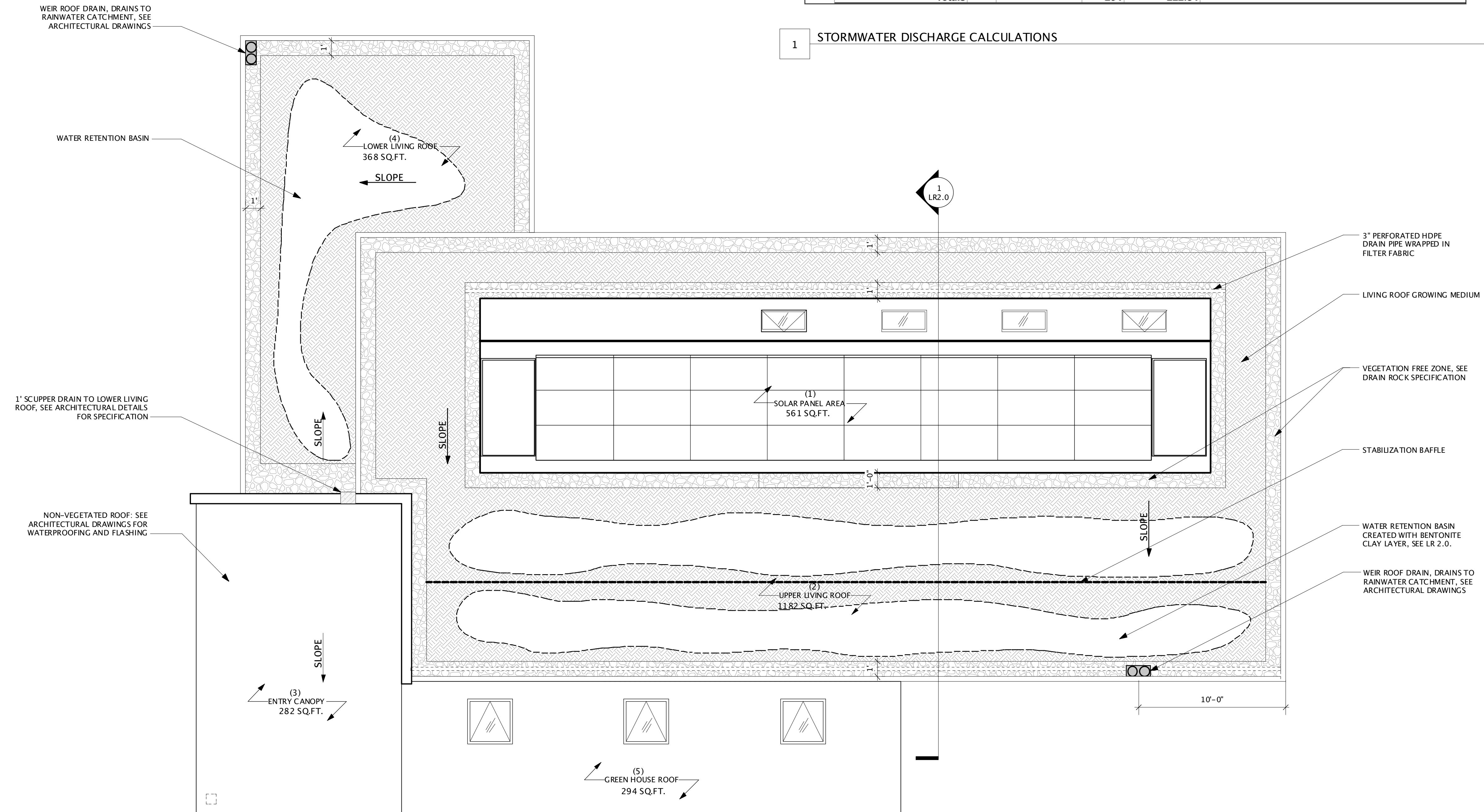


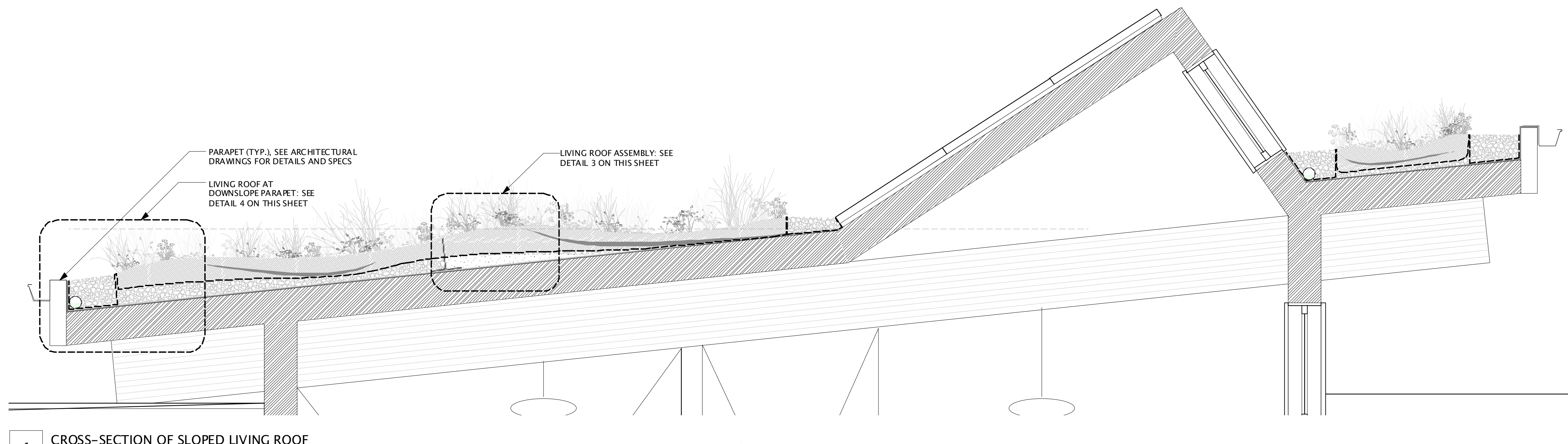
Design Storm Event: 100 year = 1.28"/hour					
	[C]	[I]	[A]	[Q]	
[C] Runoff Coefficient (%)					
[I] Storm Event Depth (feet)					
[A] Area (sq. ft)					
[Q] Discharge (Gal/hr)					
Roof Area	[C]	[I]	[A]	[Q] (Gal/hr)	Notes
Rainwater Catchment:					
1 Solar Panel Area	0.95	0.10666667	561	425.22	Impervious/No Infiltration - Drains to Upper Living Roof
2 Upper Living Roof	0.40	0.10666667	1,182	377.23	6-10" Water Retention/Growing Media - Drains to RWC
3 Entry Canopy	0.95	0.10666667	282	213.75	Impervious/No Infiltration - Drains to Lower Living Roof
4 Lower Living Roof	0.40	0.10666667	368	117.45	6-10" Water Retention/Growing Media - Drains to RWC
Totals			2,393	1,133.65	
Site Drainage:					
5 Greenhouse Roof	0.95	0.10666667	294	222.84	Impervious/No Infiltration - Drains to Site, See Civil
Totals			294	222.84	

