

B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION Conditions Where Practice Applies:

On all disturbed areas not stabilized by other methods. This specification is divided into sections on incremental stabilization; soil preparation, soil amendments and topsoiling; seeding and mulching; temporary stabilization; and permanent stabilization.

inspect seeded areas for vegetative establishment and make necessary repairs, replacements, and reseedings within the planting season.

- 1. Adequate vegetative stabilization requires 95 percent groundcover.
- 2. If an area has less than 40 percent groundcover, restabilize following the original recommendations for lime, fertilizer, seedbed preparation, and seeding.
- 3. If an area has between 40 and 94 percent groundcover, over- seed and fertilize using half of the
- 4. Maintenance fertilizer rates for permanent seeding are shown in Table B.6.

B-4-1 Standards and Specifications for Incremental Stabilization

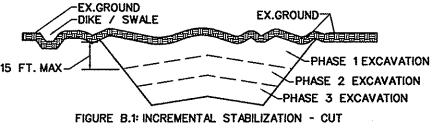
Conditions Where Practice Applies: Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

Criteria: A. Incremental Stabilization - Cut Slopes

- 1. Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.

 Construction sequence example (Refer to Figure B.1 in "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control"): for Soil Erosion and Sediment Control"):
 a. Construct and stabilize all temporary swales or dikes that will be used to convey runoff around
- b. Perform Phase 1 excavation, prepare seedbed, and stabilize.
 c. Perform Phase 2 excavation, prepare seedbed, and stabilize. Overseed Phase 1 areas as necessary. d. Perform final phase excavation, prepare seedbed, and stabilize. Overseed previously seeded

Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

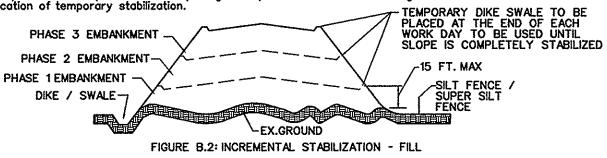


B. Incremental Stabilization - Fill Slopes

- 1. Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and
- Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.
 Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
 At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
 Construction sequence example (Refer to Figure B.2 in "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control"):

 Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the fill. Construct silt fence on low side of fill unless other methods shown on the plans address this area.
- b. At the end of each day, install temporary water conveyance practice(s), as necessary, to
- intercept surface runoff and convey it down the slope in a non-erosive manner.
 c. Place Phase 1 fill, prepare seedbed, and stabilize.
 d. Place Phase 2 fill, prepare seedbed, and stabilize. e. Place finalphase fill, prepare seedbed, and stabilize. Overseed previously seeded areas as

Note: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.



B-4-2 Standards and Specifications for Soil Preparation, Topsoiling and Soil Amendments Conditions Where Practice Applies:

Criterio: A. Soil Preparation

- 1. Temporary Stabilization
- a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
- b. Apply fertilizer and lime as prescribed on the plans.
- c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable
- 2. Permanent Stabilization
- a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil
- Soil pH between 6.0 and 7.0.
 Soluble salts less than 500 parts per million (ppm).
 Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An except silt plus clay) to provide the a sandy soil (less than 30 percent silt plus clay) would be acceptable.
- would be acceptable.
 Soil contains 1.5 percent minimum organic matter by weight.
 Soil contains sufficient pore space to permit adequate root penetration.
- b. Application of amendments or topsoil is required if on-site soils do not meet the above
- c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
- d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil
- e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

B. Topsoiling

- Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
- Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS.
- 3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
- a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
- b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
- c. The original soil to be vegetated contains material toxic to plant growth.
- d. The soil is so acidic that treatment with limestone is not feasible

4. Areas having slopes steeper than 2:1 require special consideration and design.

- 5. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria: a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1/2 inches in diameter.
- b. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified.
- c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
- a. Erosion and sediment control practices must be maintained when applying topsoil.
- b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
- c. Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

C. Soil Amendments (Fertilizer and Lime Specifications)

- Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also
- 2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the produces.
- 3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a *100 mesh sieve and 98 to 100 percent will pass through a *20 mesh sieve.
- 4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.

 B-4-5 Standards and Specification for Permanent Stabilization
- Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-3 Standards and Specifications for Seeding and Mulching Conditions Where Practice Applies:

To the surface of all perimeter controls, slopes, and any disturbed area not under active grading Criteria:

A. Seeding 1. Specifications

- a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
- b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
- c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can use the inoculant less affective.
- d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

2. Application

- a. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
- Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site- specific seeding summaries.
- ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil
- b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil. Cultipacking seeders are required to bury the seed in such a fashion as to provide at least ¼inch of soil covering. Seedbed must be firm after planting.
- ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
- c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
- If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P205 (phosphorous), 200 pounds per acre; K20 (potassium), 200 pounds per acre.
- ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydroted lime when hydroseeding.
- iii. Mix seed and fertilizer on site and seed immediately and without interruption.

iv. When hydroseeding do not incorporate seed into the soil.

1. Mulch Materials (in order of preference)

- a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. Note: Use only sterile straw mulch in greas where one species of grass is desired
- Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
- WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
- ii. WCFM, including dye, must contain no germination or growth inhibiting factors
- iii. WCFM materials are to be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
- iv. WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.
- v. WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.

a. Apply mulch to all seeded areas immediately after seeding.

- b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the
- c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

- a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
- A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land,
- ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited.

2. Sod Installation

3. Sod Maintenance

Conditions Where Practice Applies

Conditions Where Practice Applies

<u>Maintenance</u>

Steep slopes, Roadsides

Salt-Damaged Areas

Utility Rights-of-Way Dikes and Dams

Recreation Areas

Sand and Gravel Pits, Sanitary Landfills

Pond and Channel Banks, Streambanks

Wastewater Treatment Strips and Areas

TABLE H.1: GEOTEXTILE FABRICS

Grab Tensile Strength

Apparent Opening Size²

Ultraviolet Resistance

tained at 500 hours

Puncture Strength

Permittivity

Grab Tensile Elongation

Mine Spoil, Dredged Matera and Spoil Banks

Berms and Low Embankments (not on ponds)

Grassed Waterways, Diversions, Terraces, Spillways

Field Borders, Filter Stripes, Contour Buffer Strips

Athletic Fields, Residential and Commercial Lawns

R - Recommended mix for this site condition or purpose A - Alternative mix, depending on site conditions

H-1 Standards and Specifications for Materials

ASTM D-6241

? Values for AOS represent the average maximum opening.

