

SECTION 07 55 65

HARD AND SOFT LANDSCAPE SYSTEM

(ZinCo "Recreational Park" with Stabilodrain SD 30 – hard and soft landscape)

PART 1 GENERAL

1.1 SUMMARY

- A. This sample specification serves as a guideline to the specifier. It shall be adapted to each project by either choosing from several suggestions or by adjusting the text to project specific and site conditions, such as type of roof construction, roof slope, insulation, water proofing, local climate, design goals, and other.
- B. This specification is prepared in accordance with the CSI format and shall be included as separate section under DIVISION 7 – Thermal and moisture protection.

1.2 SECTION INCLUDES

- A. Soft Landscape / Intensive green roof system including the following:
 - 1. Vegetation layer according to project specific plant list.
 - 2. Growing media / mineral aggregate.
 - 3. Filter layer.
 - 4. Inspection chambers.
 - 5. Drainage layer.
 - 6. Protection layer / separation layer.
 - 7. Root barrier.
 - 8. Hard landscape materials.
 - 9. Related products.

1.3 RELATED SECTIONS

- A. Division 07 Section "Waterproofing" for waterproofing systems under vegetated roof system.
- B. Division 07 Section "Roofing" for roofing systems under vegetated roof system.
- C. Section 07 Section "Sheet Metal Flashing and Trim" for coordination with flashing.

1.4 DEFINITIONS

- A. Green roof: Multi-layered exterior system of growing media and plant materials for installation over membrane roofing and waterproofing systems.
- B. Intensive green roof: Well maintained garden on utilized flat roof. Intensive green roofs are heavy in weight with deep growing media levels. The plant selection includes perennials, shrubs, trees and / or lawn. Other landscape options like pavement, pergolas and ponds also may be included. Maintenance varies depending on plant choice and design.
- C. Hard landscape: Walkways and driveways on top of roof decks permitting heavy live loads. Heavy live loads demand high quality protection and drainage mats.
- D. System build-up "Recreational Park" with Stabilodrain SD 30 – hard and soft landscape: Heavy duty green roof system, suitable for lawn, perennials, shrubs and small trees and for hard landscapes.

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1.5 SUBMITTALS

- A. Submit in accordance with Division 01 Section "Submittal Procedures".
- B. Product data: Submit manufacturer's current published data including component materials, dimensions, standard details, and installation instructions.
- C. Shop drawings: Include the following:
 - 1. Details of green roofing system, plantings, and paving.
 - 2. Relationship to substrate, perimeter, and penetrating items.
 - 3. Location of roof drains and slopes.
 - 4. Average weight of green roof system.
- D. Range samples: Full size sample of each planting selection in trays minimum 1 x 1 feet by full thickness.
- E. Closeout submittals: Maintenance instructions and warranties.

1.6 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer qualifications: Minimum ten years' experience producing green roof systems of the size with the production facilities capable of meeting the project schedule.
 - 2. Installer qualifications: Minimum 2 years' experience with green roof systems and acceptable to the manufacturer, with adequate equipment and skilled workers.
- B. Pre-installation meeting: Convene on project site min. one week before beginning work to:
 - 1. Verify project requirements and site logistics.
 - 2. Coordinate between trades.
 - 3. Assess integrity of the roofing system and building structure.
 - 4. Review manufacturer's installation instructions and warranty requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery schedule to minimize on-site storage. Verify roofing installation system is tested and accepted prior to delivery. Do not overload roof.
- B. Store materials in a dry area, out of direct sunlight, protected from freezing, staining, contamination, or damage.
- C. Water plants and expose plant materials to daylight. Unpack trays for even daylight distribution.

