



## **ATTACHMENT J:**

### **POST-CONSTRUCTION STANDARD DETAILS, SPECIFICATIONS, AND GUIDANCE**

The details in this Attachment J are for VTA facilities only. Where there are conflicts with City Standard details or other VTA details, ask VTA MS4 Program Manager and VTA Project Manager for direction

For VTA Facilities, designers should note that industry best practices for storm water design should be used. These include, but are not limited to, the following:

#### NOTES:

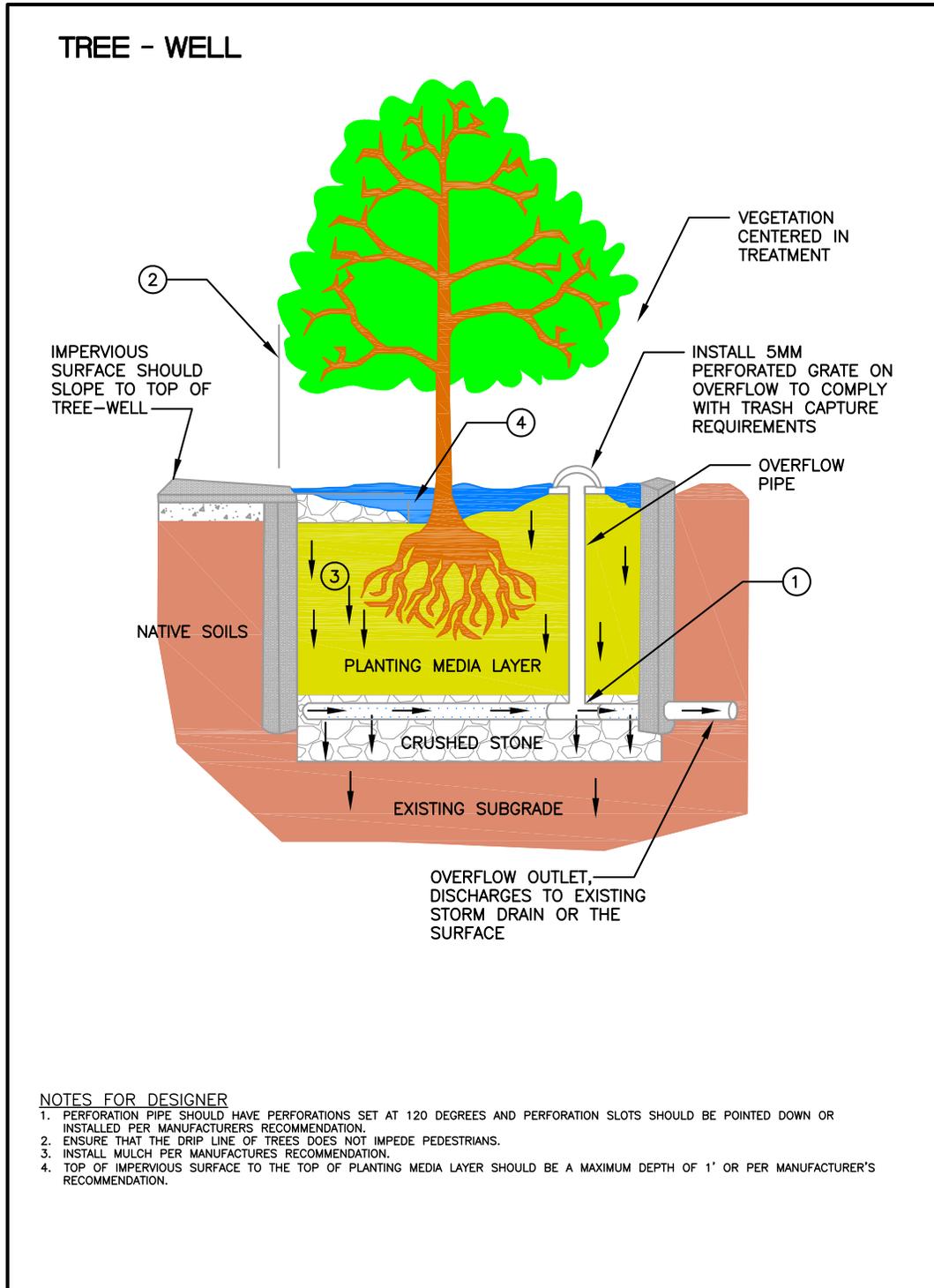
1. OVERFLOW DEVICE: INSTALL 5MM PERFORATED GRATE ON OVERFLOW TO COMPLY WITH TRASH CAPTURE REQUIREMENTS. ENSURE OVERFLOW ALLOWS FOR A MIN. OF 6" OF PONDING.
2. PERFORATION PIPE SHOULD HAVE PERFORATIONS SET AT 120 DEGREES AND PERFORATION SLOTS SHOULD BE POINTED DOWN. AT LEAST 2" OF DRAIN ROCK SHOULD COVER THE UNDERDRAIN. THE UNDERDRAIN SHOULD BE PLACED AT A MINIMUM 0.5% SLOPE TO THE STORM DRAIN OR DISCHARGE POINT (UNLESS A FLATTER SLOPE IS ALLOWED BASED UPON SITE-SPECIFIC CONDITIONS).