1 STORMWATER DISCHARGE CALCULATIONS

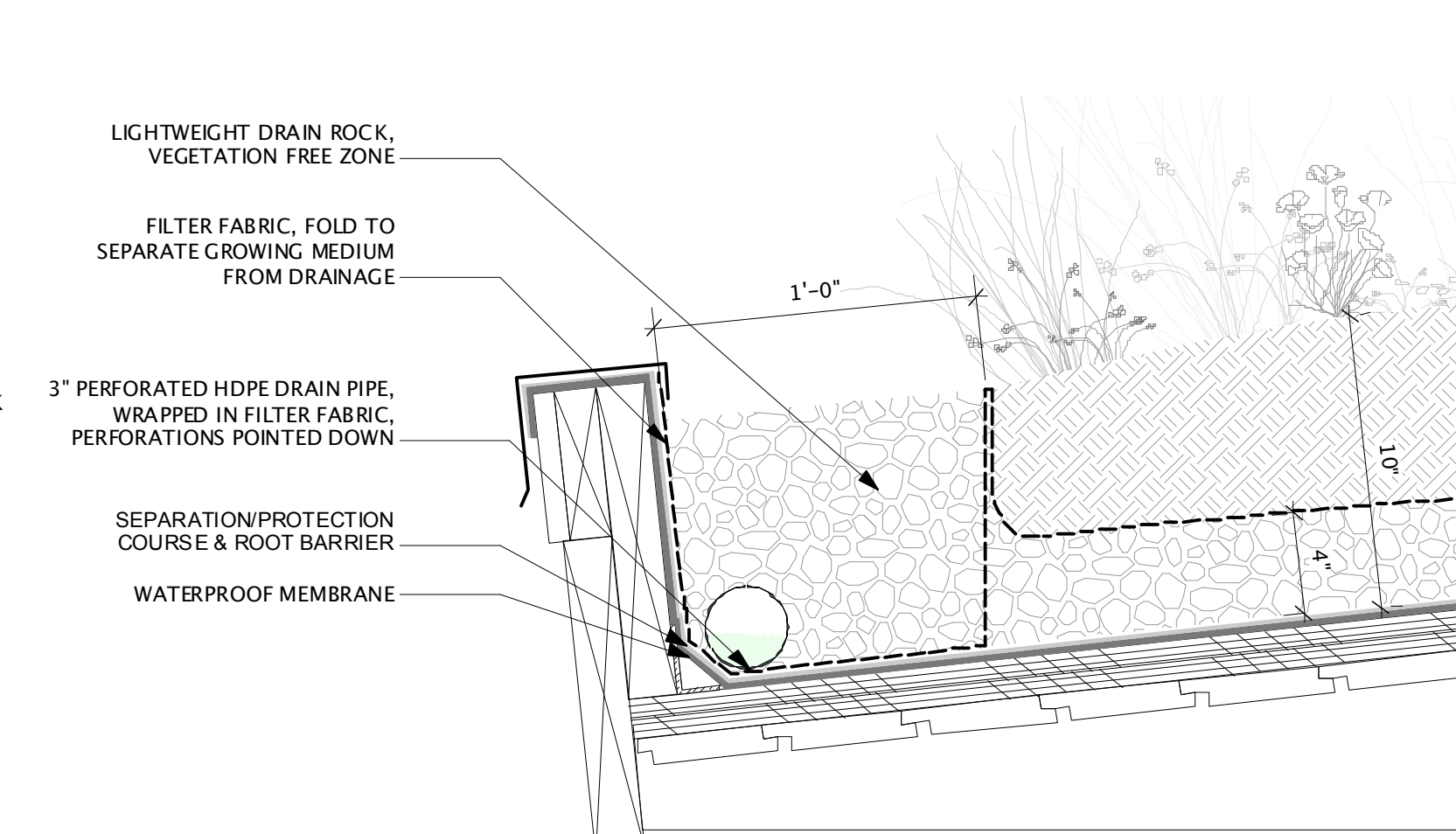
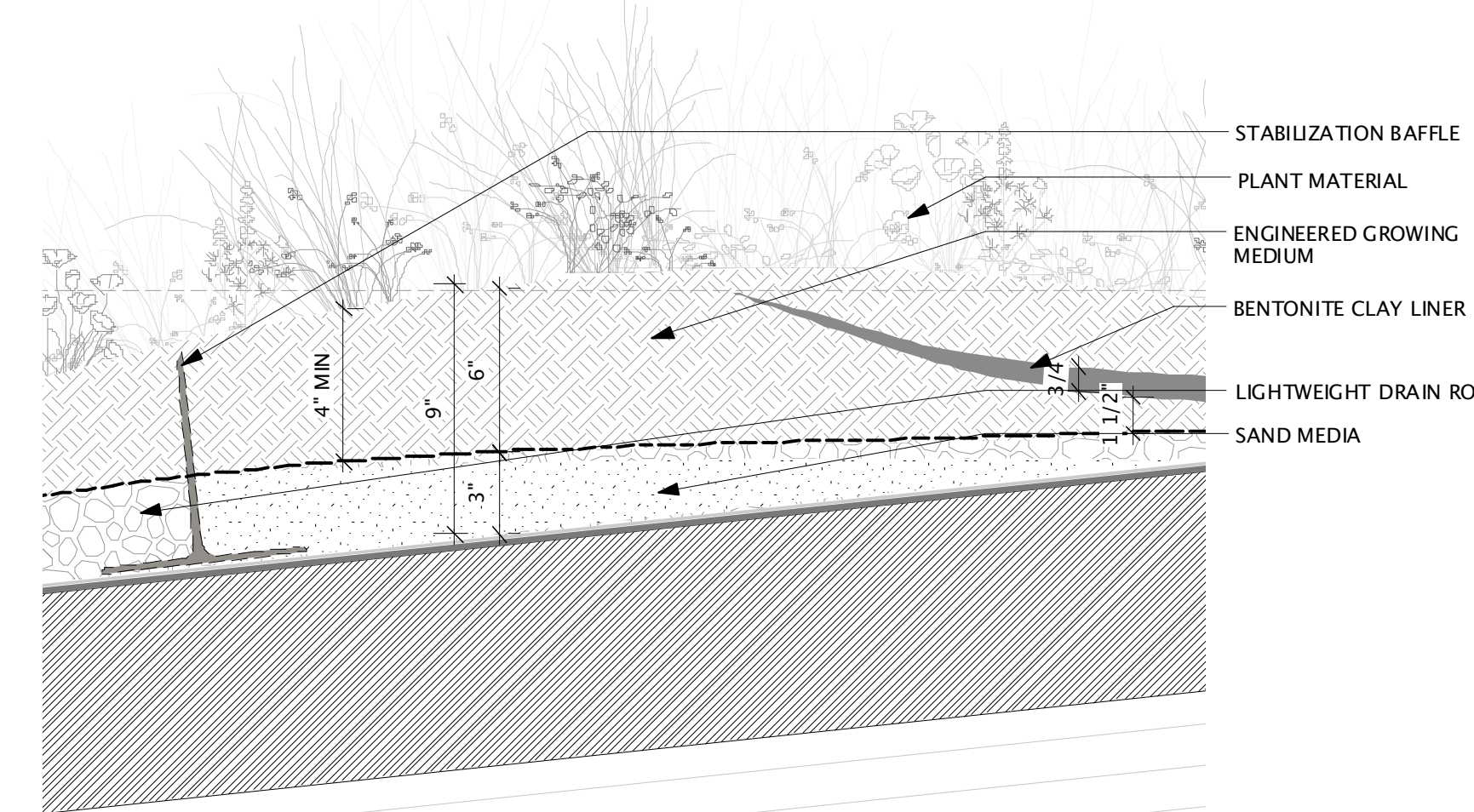