1.8 WARRANTY

- A. Manufacturer's warranty: Provide manufacturer's 5-year limited warranty against deficiencies in materials or fabrication.
- B. Installer's warranty: Provide installer's 2-year growing warranty which provides periodic inspections and maintenance service to ensure vegetation is properly installed, is becoming established, and is of sufficient density over the roof area.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design: "Recreational Park" with Stabilodrain SD 30 – hard and soft landscape Hard and Soft Landscape System by ZinCo USA, Inc.
401 VFW Drive
Rockland, MA 02370
Telephone: 866-766-3155
Website: www.zinco-usa.com

2.2 COMPONENTS

(Note to specifier: select applying components for soft landscape / hard landscape / standard roof / inverted roof.)

- A. Vegetation layer:
For soft landscapes / vegetated areas:
Species, sizes, and qualities according to project specific plant list. Delivery and appropriate planting in the growing media, including suitable watering regime after installation.
- B. Growing media:
- For soft landscapes / vegetated areas:
Zincoblend I, engineered growing media, typical for intensive roofs, or Zincoblend T, engineered growing media, typical for turf areas. Average depth according to the requirements of selected species and according to drawings, min. 10 in. (approx. 250 mm). Delivery and installation on the filter layer or on the mineral aggregate Zincoblend M.
 - For soft landscapes / vegetated areas:
Zincoblend M, engineered mineral aggregate as sub-substrate.
(Note to specifier: please select for growing media levels exceeding approx. 14.0 in. (approx. 350 mm).)
In case of growing media levels exceeding approx. 14.0 in. (approx. 350 mm); a pure mineral aggregate as sub-substrate is recommended. Also suitable as infill of drainage elements and for the installation of vegetation free zones. Delivery and installation on the filter layer.
- C. Filter layer:
- For soft landscapes / vegetated areas:
ZinCo Filter Sheet TG. Made of non-rotting thermally strengthened polypropylene. UV-stabilized, chemically and biologically neutral, highly resistant to mechanical stress, resistant to all naturally occurring acids and alkali. Color: grey. Thickness approx. 0.04 in. (approx. 0.9 mm). Weight approx. 0.04 lbs./sq. ft. (approx. 175 g/m²). Geotextile strength class 3. Water flow rate Q under 4 inch (approx. 100 mm) water column: approx. 59 gpm/sq. ft. (approx. 40 l/s/m²); Effective opening width, d_{90%}: approx. 3.2 mil (0.08 mm). Delivery and installation on the drainage layer.
 - For hard landscapes:
ZinCo Filter Sheet PV. Thermally strengthened filter sheet made of polypropylene, UV-stabilized, highly resistant to mechanical stress. Chemically and biologically neutral. Resistant to all naturally occurring acids and alkali. Color: grey. Thickness approx. 0.06 in. (approx. 1.6 mm). Weight approx. 0.06 lbs./sq. ft. (approx. 300 g/m²). Geotextile strength class 5. Maximum tensile strength (lengthwise / crosswise): approx. 131 lbs./in. (approx. 23 kN/m). Effective opening width, O_{90%}: approx. 2.75 mil (approx. 0.07 mm). Delivery and installation on the drainage layer.