3. ENERGY DISSIPATER: INSTALL ROCK WITH FILTER FABRIC BENEATH IT (OR EQUIVALENT) AT ALL OPENINGS TO BIORETENTION BASINS. ROCK SHOULD EXTEND PAST OPENING AND DISSIPATE ENERGY SUFFICIENTLY THAT NO EROSION OCCURS IN BIORETENTION SOIL MEDIA.
4. ENSURE THAT VEHICLE STOP/CURB DOES NOT IMPEDE FLOW OF WATER THROUGH THE CURB CUT TO THE BASIN. IF BASIN HAS SURROUNDING CURB, THE DEPTH FROM THE TOP OF THE CURB TO THE MEDIA SHOULD NOT EXCEED HEIGHT OF OVERFLOW BY MORE THAN 2". IF EXCEEDANCE OCCURS, CONSIDER SAFETY MEASURES (I.E . RAILING)
5. SIZING: 4% OF TRIBUTARY DRAINAGE OR 4% OF IMPERVOUS AREAS MAY BE USED AS A GUIDELINE TO SIZE BIORETENTION BASINS
6. CONSIDER IRRIGATION: MINIMIZE OVERSPRAY ENTERING STORM DRAINAGE OVERFLOWS. CONSIDER USE OF DRIP SYSTEM.
7. CONSIDER GROUNDWATER/WATER TABLE IMPACTS EARLY IN DESIGN.
8. NOTE: BASINS THAT DO NOT POND WATER, AND/OR ALLOW "SHORT CIRCUITING" OF G:FLOW DIRECTLY TO THE UNDERDRAIN DUE TO EXCESSIVELY LONG/THIN DIMENSIONS ARE NOT ACCEPTABLE DESIGNS. BASIN DIMENSIONS MUST ALLOW FOR INTENDED PONDING. DESIGNERS MAY BE REQUIRED TO DEMONSTRATE THAT PONDING WILL OCCUR USING FLOW MODELING.
9. PLANTS: SEE VTA'S PLANTING GUIDELINES. DO NOT INSTALL TREES IN BASIN IF IMPERMEABLE LINER IS PRESENT.