All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction: CD is cross direction.

<u>Criteria</u>

a. During periods of excessively high temperature or in areas having dry subsoil, lightly irrigate the subsoil immediately prior to laying the sod.

b. Lay the first row of sod in a straight line with subsequent rows placed parallel to it and tightly wedged against each other. Stagger lateral joints to promote more uniform growth and strength Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.

c. Wherever possible, lay sod with the long edges parallel to the contour and with staggering joints. Roll and tamp, peg or otherwise secure the sod to prevent slippage on slopes. Ensure solid contact exists between sod roots and the underlying soil surface.

d. Water the sod immediately following rolling and tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Complete the operations of laying, tamping and irrigating for any piece of sod within eight hours.

a. In the absence of adequate rainfall, water daily during the first week or as often and sufficiently as necessary to maintain moist soil to a depth of 4 inches. Water sod during the heat of the day

c. Do not mow until the sod is firmly rooted. No more than 1/3 of the grass leaf must be removed by the initial cutting or subsequent cuttings. Maintain a grass height of at least 3 inches unless otherwise specified.

Conditions Where Practice Applies
On newly seeded surfaces to prevent the applied seed from washing out; in channels and on steep slopes where the flow has erosive velocities or conveys clear water; on temporary swales, earth dikes, and perimeter dike swales as required by the respective design standard; and, on stream banks where moving water is likely to wash out new vegetative plantings.

This practice applies to intensively used areas (e.g., equipment and material storage, staging areas, heavily used

A minimum 4-inch base course of crushed stone or other suitable materials including wood chips over nonwoven geotextile should be provided as specified in Section H-1 Materials.

3. The transport of sediments, nutrients, oils, chemicals, particulate matter associated with vehicular traffic and equipment, and material storage needs to be considered in the selection of material. Additional control measures may be necessary to control some of these potential pollutants.

2. Select the stabilizing material based on the intended use, desired maintenance frequency, and runoff

Surface erosion can be a problem on large heavy use areas. In these situations, measures to reduce the flow length of runoff or erosive velocities need to be considered.

The heavy use areas must be maintained in a condition that minimizes erosion. This may require adding suitable material, as specified on the approved plans, to maintain a clean surface.

1. The stockpile location and all related sediment control practices must be clearly indicated on the

The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.

Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.

Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.

7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.

The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

TABLE B.2: RECOMMENDED PERMANENT SEEDING MIXTURES

BY SITE CONDITION OR PURPOSE

Bottom of Drainage Channels, Swales, Detention Basins ARAARA

Heavy Use Areas (Grass Loafing Paddocks for livestock)

WOVEN SLIT FILM MONOFILAMENT NONWOVEN GEOTEXTILE GEOTEXTILE

MINIMUM AVERAGE ROLL VALUE

 A
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 R
 A
 A
 R
 R
 R
 A
 A
 R
 R
 R
 A
 A
 A
 R
 R
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A
 A

A R R R R R

If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

b. After the first week, sod watering is required as necessary to maintain adequate moisture

B-4-6 Standards and Specifications for Soil Stabilization Matting

B-4-7 Standards and Specifications for Heavy use Area Protection

B-4-8 Standards and Specifications for Stockpile Area

4. Access the stockpile area from the upgrade side.

Site Condition or

Purpose of the Planting

Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

Runoff from the stockpile area must drain to a suitable sediment control practice.

iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000

B-4-4 Standards and Specifications for Temporary Stabilization

Conditions Where Practice Applies

Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

- Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.
- 2. For sites having soil tests performed, use and show the recommended rates by the testing agency Soil tests are not required for Temporary Seeding.
- 3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season. TEMPORARY SEEDING SUMMARY

| Hardiness Zone (from Figure B.3): 7a Seed Mixture (from Table B.1): 7a | | | | | Fertilizer Rate (10-20-20) | Lime Rate | |
|--|--------------------|-----------------------------|-------------------------|-------------------|----------------------------------|-----------------|--|
| No. | Species | Application Rate (lb/ac) | Seeding Dates | Seeding Depths | | | |
| | FOXTAL MILLET | 30 | 5/1-8/14 | 1/2" | 436 lb/ac | 2 tons/ac | |
| | ANNUAL RYEGRASS | 40 | 2/15-4/30 8/15-11/30 | 1/2" | (10 lb/1000 sf) | (90 lb/1000 sf) | |
| | CEREAL RYE | 112 | 2/15-4/30 8/15-12/15 | 1" | | | |

Conditions Where Practice Applies

2. Turfgrass Mixtures

Exposed soils where ground cover is needed for 6 months or more. Criterio

A. Seed Mixtures

- a. Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table B.2. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The Summary is to be placed on the plan.
- b. Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guide, Section 342 Critical Area Planting.
- c. For sites having disturbed area over 5 acres, use and show the rates recommended by the soil
- d. For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3½ pounds per 1000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.
- a. Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium to high level of maintenance.
- b. Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.
- i. Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
- ii. Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid establishment is necessary and when turf will receive medium to intensive management. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds mixture per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
- iii. Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade.
 Recommended mixture includes: Certified Tall Fescue Cultivars 95 to 100 percent,
 Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per
 1000 square feet. One or more cultivars may be blended.
- iv. Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass lawns. For establishment in high quality, intensively managed turf area. Mixture includes: Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1½ to 3 pounds per 1000 square feet.

Select turfgrass varieties from those listed in the most current University of Maryland Publication, Agronomy Memo •77, "Turfgrass Cultivar Recommendations for Maryland" Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed Section, provides a reliable means of consumer protection and assures a pure genetic line