- D. Inspection chambers:
(Note to specifier: please select according to project requirements.)
1. For soft landscapes / vegetated areas:
 - a. ZinCo Inspection Chamber KS 10, made of plastic-coated aluminum with lateral slots for water passage. Detachable cover made of galvanized, plastic-coated steel with two finger-holes. Color: old silver-antique. Height: approx. 3.9 in. (approx. 100 mm) (H). Outer dimension of the Chamber (at transportation): approx. 11.8 x 11.8 in. (approx. 300 x 300 mm) (O). Dimension including flange (extended, including chamber): approx. 11.8 x 20.9 in. (approx. 300 x 530 mm) (F). Aperture dimension: approx. 9.4 x 9.4 in. (approx. 240 x 240 mm) (A). Slot width: approx. 0.1 in. (approx. 3 mm). Weight: approx. 6.2 lbs (approx. 2.8 kg). Delivery and installation on top of the drainage elements above the roof outlets to ensure accessibility of the outlets at any time.
 - b. ZinCo Extension Piece KSA 8. *(Optional item for height adjustment)*. Height approx. 3.1 in (approx. 80 mm). For elevation of KS 10 in segments of approx. 3.1 in. (approx. 80 mm). Delivery and installation on top of the ZinCo Inspection Chamber KS 10.
 - c. ZinCo Extension Piece KSA 20. *(Optional item for height adjustment)*. Height approx. 7.9 in (approx. 200 mm). For elevation of KS 10 in segments of approx. 7.9 in. (approx. 200 mm). Delivery and installation on top of the ZinCo Inspection Chamber KS 10.
 2. For hard landscapes:
 - a. ZinCo Heavy Duty Inspection and Drainage Chamber BES 300, for the application within hard landscaping. Made of galvanized steel with removable, secured grill, mesh width approx. 0.4 x 1.6 in. (approx. 11 x 41 mm), sand trap made of aluminum, and pressure distributing support flange. Vertically adjustable to the respective layer depth by extension pieces. High compression resistance; fit for heavy traffic up to truck class 8. Height: approx. 11.8 in (approx. 300 mm). Weight: approx. 70.5 lbs (approx. 32.0 kg). External dimensions: approx. 11.8 x 11.8 in. (approx. 300 x 300 mm); aperture dimension: approx. 7.9 x 7.9 in. (approx. 200 x 200 mm); flange dimensions: approx. 15.8 x 15.8 in (approx. 400 x 400 mm). Delivery and installation on top of Elastodrain EL202 strips.
 - b. ZinCo Extension Piece Piece BES. *(Optional item for height adjustment)*. Height: approx. 1.0 in (approx. 25 mm). Weight: approx. 17.6 lbs lbs (approx 8.0 kg). Delivery and installation on top of the ZinCo Heavy Duty Inspection and Drainage Chamber BES 300.
- E. Drainage layer:
ZinCo Drainage Element Stabilodrain SD 30. Extremely stable and trafficable drainage and water retention element, made of thermoformed recycled polystyrene, with lateral connecting profiles, with water retaining troughs and openings for ventilation and evaporation as well as a multidirectional drainage channel system on the underside. Color: dark grey. Height: approx. 1.3 in. (approx. 32 mm). Weight: approx. 0.6 lbs/sq. ft. (approx. 3 kg/m²). Max. compressive strength at 10% compression without filling: 72.5 psi (500 kN/m²). Water retention capacity: approx. 0.2 gal/sq. ft. (approx. 7.5 l/m²). Infill volume approx. 0.5 gal/sq. ft. (approx. 20 l/m²). Delivery and installation on the protection layer / separation layer.
- F. Protection layer / separation layer:
1. For soft landscapes / vegetated areas on standard roofs:
ZinCo Protection Mat ISM 50. Recycled synthetic fiber mat made of polyester/polypropylene, bottom sided fiber impregnation using acrylic compounds. Highly resistant to mechanical stress; geotextile strength class 5. For use as protection layer and as water and nutrient retention. Reduction of impact noise. Color: grey mottled. Thickness: approx. 0.2 in. (approx. 6mm). Weight: approx. 0.2 lbs/sq. ft. (approx.