**ATTACHMENT J:**  
J2: POST-CONSTRUCTION BMP DESIGN  
GUIDANCE



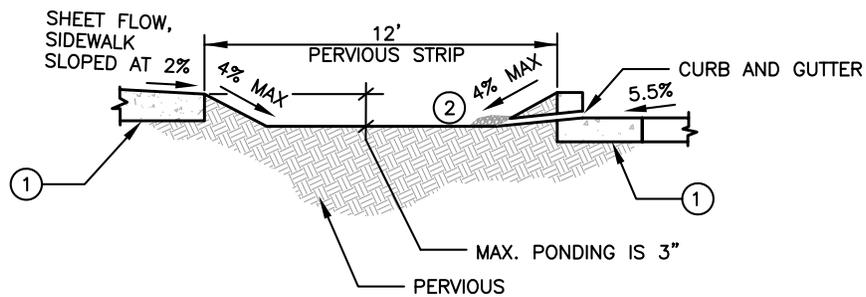
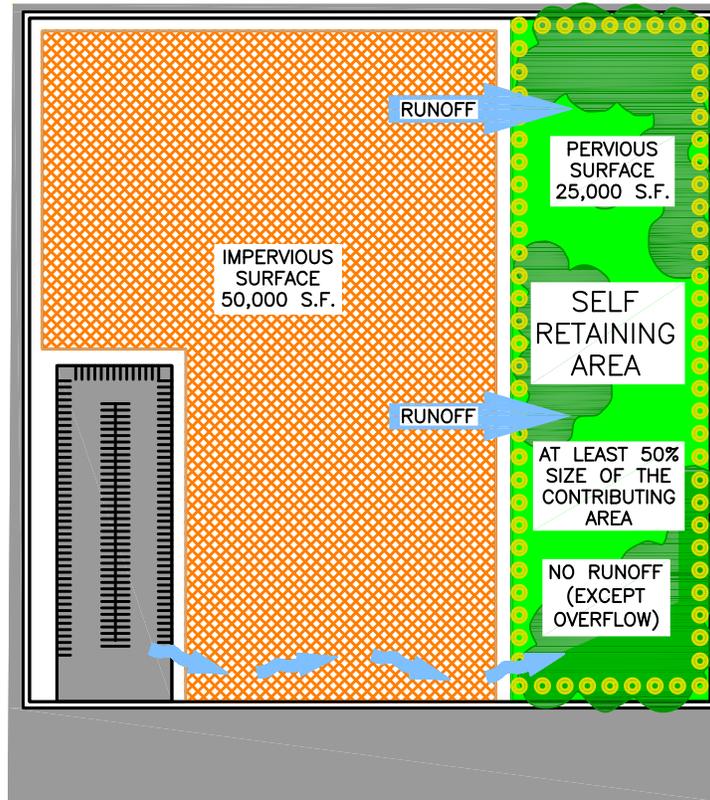