- c. Ideal Times of Seeding for Turf Grass Mixtures
- Western MD: March 15 to June 1, August 1 to October 1 (Hardiness Zones: 5b, 6a)
 Central MD: March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)
 Southern MD. Eastern Shore: March 1 to May 15, August 15 to October 15 (Hardiness Zones: 7a, 7b)
- d. Till areas to receive seed by disking or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 1/2 inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will
- e. If soil moisture is deficient, supply new seedings with adequate water for plant growth (1/2 to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedings are made late in the planting season, in abnormally dry or hot PERMANENT SEEDING SUMMARY

| Hardin Seed I | ess Zone (from Figure I Mixture (from Table B.1) | 3,3): <u>7a</u> : <u>7a</u> | | | | Fertilizer Rate (10-20-20 |) | Lime Rate |
|------------------|--|--------------------------------|------------------------------------|-------------------|----------|---------------------------------|------------------|----------------------|
| No. | Species | Application Rate (lb/ac) | Seeding Dates | Seeding Depths | N | P ₂ O ₅ | K ₂ 0 | |
| 11 | CREEPING RED FESCUE CHEWINGS FESCUE KENTUCKY BLUEGRASS FOXTAIL, OR PEARL MILLET | 30 30 20 4 | 3/1-5/15 8/1-10/15 5/1-8/14 | 14"-1 <u>2</u> " | (1.0 lb/ | (2 lb/ | (2 lb/ | 2 tons/ac (90 lb/ |
| 6 | TALL FESCUE WHITE CLOVER PERENNIAL RYEGRASS FOXTAIL, OR PEARL MILLET | 40 5 25 3.5 | 3/1-5/15 8/1-10/15 5/1-8/14 | 1/4"-1/2" | 1000 817 | 1000 817 | 1000 sf) | 1000 sf) |
| TURF CRASS | TALL FESCUE (95%) KENTUCKY BLUEGRASS (5%) FOXTAL, OR PEARL MILLET | 270 15 14 | 3/1-5/15 8/1-10/15 5/16-7/31 | 1/4"-12" | | | | ı |

For dates '5/16 - 7/31' add either foxtail or pearl millet to the seed mixture as noted above.

For sites having disturbed areas over 5 acres the rates shown above for permanent seeding shall be deleted and the rates recommended by the soil testing agency shall be used. Soil testing shall be performed at the time of fine grading and the results shall be furnished to the sediment control inspector.

- B. Sod: To provide quick cover on disturbed areas (2:1 grade or flatter). 1. General Specifications
 - a. Class of turfgrass sod must be Maryland State Certified. Sod labels must be made available to
 - b. Sod must be machine cut at a uniform soil thickness of √inch, plus or minus /₄inch, at the time of cutting. Measurement for thickness must exclude top growth and thatch. Broken pads and torn or uneven ends will not be acceptable. c. Standard size sections of sod must be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the
 - d. Sod must not be harvested or transplanted when moisture content (excessively dry or wet) may
 - e. Sod must be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period must be approved by an agronomist or soil scientist prior to its installation.

THE COORDINATE SYSTEM OF ALL DRAWINGS IS BASED ON THE NORTH AMERICAN DATUM OF 1983. THE ELEVATION SYSTEM OF ALL DRAWINGS IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988. HORZ: NAD 83/91; VERT: NAVD 88

500 CHESTERFIELD PKWY MALVERN, PA 19355 (610) 648-1700

DEVELOPER / APPLICANT

9755 PATUXENT WOODS DRIVE, SUITE 350 COLUMBIA, MD 21046 (410) 715-7202

IOWARD COUNTY, MARYLAND

REVISIONS

TEST METHOD | MD | CD | MD | CD | MD | CD ASTM D-4632 200 lb 200 lb 370 lb 250 lb 200 lb 200 lb Und Columber 6.20.16 ASTM D-4632 | 15% | 10% | 15% | 15% | 50% | 50% Trapezoidal Tear Strength | ASTM D-4533 | 75 lb | 75 lb | 100 lb | 60 lb | 80 lb | 80 lb Chief, Development Engineering Division Date Ket Stelent 6.32-66 450 lb 900 lb 450 lb Chief Division of Land Development Director Date U.S. Sieve 30 U.S. Sieve 70 U.S. Sieve 70 ASTM D-4751 (0.59 mm) (0.21 mm) (0.21 mm) 6-22-16 ASTM D-4491 | 0.05 sec⁻¹ | 0.28 sec⁻¹ | 1.1 sec⁻¹ ASTM D-4355 70% strength 70% strength 70% strength ADDRESS CHART LOT / PARCEL NO. STREET ADDRESS PARCEL H 1 8230 SANDY COURT Geotextiles must be evaluated by the National Transportation Product Evaluation Program (NTPEP) and conform to the values in Table H.1. 8242 SANDY COURT PARCEL 11 The geotextile must be inert to commonly encountered chemicals and hydrocarbons and must be rot and mildew resistant. The geotextile must be manufactured from fibers consisting of long chain synthetic polymers and composed of a minimum of 95 percent by weight of polyolefins or polyesters, and formed into a stable network so the filaments or yarns retain their dimensional stability relative to each other including solvens. When more than one section of geotextile is necessary, overlap the sections by at least one foot. The geotextile must be pulled taut over the applied surface. Equipment must not run over exposed fabric. When placing riprap on geotextile, do not exceed a one foot drop height. PERMIT INFORMATION CHART SUBDIVISION NAME SECTION / AREA LOT / PARCEL NO BALTIMORE WASHINGTON INDUSTRIAL PARK H1/167 & I1/167 N/A PLAT NO. or L/F GRID NO. ZONING TAX MAP NO. | ELEC. DIST. CENSUS TRAC 5338 606901 DRAWING NO. **EROSION AND SEDIMENT CONTROL PLAN** NOTES AND SPECIFICATIONS

This development plan is approved for soil erosion and sediment control by t HOWARD SOIL CONSERVATION DISTRICT.

' I/We certify that all development and construction will be done according to

this plan and that any responsible personnel involved in the construction project will have a Certificate of Attendance at a Department of the Environment

approved Training Program for the Control of Sediment and Erosion before beginning the project. I also authorize periodic on-site inspection by the Howard Soil Conservation District"

"I certify that this plan for erosion and sediment control represents a practica and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District"

APPROVED: DEPARTMENT OF PLANNING AND ZONING

EVELOPER'S CERTIFICATE

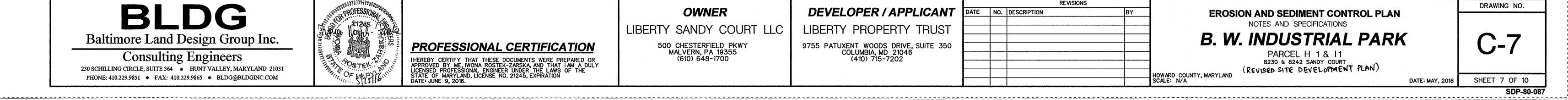
ENGINEER'S CERTIFICATE

Iwona Rostek-Zarska

Benjamin O'Neil, Vice President & City Manager

Baltimore Land Design Group Inc.