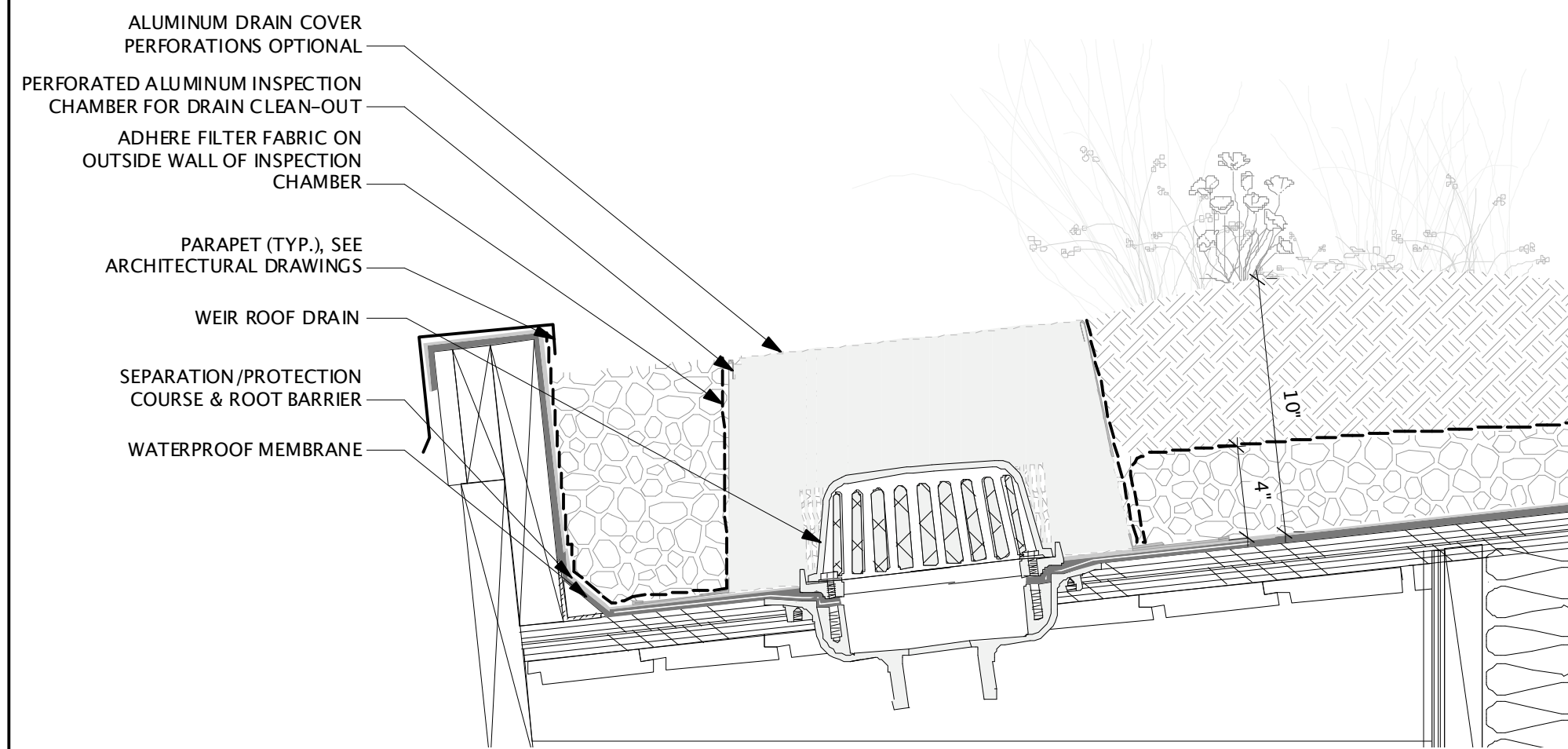