## SELF - RETAINING AREAS

### NOTES FOR DESIGNERS:

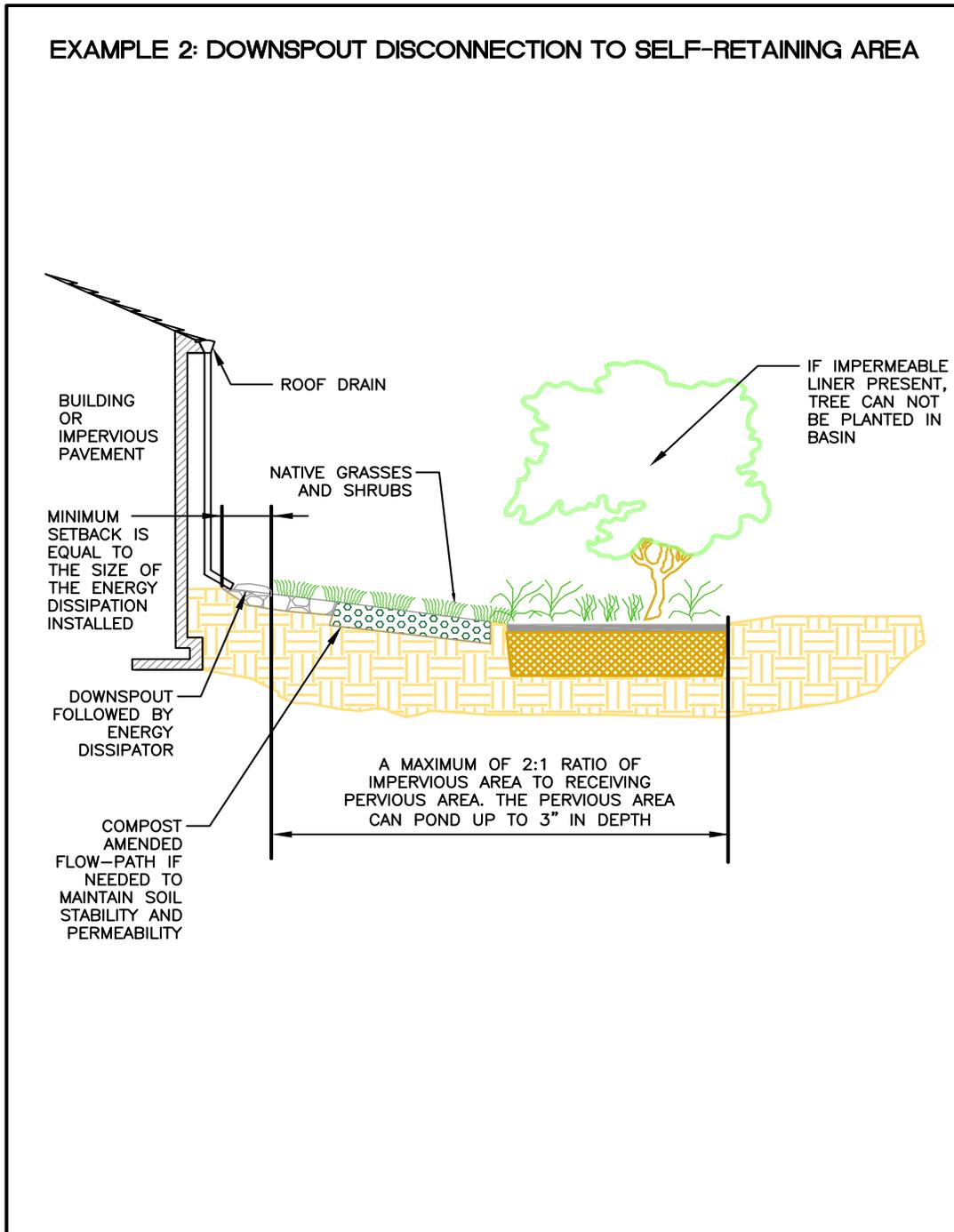
1. LANDSCAPED SELF-RETAINING AREAS ARE DESIGNED AS CONCAVE AREAS THAT WILL RETAIN THE FIRST ONE-INCH OF RAINFALL WITHOUT PRODUCING ANY RUNOFF (ALTHOUGH SELF-RETAINING AREAS DO NOT NEED TO BE HYDRAULICALLY SIZED LIKE A TREATMENT MEASURE, ONE-INCH DEPTH ROUGHLY CORRESPONDS TO THE MS4 NUMERIC VOLUME-BASED AND FLOW-BASED SIZING CRITERIA).
2. PERVIOUS PAVING OR ARTIFICIAL TURF DESIGNED AS A SELF-RETAINING AREA MUST PROVIDE ADEQUATE STORAGE IN THE VOID SPACE OF THE GRAVEL BASE LAYER TO ACCOMMODATE THE VOLUME OF RUNOFF SPECIFIED IN THE MS4 PERMIT FOR BOTH THE AREA OF PERVIOUS PAVING AND THE IMPERVIOUS SURFACES THAT CONTRIBUTE RUNOFF. THE AREA MUST ALLOW FOR INFILTRATION OF WATER AND NOT BE LINED WITH IMPERVIOUS MATERIALS OR CONSTRUCTED OVER AN IMPERVIOUS BARRIER.
3. RUNOFF MAY ENTER THE SELF-RETAINING AREA AS SHEET FLOW, OR IT MAY BE PIPED FROM A ROOF OR AREA OF IMPERVIOUS PAVEMENT (I.E. DOWNSPOUT DISCONNECTION).
4. THE SELF-RETAINING AREA MUST DRAIN COMPLETELY WITHIN 5 DAYS UNDER SATURATED CONDITIONS.
5. A **MAXIMUM 2:1 RATIO OF IMPERVIOUS AREA TO THE RECEIVING PERVIOUS AREA** IS ACCEPTABLE, WHERE THE PERVIOUS AREA CAN POND UP TO 3 INCHES IN DEPTH (I.E., 1 INCH OF DEPTH ON THE PERVIOUS AREA PLUS 1 INCH FROM EACH OF THE 2 UNITS OF IMPERVIOUS AREA).