Consulting Engineers 230 SCHILLING CIRCLE, SUITE 364 • HUNT VALLEY, MARYLAND 21031 PHONE: 410.229.9851 • FAX: 410.229.9865 • BLDG@BLDGINC.COM



PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, IWONA ROSTEK-ZARSKA, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21245, EXPIRATION

OWNER LIBERTY SANDY COURT LLC

LIBERTY PROPERTY TRUST

DATE NO. DESCRIPTION

. W. INDUSTRIAL PARK

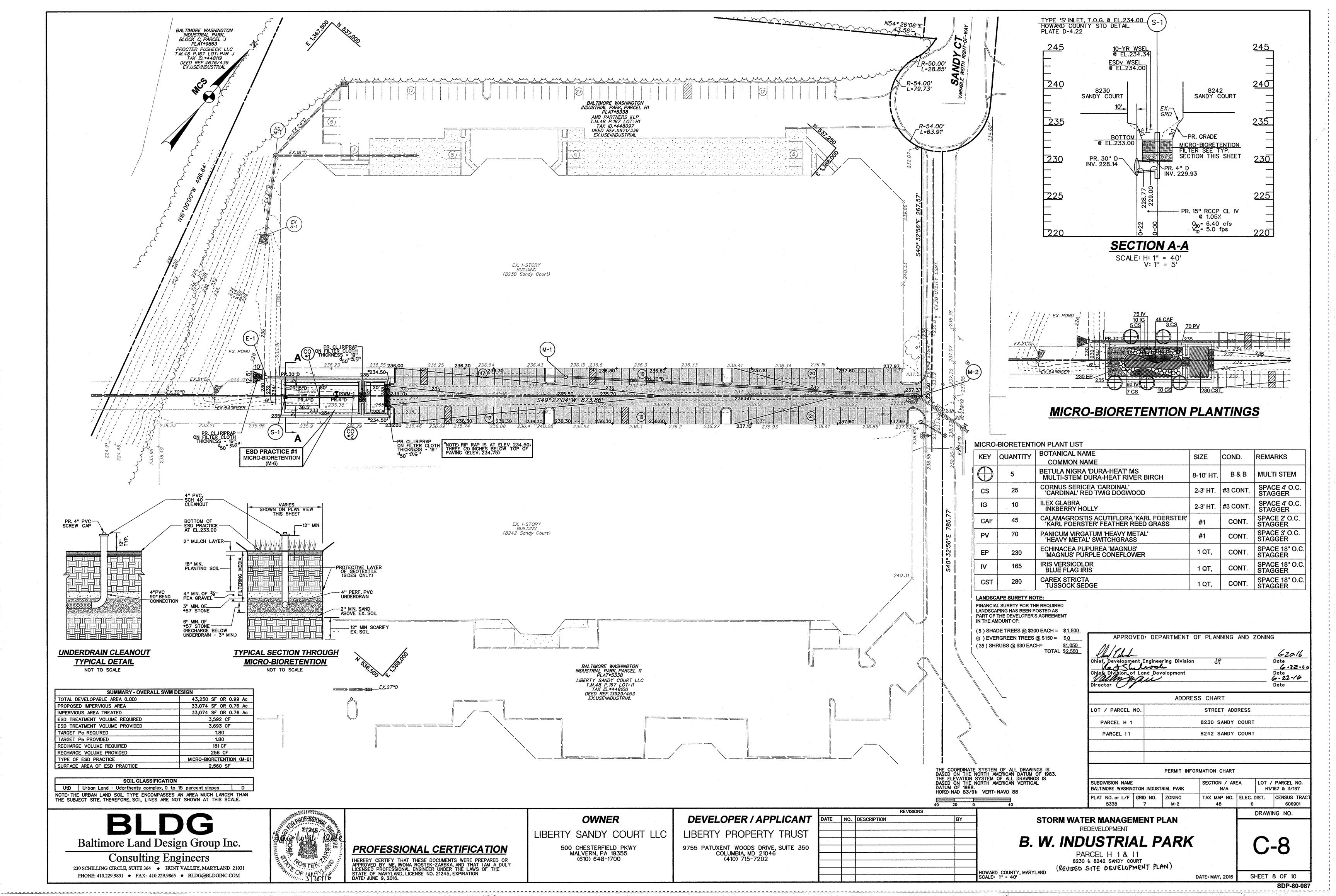
PARCEL H 1 & I1 8230 & 8242 SANDY COURT (REVISED SITE DEVELOPMENT PLAN)

DATE: MAY, 2016

SHEET 7 OF 10 SDP-80-087

Date

5 25/16



CONSTRUCTION SPECIFICATIONS

B.4.C Specifications for Micro-Bioretention. Rain Gardens, Landscape Infiltration & Infiltration Berms

1. Material Specifications: The allowable materials to be used in these practices are detailed in Table B.4.1.

- 2. Filtering Media or Planting Soil: The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretention practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.
- The planting soil shall be tested and shall meet the following criteria:
- Soil Component Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
 Organic Content Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy sand (60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%),
- and compost (40%).

 Clay Content Media shall have a clay content of less than 5%.

 pH Range Should be between 5.5 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil

- 3. Compaction: It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.
- Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsciler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade. When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

- 4. Plant Material: Recommended plant material for micro-bioretention practices can be found in Appendix A, Section A.2.3 of the "2000 Maryland Stormwater Design Manual Volumes 1& II".
- 5. Plant Installation: Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch

Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so $\frac{1}{8}$ th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications. The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains: should meet the following criteria:

Pipe- Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTMF 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC

Perforations - If perforated pipe is used, perforations should be $\frac{3}{8}$ " diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a $\frac{1}{4}$ " (No. 4 or 4x4) galvanized

Gravel - The gravellayer (No. 57 stone preferred) shall be at least 3" thick above and below the

The main collector pipe shall be at a minimum 0.5% slope.