2 LIVING ROOF PLAN
Scale: 1/4" = 1'-0"





1 CROSS-SECTION OF SLOPED LIVING ROOF
Scale: 3/4" = 1'-0"



2 LIVING ROOF @ WEIR DRAIN
Scale: 2" = 1'-0"

3 LIVING ROOF ASSEMBLY
Scale: 2" = 1'-0"

4 LIVING ROOF @ DOWNSLOPE PARAPET
Scale: 2" = 1'-0"

WATERPROOF MEMBRANE
DESCRIPTION: A MONOLITHIC HOT FLUID APPLIED MEMBRANE MADE OF RUBBERIZED ASPHALT INCLUDING 25% RECYCLED CONTENT.
SPECIFICATION: PREP ROOF DECK WITH SURFACE CONDITIONER. COMPLETE ALL DETAILING AND FLASHING BEFORE MEMBRANE INSTALLATION AND PRE-DETAIL JOINTS WITH MEMBRANE AND FABRIC REINFORCING PRIOR TO FULL MEMBRANE APPLICATION. APPLY 90 MIL MINIMUM (APPROXIMATELY 2.3 MM) OF HOT FLUID MEMBRANE TO THE PREPARED ROOF DECK AND EMBED SPUN-BONDED POLYESTER REINFORCING SHEET. A SECOND COAT OF MEMBRANE IS THEN APPLIED AT 125 MIL (APPROX. 3.2 MM) FOR A TOTAL MEMBRANE THICKNESS OF 215 MILS.
SOURCE: AMERICAN HYDROTECH. OR APPROVED EQUAL.