6. DRAINAGE FROM SELF-RETAINING AREAS (FOR AMOUNTS OF RUNOFF GREATER THAN THE FIRST ONE-INCH) MUST FLOW TO OFF-SITE STREETS OR STORM DRAINS WITHOUT FLOWING ONTO PAVED AREAS WITHIN THE SITE.
7. IF OVERFLOW DRAINS OR INLETS TO THE STORM DRAIN SYSTEM ARE INSTALLED WITHIN A LANDSCAPED SELF-RETAINING AREA, SET THEM AT A MAXIMUM ELEVATION OF 3 INCHES ABOVE THE LOW POINT TO ALLOW PONDING. THE OVERFLOW DRAIN, OR STORM DRAIN INLET ELEVATION, SHOULD BE HIGH ENOUGH TO ALLOW PONDING THROUGHOUT THE ENTIRE SURFACE OF THE SELF-RETAINING AREA.
8. ANY IMPERVIOUS PAVEMENT WITHIN THE SELF-RETAINING AREA (E.G., A SIDEWALK THROUGH A LANDSCAPED AREA) CANNOT EXCEED 5 PERCENT OF THE TOTAL SELF-RETAINING AREA.
9. AMENDED SOILS, VEGETATION, AND IRRIGATION IN THE SELF-RETAINING AREA MAY BE NEEDED TO MAINTAIN SOIL STABILITY AND PERMEABILITY. HOWEVER, SPECIAL BIOTREATMENT SOILS ARE NOT REQUIRED.
10. SELF-RETAINING AREAS SHOULD BE PROTECTED FROM CONSTRUCTION TRAFFIC AND COMPACTION.
11. ENERGY DISSIPATOR: INSTALL ROCK WITH FILTER FABRIC BENEATH IT (OR EQUIVALENT) AT ALL OPENINGS TO THE PERVIOUS AREA THAT RECEIVE CONCENTRATED FLOWS. ROCK SHOULD EXTEND PAST OPENING.