- 850 g/m²). Water retention capacity: approx. 0.1 gal/sq. ft. (approx. 4 l/m²). Compatible with bitumen and polystyrene. Delivery and installation on top of the root barrier or root resistant waterproofing.
2. For soft landscapes / vegetated areas on inverted roofs:
ZinCo Filter Sheet PV. Thermally strengthened filter sheet made of polypropylene, UV-stabilized, highly resistant to mechanical stress. Chemically and biologically neutral. Resistant to all naturally occurring acids and alkali. Color: grey. Thickness approx. 0.06 in. (approx. 1.6 mm). Weight approx. 0.06 lbs./sq. ft. (approx. 300 g/m²). Geotextile strength class 5. Maximum tensile strength (lengthwise / crosswise): approx. 131 lbs./in. (approx. 23 kN/m). Effective opening width, O_{90%}: approx. 2.75 mil (approx. 0.07 mm). Delivery and installation on top of the thermal insulation.
 3. For hard landscapes on standard roofs:
ZinCo Filter Sheet PV. Thermally strengthened filter sheet made of polypropylene, UV-stabilized, highly resistant to mechanical stress. Chemically and biologically neutral. Resistant to all naturally occurring acids and alkali. Color: grey. Thickness approx. 0.06 in. (approx. 1.6 mm). Weight approx. 0.06 lbs./sq. ft. (approx. 300 g/m²). Geotextile strength class 5. Maximum tensile strength (lengthwise / crosswise): approx. 131 lbs./in. (approx. 23 kN/m). Effective opening width, O_{90%}: approx. 2.75 mil (approx. 0.07 mm). Delivery and installation on top of the root barrier or root resistant waterproofing.
 4. For hard landscapes on inverted roofs:
ZinCo Filter Sheet PV. Thermally strengthened filter sheet made of polypropylene, UV-stabilized, highly resistant to mechanical stress. Chemically and biologically neutral. Resistant to all naturally occurring acids and alkali. Color: grey. Thickness approx. 0.06 in. (approx. 1.6 mm). Weight approx. 0.06 lbs./sq. ft. (approx. 300 g/m²). Geotextile strength class 5. Maximum tensile strength (lengthwise / crosswise): approx. 131 lbs./in. (approx. 23 kN/m). Effective opening width, O_{90%}: approx. 2.75 mil (approx. 0.07 mm). Delivery and installation on top of the thermal insulation.
- G. Root barrier:
(Note to specifier: please select, if non root resistant waterproofing is used.)
ZinCo Root Barrier WSB 100-PO. Root proof, hot air weldable sheet made of flexible polyolefin (FPO), with polyester weft inserted reinforcement. Resistant to bitumen and for short periods of time to oil. Superb weather proofness (UV- and IR-Radiation). Thickness: approx. 0.04 in. (approx. 1.1 mm). Weight: approx. 0.23 lbs./sq. ft. (approx. 1.1 kg/m²). Hot air weldable, excellent cold flexibility. Root resistance tested according to FLL-Test method of 2002. Delivery and installation on top of the waterproofing.
- H. Hard landscape materials:
1. Infill of drainage element:
The material and its grading shall suit the application as infill material. It shall be structure stable and water permeable. Delivery and installation into the drainage layer.
 2. Compacted base layer:
For load distribution reasons and for creating grade in the paved surface a compacted base layer shall be installed. Thickness: min. 6.0 in. (approx. 150 mm). The material and its grading shall be suitable for the use on roofs and comply with the local regulations and standards. For example: compacted crusher run, lime free, sieve size e.g. 1 1/2 in. to # 200. The material shall be frost resistant, stable and permeable after compaction. Delivery and installation on top of the filter layer.
 3. Bedding layer:
The paving shall be laid in a suitable structure stable bedding layer. Thickness: approx. 1.2-2.0 in. (approx. 30-50 mm). The material shall be structure stable, suitable for the use on roofs and shall comply with the local standards and regulations and project specific requirements. For example: well graded coarse sand, lime free, sieve size 3/8 in. to # 100. Delivery and installation on top of the compacted base layer.