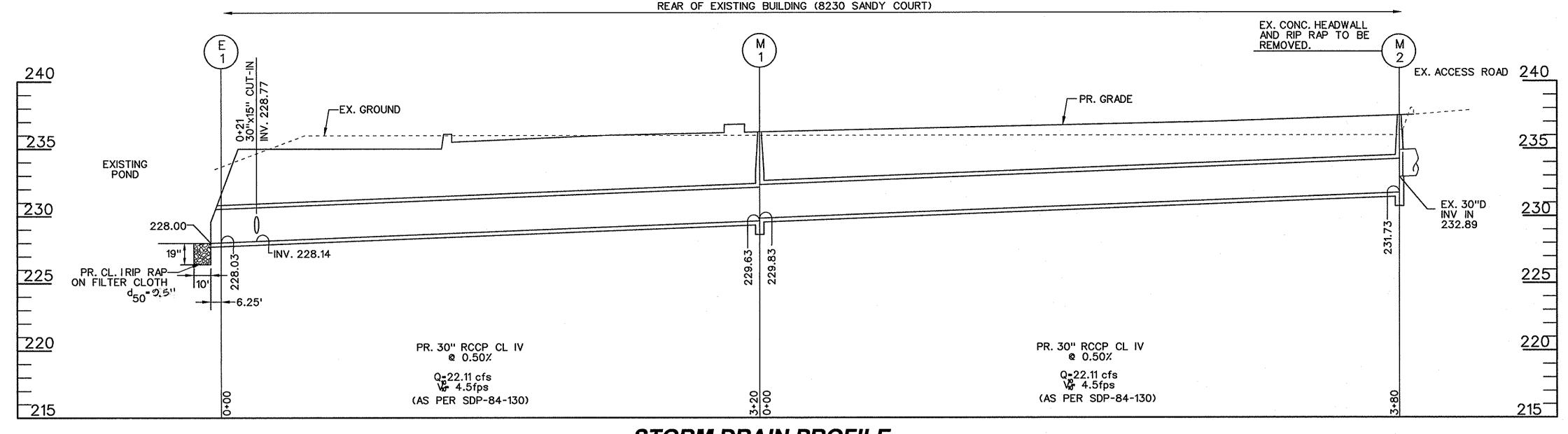
A rigid, non-perforated observation well-must be provided (one per every 1,000 square feet) to provide a clean-out port and monitor performance of the filter.

A 4" layer of pea gravel (1/8" to $\frac{3}{6}$ " stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".

The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet

7. Miscellaneous: These practices may not be constructed until all contributing drainage area has been

| Materials Specification | ons for Micro-Bioretention | , Rain Gardens | & Landscape Infiltration |
|---|---|---|---|
| MATERIAL | SPECIFICATION | SIZE | NOTES |
| Plantings | See Appendix A, Table A.4 | n/a | plantings are site-specific |
| Planting soil [2' to 4' deep] | loamy sand (60 - 65%) & compost (35 - 40%) or sandy loam (30%), coarse sand (30%) & compost (40%) | n/a | USDA soil types loamy sand or sandy loam; clay content < 5% |
| Organic content | Min. 10% by dry weight (ASTM D 2974) | | |
| Mulch | shredded hardwood | | aged 6 months, minimum; no pine or wood chips |
| Pea gravel diaphragm | pea gravel: ASTM-D-448 | NO. 8 OR NO. 9 (1/8" TO %") | |
| Curtain drain | ornamental stone: washed cobbles | stone: 2" to 5" | |
| Geotextile | | n/a | PE Type 1 nonwoven |
| Gravel (underdrains and infiltration berms) | AASHTO M-43 | NO. 57 OR NO. 6 AGGREGATE (3/8" to ¾") | |
| Underdrain piping | F 758, Type PS 28 or AASHTO M-278 | 4" to 6" rigid schedule 40 PVC or SDR35 | Slotted or perforated pipe; 3/8" perf. © 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth |
| Poured in place concrete (if required) | MSHA Mix No. 3: f'c= 3500 psi © 28 days, normal weight, air-entrained: reinforcing to meet ASTM-615-60 | n/a | on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland – design to include meeting ACI Code 350.R/89; vertical loading [H-10] or H-201; allowable horizontal loading (based on soil pressures); and analysis of potential cracking |
| Sand | AASHTO-M-6 or ASTM-C-33 | 0.02" to 0.04" | Sand substitutions such as Diabase and Graystone (AASHTO) •10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand. |



STORM DRAIN PROFILE

SCALE: H: 1" = 40'

CONSTRUCTION CRITERIA. INSPECTION. AND **MAINTENANCE CRITERIA**

M-6. Micro-Bioretention Construction Criteria:

- The following items should be addressed during construction of projects with micro-bioretention:
- Erosion and Sediment Control: Micro-bioretention practices should not be constructed until the contributing drainage area is stabilized. If this is impractical, runoff from disturbed areas shall be diverted away and no sediment control practices shall be used near the proposed location.
- Soil Compaction: Excavation should be conducted in dry conditions with equipment located outside of the practice to minimize bottom and sidewall compaction. Only lightweight, low ground-contact equipment should be used within micro-bioretention practices and the bottom scarified before installing underdrains and filtering media.
- 3. Underdrain Installation: Gravel for the underdrain system should be clean, washed, and free of fines. Underdrain pipes should be checked to ensure that both the material and perforations meet specifications. The upstream ends of the underdrain pipe should be capped prior to installation.
- 4. Filter Media Installation: Bioretention soils may be mixed on-site before placement. However, soils should not be placed under saturated conditions. The filter media should be placed and graded using excavators or backhoes operating adjacent to the practice and be placed in horizontal layers (12 inches per lift maximum). Proper compaction of the media will occur naturally. Spraying or sprinkling water on each lift until saturated may quicken settling times.
- 5. Landscape Installation: The optimum planting time is during the Fall. Spring planting is also acceptable but may require watering.

- Regular inspections shall be made during the following stages of construction: During excavation to subgrade and placement and backfill of underdrain systems.
- During placement of filter media.
 During construction of appurtenant conveyance.
 Upon completion of final grading and establishment of permanent stabilization.

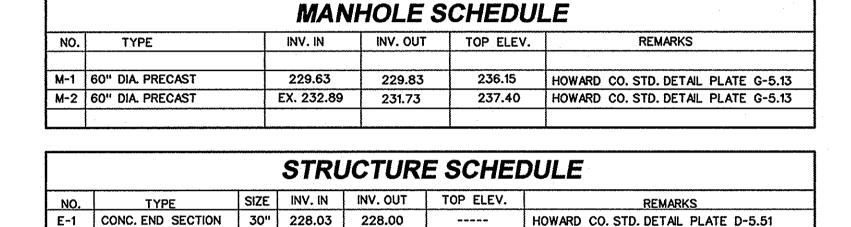
- The following items should be addressed to ensure proper maintenance and long-term performance
- 1. Privately owned practices shall have a maintenance plan and shall be protected by easement, deed restriction, ordinance, or other legal measures preventing its neglect, adverse alteration, and removal
- 2. The top few inches of filter media should be removed and replaced when water ponds for more than 48 hours. Silts and sediment should be removed from the surface of the filter bed when accumulation
- 3. Where practices are used to treat areas with higher concentrations of heavy metals (e.g., parking lots, roads), mulch should be replaced annually. Otherwise, the top two to three inches should be replaced
- 4. Occasional pruning and replacement of dead vegetation is necessary. If specific plants are not surviving, more appropriate species should be used. Watering may be required during prolonged dry periods.