**EXAMPLE 1: SHEET FLOW TO SELF - RETAINING AREA**

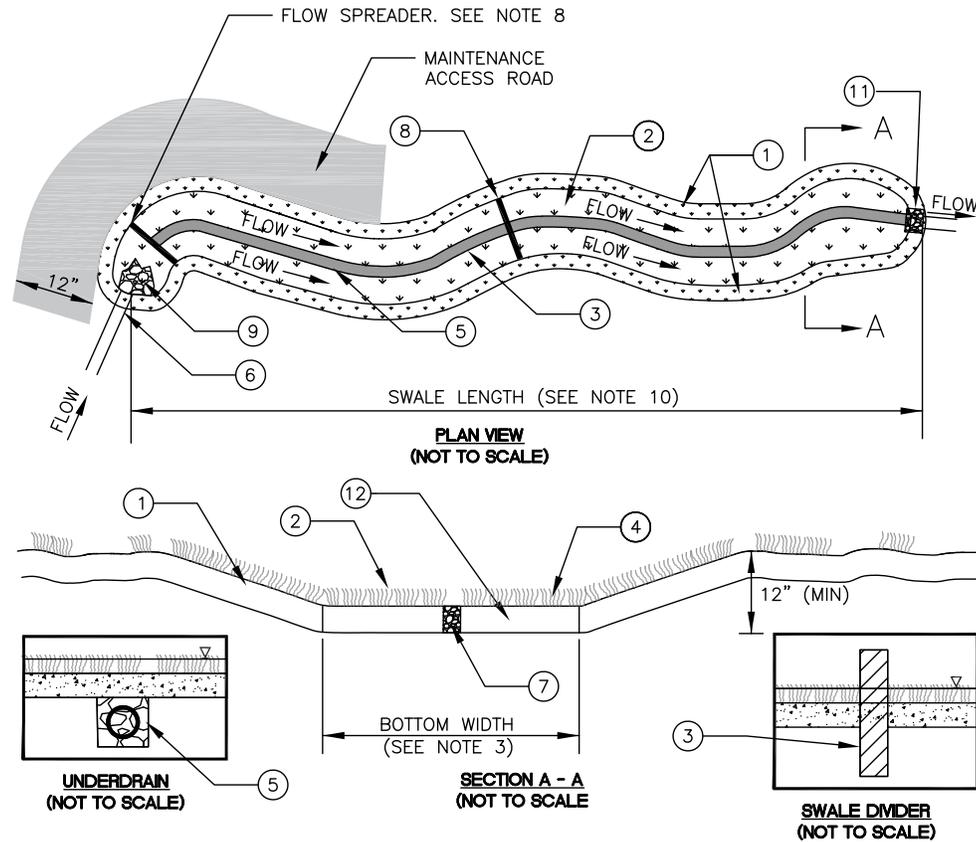


**NOTES FOR DESIGNER**

1. MAXIMUM 2:1 RATIO OF CONTRIBUTING IMPERVIOUS AREA TO THE RECEIVING PERVIOUS AREA.
2. DISSIPATION BLOCK OR FABRIC WITH ROCKS.



**EXAMPLE 3: VEGETATED SWALE**



**NOTES FOR DESIGNER**

1. VEGETATED SIDE SLOPES AT 2H:1V MAX SLOPE. MOWED TURF SWALES AT 3H:1V MAX.
2. GRASS HEIGHT 4"-6" PLANTS: SEE VTA'S LANDSCAPE CRITERIA MANUAL. DO NOT INSTALL TREES IF LINER IS PRESENT.
3. SWALE DIVIDER REQUIRED FOR BOTTOM WIDTHS > 10'. MINIMUM REQUIRED BOTTOM WIDTH IS 2" EXCLUDING WIDTH OF LOW FLOW CHANNEL. MAXIMUM BOTTOM WIDTH WITH DIVIDER IS 16'.
4. DEPTH OF FLOW FOR WATER QUALITY TREATMENT MUST NOT EXCEED 2/3 OF THE GRASS HEIGHT AND NOT GREATER THAN 4" (INFREQUENTLY MOWED) OR 2" (FREQUENTLY MOWED).
5. 6" PERFORATED UNDERDRAIN IN 9" DEEP COURSE AGGREGATE BED CONNECTED TO STORM DRAIN REQUIRED FOR SLOPES <1.5%. PERFORATION PIPE SHOULD HAVE PERFORATIONS SET AT 120 DEGREES AND PERFORATION SLOTS SHOULD BE POINTED DOWN.
6. INLET PIPE WITH INLET PROTECTION.
7. IF NO UNDERDRAIN, LOW FLOW DRAIN SHALL EXTEND ENTIRE LENGTH OF SWALE AND SHALL HAVE A DEPTH OF 6" MINIMUM AND WIDTH NO MORE THAN 5% SWALE BOTTOM WIDTH. IF USED, ANCHORED PLATE FLOW SPREADER SHALL HAVE V-NOTCHES (MAXIMUM TOP WIDTH 5% OF SWALE WIDTH) OR HOLES TO ALLOW PREFERENTIAL EXIT OF LOW FLOWS.
8. INSTALL CHECK DAMS OR GRADE CONTROL STRUCTURES FOR SLOPES >6% AT 50' MAXIMUM SPACING TO ACHIEVE MAXIMUM EFFECTIVE LONGITUDINAL SLOPE OF 6% SPREADERS MUST BE PROVIDED AT INLET AND AT BASE OF EACH CHECK DAM.
9. INSTALL ENERGY DISSIPATOR AT THE INLET. INSTALL ROCK WITH FILTER FABRIC BENEATH IT (OR EQUIVALENT) AT ALL OPENINGS TO THE BASIN. ROCK SHOULD EXTEND PAST OPENING.
10. SWALE LENGTH SHALL BE 100' OR LENGTH REQUIRED TO PROVIDE 10 MINUTES RESIDENCE TIME, WHICH EVER IS GREATER. MAXIMUM 2:1 RATIO OF CONTRIBUTING IMPERVIOUS AREA TO THE RECEIVING PERVIOUS AREA.
11. INSTALL APPROPRIATE OUTLET STRUCTURE TO ACCOMMODATE LOW FLOW CHANNEL AND/OR UNDERDRAIN, IF PRESENT.
12. AMEND SOILS WITH 2" COMPOST TILLED INTO 6" OF NATIVE SOIL UNLESS SOIL ORGANIC CONTENT IS >10%.