4. Paving:
Thickness depending on live load and substructure. The material dimensions and installation shall comply with the local standards and regulations and project specific requirements. Delivery and installation on the bedding layer.
 5. Joint infill:
Grading adapted to bedding layer. The material shall comply with the local standards and regulations and project specific requirements. Delivery and installation in the paving.
 6. Edging - Separation between vegetation and hard landscape:
Steel profile or concrete curb as edging for driveways. Dimensions according to the application as well as customers' and architects' requirements. Delivery and installation in a concrete foundation according to local standards and regulations and project specific requirements.
- I. Related products:
(Note to specifier: please select, if required.)
1. Provide gravel for non-vegetated areas, including roof edges, flashing, and roof penetrations: smooth, washed, clean, well rounded gravel.
 2. Provide stainless steel or concrete L-shaped profiles between gravel and growing media.
 3. Provide Elastodrain EL202 strips: Strips of the protection and drainage mat Elastodrain EL202 for installation below the flanges of the ZinCo Heavy Duty Inspection and Drainage Chamber BES 300.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions:
1. Confirm work by others is installed per the project requirements. Do not cover work by others prior to inspection or acceptance.
 2. Inspect seams, penetrations and details. Identify defects in writing to the Architect.
- B. Do not proceed until unacceptable conditions are corrected.

3.2 INSTALLATION

(Note to specifier: select applying components for soft landscape / hard landscape / standard roof / inverted roof.)

- A. General:
Install green roof system in strict accordance with manufacturer's instructions and in proper relationship with adjacent materials and the following.
1. Root barrier:
(Note to specifier: please select, if required.)
Install the Root Barrier WSB 100-PO above the non root resistant waterproofing, the seams are to be hot air welded, root proof and waterproof with an overlap of min. 2.0 in. The root barrier shall be taken above the growing media along edges and at roof penetrations. Cut the root barrier in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 3-5 %.

2. Protection layer / separation layer:
 - a. For soft landscapes / vegetated areas on standard roofs:

Install the Protection Mat ISM 50 above a root resistant waterproofing or root barrier with an overlap of approx. 4.0 in. (approx. 100 mm). The protection mat shall be taken above the growing media along edges and at roof penetrations. Cut the protection mat in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 10–15 %.
 - b. For soft landscapes on inverted roofs:

Install the Filter Sheet PV above the thermal insulation with an overlap of approx. 8 in. The filter sheet shall be taken above the growing media along edges and at roof penetrations. Cut the slip sheet in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 15-25 %.
 - c. For hard landscapes on standard roofs:

Install the Filter Sheet PV above a root resistant waterproofing or root barrier with an overlap of approx. 8 in. The filter sheet shall be taken above the growing media along edges and at roof penetrations. Cut the slip sheet in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 15-25 %.
 - d. For hard landscapes on inverted roofs:

Install the Filter Sheet PV above the thermal insulation with an overlap of approx. 8 in. The filter sheet shall be taken above the growing media along edges and at roof penetrations. Cut the slip sheet in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 15-25 %.
3. Drainage layer:

Install the drainage element Stabilodrain SD 30 on the Protection Mat ISM 50 or on the Filter Sheet PV. The drainage elements are installed with an overlap of approx. 1 in., in green roof applications with the cross shaped support surfaces facing up, for hard landscape applications with the cross shaped support surfaces facing down. In case of hard landscapes fill the drainage element with bedding layer. Cut the drainage element in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 3-6 %.
4. Inspection chambers:
 - a. For soft landscapes / vegetated areas:

Cut holes into all layers of the build-up in the size of the drain. Then install the Inspection Chamber KS 10 on top of the drainage layer above the drain. Install the Filter Sheet SF by rolling it over the inspection chamber and cutting it, ensuring that all slots of the inspection chamber remain uncovered, but the flanges remain covered. Surround with a gravel strip.
 - b. For hard landscapes:

Cut an opening in the size of flanges of the Heavy Duty Inspection and Drainage Chamber BES 300 into all layers of the build-up. Install EL 202 strips to support the flanges of the BES 300. Then install the Heavy Duty Inspection Chamber BES 300 on top of Elastodrain strips above the drain. Install the Filter Sheet PV on top of the flange of the Heavy Duty Inspection Chamber BES 300.
5. Filter layer:
 - a. For soft landscapes / vegetated areas:

Install the Filter Sheet TG with an overlap of approx. 8 in. (approx. 200 mm) above the Drainage Element SD 30. The filter sheet shall be taken above the growing media along edges and at roof penetrations. Cut the filter sheet in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 15–25 %.