SEPARATION/PROTECTION COURSE & ROOT BARRIER
DESCRIPTION: COMBINATION OF A FIBERGLASS REINFORCED RUBBERIZED ASPHALT PROTECTION SHEET AND POLYETHYLENE ROOT BARRIER.
SPECIFICATION: EMBED SEPARATION/PROTECTION COURSE INTO THE FLUID APPLIED MEMBRANE AS IT IS APPLIED TO ACT AS A PROTECTION COURSE DURING ROOF CONSTRUCTION AND THEN AS A ROOT BARRIER. WATERPROOFING CONTRACTOR MUST STRICTLY ADHERE TO MANUFACTURERS SPECIFICATIONS AND HAVE COMPETED AT LEAST THREE LIVING ROOF PROJECTS. WARRANTY TO BE NEGOTIATED BETWEEN CLIENT AND MANUFACTURER.
SOURCE: AMERICAN HYDROTECH. OR APPROVED EQUAL.

ROOF WEIR DRAIN
DESCRIPTION: USED TO CONTROL THE FLOW OF RAINWATER OFF A ROOF AT A KNOWN MAXIMUM RATE, INDEPENDENT OF WATER HEIGHT. TRAPEZOIDAL WEIRS LIMIT AND REGULATE FLOW TO CATCHMENT SYSTEMS AND STORM DRAINS. ADJUSTABLE TO PROVIDE VARIOUS FLOW RATES AS REQUIRED.
SPECIFICATION: RAINFLO WEIR DRAIN. LIMIT ROOF AREA TO 25,000 SQ. FT. PER WEIR OPENING WITH A MINIMUM OF TWO DRAINS PER ROOF. 3" WEIR HEIGHT RECOMMENDED FOR FLAT ROOFS, 4" FOR 2" ROOF RISE, 5" FOR 4" ROOF RISE AND 6" FOR 6" ROOF RISE. LIVE LOAD SHALL NOT EXCEED 20 PSF AT ANY TIME.
SOURCE: JAY R. SMITH MFG. CO., 2781 GUNTER PARK DR. E. MONTGOMERY, AL 36109-1405, (334) 277-8520, OR APPROVED EQUAL.

LIGHTWEIGHT DRAIN ROCK
DESCRIPTION: VEGETATION FREE ZONES ARE SIZED TO HANDLE DESIGN STORM EVENT AND ARE INCORPORATED INTO DOWNSLOPE EDGES OF ROOF(S) AS WELL AS AROUND SKYLIGHTS, VENTS AND OTHER ROOF FIXTURES TO PROVIDE FREE FLOWING DRAINAGE, MINIMIZE EROSION AND ALLOW FOR REPAIR ACCESS.
SPECIFICATION: 3/4" CRUSHED SCORIA TYPE LAVA ROCK. SEE DRAWINGS FOR SIZING OF VEGETATION FREE ZONES.
SOURCE: AMERICAN SOIL & STONE PRODUCTS, 2121 SAN JOAQUIN STREET, RICHMOND, CA 94804, (510) 292-3000, OR APPROVED EQUAL.

FILTER FABRIC
DESCRIPTION: THE FILTER FABRIC ACTS AS A FILTER FOR FINE PARTICULATE MATTER AND POLLUTANTS FOUND IN STORM WATER. FILTER FABRIC IS PLACED AROUND THE UNDERDRAIN PIPING TO PREVENT SAND AND OTHER PARTICULATES FROM CLOGGING DRAINAGE SYSTEMS OR BEING DISCHARGED.
SPECIFICATION: NON-WOVEN, NEEDLE-PUNCHED, GEOTEXTILE FILTER SHEET, MADE OF NON-ROTTING, LONG-CHAIN SYNTHETIC POLYMERS COMPOSED OF AT LEAST 95% BY WEIGHT OF POLYOLEFINS OR POLYESTERS. HIGHLY RESISTANT TO ALL NATURAL ACIDS AND ALKALIS AND CHEMICALLY NEUTRAL. ELONGATION ≥ 50%: MIRAFI 140N.
SOURCE: REED & GRAHAM, 550 SUNOL STREET, SAN JOSE, CA 95126, (888) 381-0800.