OPERATION AND MAINTENANCE SCHEDULE

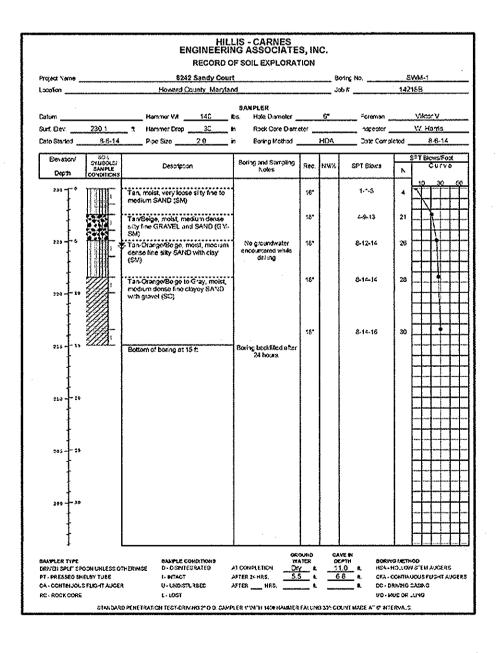
- 1. Forebay shall be inspected annually and after major storm events.
- 2. Check for woody vegetation on dam and within 25 feet of release structure.
- 3. Visible signs of erosion in the forebay as well as the riprap stones or gabion stone outlet area shall
- 4. Structural components of the forebay such as the dam, release structure and pipes shall be repaired upon detection of any failure. Grass should be maintained in good condition and be less than 12" in moving height
- 5. Debris and litter shall be removed during regular mowing operations.
- 6. Sediment shall be removed from forebay when 50% of storage loss has been achieved or when necessary for aesthetic reasons.

BIORETENTION

- 1. Annual maintenance of plant material, mulch layer, sand media and soil layer is required. Maintenance of mulch and soil is limited to correction areas of erosion or washout. Check for dewatering within 48 hours. When necessary, replace filter media per plan.
- Schedule of plant inspection will be twice a year in spring and fall. This inspection will include removal of dead, diseased and excessive vegetation considered beyond treatment. Replacement of all diseased trees, shrubs, deficient stakes and wires will be required.
- 3. Mulch layer shall be inspected each spring. Once every 2 to 3 years, remove previous mulch layer and apply new 2 to 3 inch layer.
- 4. Soil erosion and flow blockages to be addressed on an as needed basis with a minimum of once per month and after heavy storms inspections. Inspect clean outs and observation wells along with overflow inlets and outfall/exit pipes at least once a month and after heavy storms.



| | PIPE SCI | HEDULE | |
|------|-------------|--------------------|--|
| SIZE | TYPE | ESTIMATED QUANTITY | |
| 30" | RCCP CL. IV | 700 LF | |
| | | | |



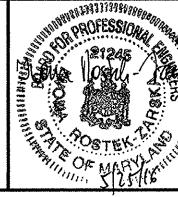
APPROVED: DEPARTMENT OF PLANNING AND ZONING 6.20.1L Date Keit & lulwood 6.22-16 hief, Division of Land Development 6.22-16 ADDRESS CHART STREET ADDRESS 8230 SANDY COURT PARCEL H 1 8242 SANDY COURT PARCEL 11 PERMIT INFORMATION CHART

THE COORDINATE SYSTEM OF ALL DRAWINGS IS BASED ON THE NORTH AMERICAN DATUM OF 1983. THE ELEVATION SYSTEM OF ALL DRAWINGS IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
HORZ: NAD 83/91; VERT: NAVD 88

LOT / PARCEL NO. SUBDIVISION NAME SECTION / AREA LOT / PARCEL NO. BALTIMORE WASHINGTON INDUSTRIAL PARK N/A H1/167 & I1/167 TAX MAP NO. [ELEC. DIST. PLAT NO. or L/F | GRID NO. | ZONING CENSUS TRAC

Baltimore Land Design Group Inc.

Consulting Engineers 230 SCHILLING CIRCLE, SUITE 364 • HUNT VALLEY, MARYLAND 21031 PHONE: 410.229.9851 • FAX: 410.229.9865 • BLDG@BLDGINC.COM



PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, IWONA ROSTEK-ZARSKA, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21245, EXPIRATION

OWNER LIBERTY SANDY COURT LLC

500 CHESTERFIELD PKWY MALVERN, PA 19355 (610) 648-1700

DEVELOPER / APPLICANT LIBERTY PROPERTY TRUST 9755 PATUXENT WOODS DRIVE, SUITE 350 COLUMBIA, MD 21046

(410) 715-7202

| DATE | NO. | DESCRIPTION | BY | STO |
|------|--------------|-------------|---------------------------------------|---|
| | | | · · · · · · · · · · · · · · · · · · · | NOTES |
| | 1 | | | B. W |
| | | | | |
| | | | | |
| | | | | HOWARD COUNTY, MARYLAND SCALE: AS SHOWN |

REVISIONS

STORM WATER MANAGEMENT PLAN NOTES, SPECIFICATIONS AND STORM DRAIN PROFILE

B. W. INDUSTRIAL PARK

8230 & 8242 SANDY COURT

(REVISED SITE DEVELOPMENT PLAN)