- b. For hard landscapes:
Install the Filter Sheet PV with an overlap of approx. 8 in. (approx. 200 mm) above the Drainage Element SD 30. The filter sheet shall be taken above the growing media along edges and at roof penetrations. Cut the filter sheet in situ at roof penetrations. Consider an allowance for overlap and wastage of approx. 15–25 %.
6. Growing media:
 - a. Mineral aggregate Zincoblend M as sub-substrate
(Note to specifier: please select, if required.)
For greater growing media depths install Zincoblend M in the required depth. Check the depth in several places to ensure a continuous thickness. A tolerance of 0.5 in. (13 mm) is acceptable. Consider a settlement factor of 1.05.
 - b. Zincoblend I or Zincoblend T:
Install the Growing Media Zincoblend I or Zincoblend T for the “Recreational Park” Green Roof System on the Filter Sheet TG or on the mineral aggregate Zincoblend M. Install the growing media equally in the necessary depth. Check the depth in several places to ensure a continuous thickness. A tolerance of 0.5 in. (13 mm) is acceptable. Consider a settlement factor of 1.2.
7. Vegetation layer:
Apply plants at recommended application rate and according to the project specific plant list and drawings. Water and fertilize as required by the specific plant lists and local climate.
8. Hard landscape materials:
 - a. Infill of drainage element.
Fill the drainage element with bedding material before covering with the Filter Sheet PV.
 - b. Compacted base layer:
Install the compacted base layer for the hard landscape application on the Filter Sheet PV. The grade of the paved surface shall be incorporated in the compacted base layer. The compacted base layer shall be compacted with a suitable compactor (compaction rollers are not recommended) without deforming / damaging the drainage element. For increased thicknesses of the material it is recommended to install and compact the base in layers.
 - c. Bedding layer:
Apply the bedding material in a continuous layer as basis for the paving.
 - d. Paving:
Install the paving on the bedding layer. Ensure sufficient infill of joints.
 - e. Separation between vegetation and hard landscape:
Install separation elements in a concrete foundation according to the local standards and regulations and project specific requirements.
9. Related products
(Note to specifier: please select, if required.):
 - a. Install gravel in non-vegetated areas, including roof edges, flashing, and roof penetrations: smooth, washed, clean, well rounded gravel.
 - b. Install stainless steel or concrete L-shaped profile between gravel and growing media.

3.3 CLEANING

- A. Remove all debris from the project site in accordance with the owner’s construction waste management requirements.

3.4 PROTECTION

- A. Protect green roof planting and components from dirt and damage caused by subsequent construction activities.

3.5 MAINTENANCE

- A. Initial irrigation: Immediately after installation ensure the plants have sufficient water to root successfully. Subsequent irrigation regime depends on weather, location, and project specific plant material.
- B. Initial fertilization: An initial fertilization with a slow release fertilizer is recommended. Fertilization regime depends on weather, location, project specific plant list.
- C. Monitor the first two growing seasons carefully. Replace dead plants to ensure full-vegetation coverage and prevent weed growth. Remove coarse or unwanted plants and tree seedlings.
- D. General maintenance of soft landscapes / vegetated areas: includes but is not limited to the removal of unwanted plants and the seedlings of trees, keeping the vegetation zone free from unwanted plants, visual inspection and cleaning of the outlets, and fertilization of the vegetation with a slow release fertilizer, replacing plant material that dies, plant specific irrigation.
- E. General maintenance of hard landscapes: includes, but is not limited to the removal of unwanted plants from borders, edges or joints, filling of joint material washed out during the time, and visual inspection and cleaning of the outlets.

END OF SECTION