STABILIZATION BAFFLE
DESCRIPTION: RETENTION BAFFLES PROVIDE SLOPE STABILIZATION OF SAND AND GROWING MEDIUM DURING HIGH RAINFALL EVENTS.
SPECIFICATION: 6" X 6" X 8" ALUMINUM ANGLE IRON WITH PRE-DRILLED (5/32") SLOTS COUNTERSUNK FROM THE INSIDE ON ONE EDGE. SET 2" O.C. STAGGERED AT 2" & 4" FROM BOTTOM OF ANGLE & PRE-PAINTED WITH 2 COATS OF NON-TOXIC RUST PROTECTION. ADHERE OR LOOSE LAY ONTO THE COMPLETED ROOF MEMBRANE. DO NOT MECHANICALLY ATTACH BAFFLES THROUGH A WATERTIGHT ROOF MEMBRANE, SINCE MOISTURE PENETRATION AND ROOF LEAKS ARE LIKELY TO OCCUR DURING THE SERVICE LIFE OF THE ROOF. HOLD METAL EDGING IN PLACE DURING THE PLACEMENT OF THE VEGETATED ROOF SYSTEM USING SEALANT OR ADHESIVE COMPATIBLE TO THE ROOF MEMBRANE. USE HARDWARE

STABILIZATION BAFFLE (CONT)
CLIPS PROVIDED BY MANUFACTURER TO MECHANICALLY JOIN SECTIONS TOGETHER. AFTER SETTING INTO POSITION, INSTALL DRAIN ROCK FLUSH AGAINST THE VERTICAL LEG OF BAFFLES TO PREVENT MIGRATION OF SAND AND GROWING MEDIA THROUGH BAFFLE.
SOURCE: GREEN ROOF SOLUTIONS, 4307 REGENCY DRIVE, GLENVIEW, ILLINOIS 60025, (847) 297-7938.

SAND MEDIA
DESCRIPTION: COURSE SAND INCORPORATED INTO THE DRAINAGE LAYER WILL INCREASE WATER FILTRATION AND SUBSURFACE WATER RETENTION.
SPECIFICATION: SAND PARTICLES SHALL BE 0.02 TO 0.04 INCHES IN DIAMETER. APPLY LAYER OF COURSE SAND ABOVE RETENTION BAFFLE AS SHOWN IN DRAWINGS.
SOURCE: AMERICAN SOIL & STONE, 2121 SAN JOAQUIN STREET, RICHMOND, CA 94804, (510) 292-3000.

BENTONITE CLAY
DESCRIPTION: BENTONITE CLAY LENSES IN LOW-LYING TOPOGRAPHIC DEPRESSIONS ON THE ROOF WILL INCREASE SURFACE-LEVEL WATER RETENTION AND SUPPORT EMERGENT WETLAND VEGETATION AND HABITAT.
SPECIFICATION: APPLY 3/4" LAYER OF SPECIALLY SELECTED NATURAL WYOMING TYPE GRANULAR BENTONITE CLAY AS SHOWN ON DRAWINGS. BENTONITE CLAY SHALL CONTAIN A MINIMUM 90% MONTMORILLONITE, GRADED SO THAT 90% WILL PASS A 20 MESH SIEVE AND LESS THAN 10% WILL PASS A 200 MESH SIEVE.
SOURCE: AMERICAN SOIL & STONE, 2121 SAN JOAQUIN STREET, RICHMOND, CA 94804, (510) 292-3000.