5338

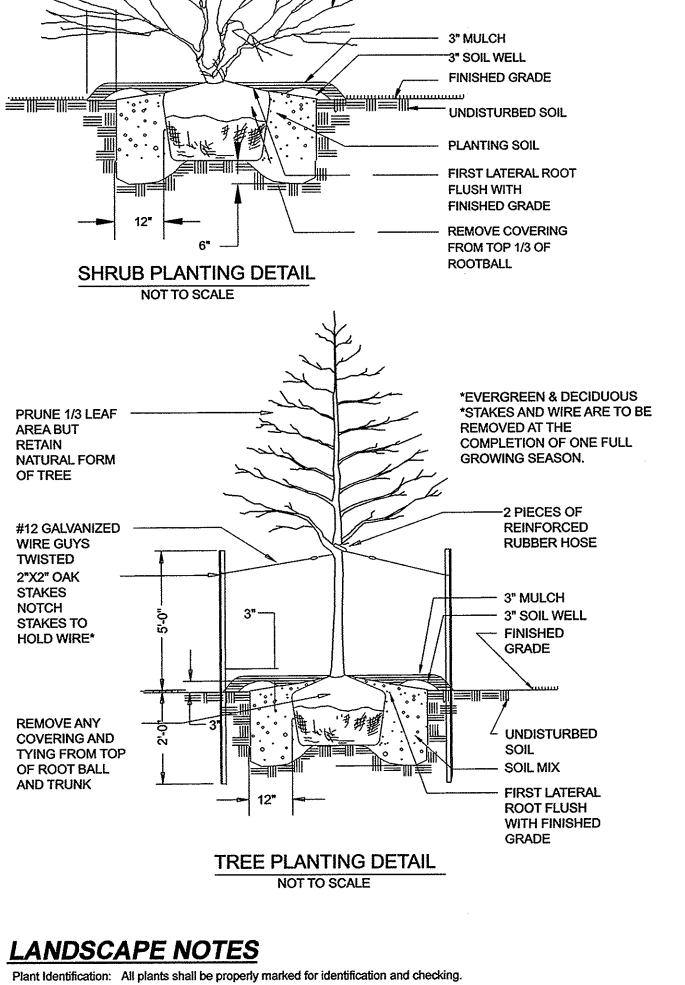
7

DRAWING NO.

DATE: MAY, 2016

SHEET 9 OF 10

606901



THIN DECIDUOUS 1/3

FORM.

OF INITIAL BRANCHING, RETAINING NATURAL

List of Plant Materials: The Contractor will verify plant quantities prior to bidding and any discrepancies shall be brought to the attention of the Landscape Architect. Contractor shall furnish and plant all plants required to complete the work as shown on the drawings. Substitutions shall not be made without the written approval of the abe Architect. This contract will be based on the blouer bidding, the availability of the required plant materials as specified on the Plant List. Plant Quantity: All shrubs shall be dense, heavy to the ground, and well grown, showing evidence of having been sheared regularly, and sound, free of plant disease or insect eggs. and shall have a healthy, normal root system. Plants shall be nursery grown. Plants shall not be pruned prior to delivery. The shape of the plant shall in general conform to its natural growth proportions unless otherwise specified. All plants including container grown shall conform to American Standard for Nursery Stock (ANSI z60.1, latest edition), and shall have a we'l-shaped, heavy branch structure for the species. Evergreen trees are to have an internode no greater than 24" and shall be uniformly well-shaped. All plant sizes shall

average at least the middle of the range given in the plant list. Plant Spacing: Plant spacing is to scale on the plan or as shown on the plant list. Soil Mix: Soil mix will be 2/3 existing soil and 1/3 leaf mold or equal organic material, thoroughly mixed and homogenized.

Ball Size: The ball size shall conform to the American Association of Nurserymen's publication entitled American Standard for Nursery Stock, ANSI z60.1, latest edition. Excavation: Holes for all plants shall be 18" larger in diameter than size of ball or container and shall have vertical sides. Hedges shall be planted in a trench 12" wider than ball diameter. Beds for mass planting shall be entirely rototilled to a depth of 8" and shall be 18" beyond the average outside edge of plant balls. A 2" layer of organic material (i.e., leaf mold) will be incorporated into plant beds by tilling again.

Planting: Backfilling shall be done with soil mix, reasonably free of stones, subsoil, clay, lumps, stumps, roots, weeds, bermuda grass, litter, toxic substances, or any other material which may be harmful to plant growth or hinder grading, planting, or maintenance operations. Should any unforeseen or unsuitable planting conditions arise, such as faulty soil drainage or chemical residues, they should be called to the attention of the Landscape Architect and Owner for adjustments before planting. The plant shall be set plumb and straight and shall be staked at the time of planting. Backfill shall be well worked about the roots and settled by watering. Plants will be planted higher than surrounding grade. Shrubs will be 1" higher and trees will be 3" higher. Remove rope from around tree trunks and lay back burlap from top of all B&B material. Nylon or vinyl rope and/or burlap will be completely removed from all plant material prior to planting.

Transplanting Trees by Tree Machines: Trees shall be moved by machines that provide a minimum of 9" per 1" of tree caliper. Holes are to be dug by the same size machine as the one transporting the plant. The plant material shall be transplanted in approximately the same growing condition as it is presently growing, in terms of soil type and moisture

content. Fertilize and guy as described in these plans and specifications. Cultivation: All trenches and shrub beds shall be cultivated, edged and mulched to a depth of 3" with shredded bark. The area around isolated plants shall be mulched to at least 6" greater diameter than that of the hole. Plant beds adjacent to buildings shall be mulched to the building wall.

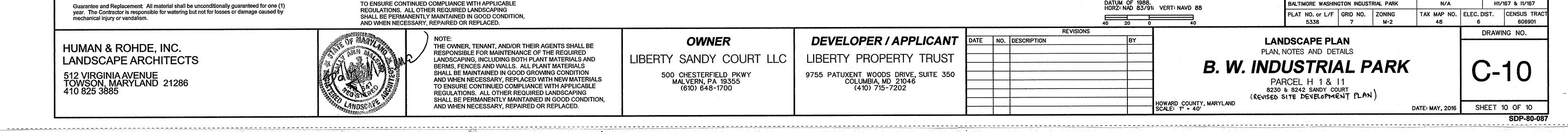
Maintenance: The Contractor shall be responsible during the contract and up to the time of acceptance for keeping the planting and work incidental thereto in good condition, by replanting, plant replacement, watering, weeding, cultivating, pruning and spraying, restaking and cleaning up and by performing all other necessary operations of care for promotion of good plant growth so that all work is in satisfactory condition at time of acceptance, at no additional cost to the Owner.

Fertilizer: Fertilizer shall be a slow release type contained in polyethylene perforated bags with micropore holes for controlled feeding, such as Easy Grow as manufactured by Specialty Fertilizer, Inc., Box 355, Suffern, New York 10901, or approved equal. The bags shall contain 1 ounce of soluble fertilizer analysis 16-18-16 per unit to last three (3) years and shall be applied during planting as recommended by the manufacturer. If fertilizer packets are not used, the Contractor shall apply granular fertilizer to the soil mix with 10-6-4 analysis, 50% organic, at the following rates: Trees @ 2-3 lbs. per caliper inch; Shrub Beds @ 3-5 lbs. per 100 sq. ft.; and Groundcover Beds @ 2-3 lbs.

