATERIAL OVER THE CHAMBERS IS REACHED. MPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX IFTS TO A MIN. 95% PROCTOR DENSITY FOR VELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE ATERIALS. ROLLER GROSS VEHICLE WEIGHT	Revisions:
FORCE NOT TO EXCEED 20,000 lbs (89 kN).	No. Date Description
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NOTE

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Project:



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GROUNDCOVER SPACING TABLE



PLANT SPACING "A"	PLANT SPACING "B"	PLANTS	AREA UNIT
6" O.C.	5.2"	4.61	1 SQ. FT.
8" O.C.	6.93"	2.6	1 SQ. FT.
10" O.C.	8.66"	1.66	1 SQ. FT.
12" O.C.	10.4"	1.15	1 SQ. FT.

- GROUNDCOVER PLANTS, SEE PLANS

FINISHED GRADE

- 3" DEPTH BARK MULCH, INSTALLED BEFORE PLANTING - PREPARED PLANTING SOIL MIX, SEE SPECIFICATIONS

- COMPACTED SUBGRADE

SECTION

- I. ALL GROUND COVERS TO BE PLANTED IN TRIANGULAR PATTERN. SEE PLANTING
- SCHEDULE FOR SPACING. 2. JUTE EROSION CONTROL MAT TO BE USED ON ALL SLOPES 3:1 OR GREATER.
- SEE SPECIFICATIONS



GROUNDCOVER PLANTING