ENGINEERED GROWING MEDIUM
DESCRIPTION: SITE SPECIFIC LIVING ROOF SOIL CONTAINING A BLEND OF ORGANIC MATERIALS SUITED TO SAN FRANCISCO WEATHER CONDITIONS AND STRUCTURAL LOAD LIMITATIONS.
SPECIFICATION: 20% WELL-AGED COMPOST, 10% FOREST HUMUS, 50% SCORIALAVA ROCK, 20% COURSE SAND. THE MAXIMUM PARTICLE SIZE SHALL BE 13MM, 80 PERCENT OR MORE SHALL PASS A NO. 4 SCREEN. SEND GROWING MEDIUM TO SOILS LABORATORY TO TEST FOR PHYSICAL AND CHEMICAL COMPOSITION. SATURATED WEIGHT PER CU. FT. PARASITIC NEMATODES, AND HERBICIDE CONTAMINATION AT LEAST 30 DAYS PRIOR TO GROWING MEDIUM WORK, SUBMIT THE LABORATORY'S WRITTEN SUBSTRATE TEST REPORT INCLUDING THE LABORATORY'S SUBSTRATE ANALYSIS DATA AND AMENDMENT RECOMMENDATIONS TO THE OWNER'S REPRESENTATIVE FOR REVIEW. ACCEPTABILITY WILL BE DETERMINED BY SOILS LABORATORY. AMEND WITH BALANCED, CONTROLLED-RELEASE PELLETTED ORGANIC FERTILIZER WITH A BLEND OF MOLASSES, FEATHERMEAL, BONE MEAL & MINE D POTASSIUM SULFATE WHICH SUPPLY CONTROLLED-RELEASE NITROGEN, PHOSPHORUS AND POTASSIUM ONLY FOR PLANT ESTABLISHMENT ONLY.
SOILS LABORATORY: SOIL CONTROL LAB, 42 HANGAR WAY, WATSONVILLE, 95076 - (831) 724-5422. REPLACE WITH LOCAL LABS AS NECESSARY.
SOURCE: AMERICAN SOIL & STONE, 2121 SAN JOAQUIN STREET, RICHMOND, CA 94804, (510) 292-3000.

ROOF STRUCTURAL LOADING
SEE STRUCTURAL FOR ALL LOADING CALCULATIONS
DRAIN ROCK NET SATURATED WEIGHT: 96.3 LBS/CU. FT. DRAIN ROCK SHALL NOT EXCEED 4" IN DEPTH, OR 32.1 PSF.
SAND MEDIA NET SATURATED WEIGHT: 120 POUNDS PER CU. FT. SAND MEDIA SHALL NOT EXCEED 3", OR 30 PSF.
BENTONITE CLAY NET SATURATED WEIGHT: 37 POUNDS PER CU. FT. BENTONITE CLAY THICKNESS SHALL NOT EXCEED 1", OR 3.08 PSF.
GROWING MEDIUM NET SATURATED WEIGHT: 78 POUNDS PER CU. FT. GROWING MEDIUM DEPTH SHALL NOT EXCEED 6", OR 39 PSF.
MAXIMUM DEAD LOAD: THE ROOF DEAD LOAD SHALL NEVER EXCEED 80 PSF. REFER TO DRAWINGS FOR BUILT-UP SYSTEM DEPTHS, LAYERING AND DESIGN INTENT.
MAXIMUM LIVE LOAD: THE ROOF LIVE LOAD SHALL NEVER EXCEED 20 PSF.

SUGGESTED LIVING ROOF PLANT MIX*

MIMULUS AURANTIACUS	MONKEY FLOWER	6
BACCHARIS PILULARIS "TWIN PEAKS"	DWARF COYOTE BUSH	4
FRAGRARIA CHILOENSIS	BEACH STRAWBERRY	46

SUGGESTED LIVING ROOF OVERSEED MIX*

LASTHENIA CALIFORNICA	GOLD FIELDS	1/4 POUND PER 1000 SQ. FT.
LAYIA PLATYGLOSSA	TIDY-TIPS	1/4 POUND PER 1000 SQ. FT.
PLANTAGO ERECTA	CALIFORNIA PLANTAIN	1/4 POUND PER 1000 SQ. FT.
CASTILLEJA DENSIFLORA	PURPLE OWLS-CLOVER	1/2 POUND PER 1000 SQ. FT.
NASSELLA PULCHRA	PURPLE NEEDLEGRASS	1 POUND PER 1000 SQ. FT.
FESTUCA RUBRA	RED FESCUE	1 POUND PER 1000 SQ. FT.
ELYMUS GLAUCUS	BLUE WILD RYE	1 POUND PER 1000 SQ. FT.
TRIFOLIUM WILLDENOVII	TOMCAT CLOVER	1/8 POUND PER 1000 SQ. FT.
CLARKIA AMOENA	FAREWELL TO SPRING	1/8 POUND PER 1000 SQ. FT.
GILIA CAPATATA	GLOBE GILIA	1/8 POUND PER 1000 SQ. FT.

*ACTUAL PLANT LIST TO BE PROVIDED BY OWNER

6 LIVING ROOF PLANT LIST

5 LIVING ROOF MATERIALS SPECIFICATIONS