Groundcover: All areas of groundcover shall be rototilled to a depth of 6". Apply 2" of organic material and rototill until thoroughly mixed. Apply fertilizer as stated above.

Guarantee and Replacement: All material shall be unconditionally guaranteed for one (1) year. The Contractor is responsible for watering but not for losses or damage caused by mechanical injury or vandalism.

HUMAN & ROHDE, INC. LANDSCAPE ARCHITECTS 512 VIRGINIA AVENUE TOWSON, MARYLAND 21286



THE OWNER, TENANT, AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING, INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION. AND WHEN NECESSARY, REPAIRED OR REPLACED.

OWNER LIBERTY SANDY COURT LLC

500 CHESTERFIELD PKWY MALVERN, PA 19355 (610) 648-1700

DEVELOPER / APPLICANT LIBERTY PROPERTY TRUST

9755 PATUXENT WOODS DRIVE, SUITE 350 COLUMBIA, MD 21046 (410) 715-7202

REVISIONS DATE NO. DESCRIPTION HOWARD COUNTY, MARYLAND SCALE: 1" - 40'

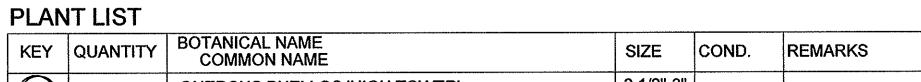
THE COORDINATE SYSTEM OF ALL DRAWINGS IS BASED ON THE NORTH AMERICAN DATUM OF 1983. THE ELEVATION SYSTEM OF ALL DRAWINGS IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

HORZ: NAD 83/91; VERT: NAVD 88

LANDSCAPE PLAN

8230 & 8242 SANDY COURT (REVISED SITE DEVELOPMENT PLAN)

DATE: MAY, 2016



ESD PRACTICE #1

MICRO-BIORETENTION

SEE SHEET C-8 FOR

PLANTINGS AND PLANT LIST

BLOCK C, PARCEL PLAT • 9863

PROCTER PUSHECK LLC T.M.48 P.167 LOT: PAR J TAX ID. •448119

DEED REF.4676/439 EX.USE:INDUSTRIAL

QUERCUS PHELLOS 'HIGH TOWER' B&B AS SHOWN 'HIGH TOWER' WILLOW OAK

PLANTING NOTES:

and the Landscape Manua

. This Plan is for planting purposes only. 2. This Plan has been prepared in accordance with the provisions of section 16.124 of the Howard County Code

3. All plant material shall be nursery grown and shall conform to American Association of Nurserymen latest standards. Plant installation must conform to the minimum standards cited in the latest edition of the "LANDSCAPE SPECIFICATION GUIDELINES" by the Landscape Contractor's Association.

4. Contractor is to notify Miss Utility a minimum of 72 hours prior to digging. Telephone 1-800-257-7777

5. The Landscape Architect is to be notified 48 hours before planting begins. The location of all plant material is to be approved in field by the Landscape Architect.

AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS

6. No tree or shrub planting pits are to be left open or unattended.

7. Shrubs are to be grouped into mulched beds. Beds are to be edged and the grass is to be killed or removed prior to mulching.

8. Sod is to be: Kentucky blue/tall fescue mix

9. "At the time of installment, all shrubs and other plantings herewith listed and approved for this site, shall be of the proper height requirements in accordance with the Howard County Landscape Manual. In addition, no substitutions or relocation of required plantings may be made without prior review and approval from the Department of Planning and Zoning. Any deviation from this approved Landscape plan may result in denial or delay in the release of landscape surety until such time as all required materials are planted and/or revisions are made to applicable plans and certificates."

DEVELOPER'S / BUILDER'S CERTIFICATE

I / We certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Howard County Landscape Manual.

I / We further certify that upon completion, a Certification of Landscape installation, accompanied by an executed one year guarantee of plant materials, will be submitted to

the Department of Planning and Zoning.

BENJAMIN O'NEIL VICE PRESIDENT & CITY MANAGER THE OWNER, TENANT, AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING, INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION

LIBERTY SANDY COURT LLC T.M.48 P.167 LOT: I1 TAX ID. •448100 DEED REF.13929/453 EX.USE:INDUSTRIAL EX. 1-STORY BUILDING (8242 Sandy Court)

EX. 1-STORY BUILDING

(8230 Sandy Court)

BALTIMORE WASHINGTON INDUSTRIAL PARK, PARCEL IN PLAT*5338

EXISTING ISLAND & TREES

MAPLE & HAWTHORNS)

SCHEDULE B: PARKING LOT INTERNAL LANDSCAPING | 11 (SDP-82-087) 138/191 H1 (SDP 82-060) 80 / 136 Number of Parking Spaces Existing / Proposed MORE THAN 50% = 7 PU'S | LESS THAN 50% = 3 PU'S Number of Trees Required (<50%/>50%)) **Number of Trees Provided** 7-3 EX./ 4 PROPOSED Shade Trees Other Trees (2:1 substitution) Internal Islands Required EX. 4160 SF/200 = 20.8 Internal Islands Provided (Min. 200 Sf.) 3 ISLANDS PROPOSED 3

LANDSCAPE SURETY NOTE: FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE GRADING PERMIT IN THE AMOUNT OF:

(8) SHADE TREES @ \$300 EACH = \$2,400 (0) EVERGREEN TREES @ \$150 = \$0

(0) SHRUBS @ \$30 EACH= TOTAL \$2,400 APPROVED: DEPARTMENT OF PLANNING AND ZONING 6-20-16 9-22-16 6.22.16 ADDRESS CHART

LOT / PARCEL NO. STREET ADDRESS 8230 SANDY COURT PARCEL H 1 8242 SANDY COURT PARCEL 11

> PERMIT INFORMATION CHART SECTION / AREA

LOT / PARCEL NO. SUBDIVISION NAME BALTIMORE WASHINGTON INDUSTRIAL PARK H1/167 & I1/167 CENSUS TRAC PLAT NO. or L/F | GRID NO. | ZONING TAX MAP NO. | ELEC. DIST. 5338 7 606901 DRAWING NO.

PLAN, NOTES AND DETAILS

B. W. INDUSTRIAL PARK

mmmmmmmm.

_ 234 _

L=28.85'

EXISTING WOODS

IAL PARK, PARCEL PLAT•5338

AMB PARTNERS ILP T.M.48 P.167 LOT: H TAX ID. •448097 DEED REF. 5971/336 EX. USE: INDUSTRIAL

SHEET 10 OF 10