UTILITY DETAILS

DOWELED TRANSVERSE EXPANSION JOINT
FOR CONCRETE DRIVEWAY PAVEMENT

CONTRACTION JOINT WITH LOAD TRANSFER
FOR CONCRETE DRIVEWAY PAVEMENT

FOR DRIVEWAY APRON

TYPICAL CONCRETE PAVEMENT DETAIL

BITUMINOUS ASPHALT PAVING

*DDOT PAVEMENT NOTE:

CONCRETE VAULT NOT REQUIRED IF PLACED INSIDE OF BUILDING
STORMWATER MANAGEMENT PLAN

LOADING / RECEIVING SERVICE
TRUCK 1
TRASH
COMP
GREEN ROOF (APPROXIMATE LOCATION)
GREEN ROOF (APPROXIMATE LOCATION)
GREEN ROOF (APPROXIMATE LOCATION)
GREEN ROOF (APPROXIMATE LOCATION)
CISTERN (APPROXIMATE LOCATION)

LEGEND
GREEN ROOF (APPROXIMATE LOCATION)
CISTERN (APPROXIMATE LOCATION)

STORMWATER MANAGEMENT NARRATIVE:

THE PROJECT WILL BE UNDER THE 2013 STORMWATER MANAGEMENT REQUIREMENTS PER THE DEPARTMENT OF ENERGY AND ENVIRONMENT. THIS WILL BE A MAJOR LAND DISTURBING ACTIVITY, THEREFORE, THE SITE WILL RETAIN THE FIRST 1.2” OF RAINFALL GREEN ROOF AND RAINWATER HARVESTING WILL BE USED TO MEET THE RETENTION AND DETENTION REQUIREMENTS.

STORMWATER MANAGEMENT NARRATIVE:

MAXIMUM EXTENT PRACTICABLE IN THE PROW


NOTE:

"NO PERMITTED STORMWATER BMP IS COMPLETE UNTIL FINAL INSPECTION HAS BEEN CONDUCTED AND AN AS-BUILT PLAN HAS BEEN SUBMITTED TO THE DEQ WITHIN 21 DAYS AFTER FINAL INSPECTION FOR REVIEW AND APPROVAL."

Date
04/12/2017

Project Name
2100 PENNSYLVANIA AVENUE NW

Project Number
A1613

Description
STORMWATER MANAGEMENT PLAN

Scale
1" = 40'
INITIAL STORMWATER MANAGEMENT ANALYSIS
GWU 2100 Pennsylvania Ave, NW

TOTAL SITE AREA:
- Impervious Area: 50,497 SF
- BMP Area: 37,557 SF
- Compacted Cover: 12,940 SF (APPROXIMATE GREEN ROOF AREA)
- Total Retention Volume Required: 0 SF
- Total Detention (2 Year) Volume Required: 4,797 CF

GREEN ROOF NOTE:
FERTILIZER IS NOT RECOMMENDED. IF APPLIED, THE FERTILIZER MUST BE A SLOW RELEASE TYPE, RATHER THAN LIQUID OR GASEOUS FORM.

GREEN ROOF DETAIL (TYPICAL):
GREEN ROOF INSTALLATION

GIVEN THE DIVERSITY OF EXTENSIVE VEGETATED ROOF DESIGNS, THERE IS NO TYPICAL STEP-BY-STEP CONSTRUCTION SEQUENCE FOR PROPER INSTALLATION. THE FOLLOWING GENERAL CONSTRUCTION CONSIDERATIONS ARE NOTED:

- **CONSTRUCT THE ROOF DECK WITH THE APPROPRIATE SLOPE AND MATERIAL**

- **INSTALL THE WATERPROOFING METHOD, ACCORDING TO MANUFACTURER’S SPECIFICATIONS.**

- **CONDUCT A FLOOD TEST TO ENSURE THE SYSTEM IS WATERTIGHT BY PLACING AT LEAST 2 INCHES OF WATER OVER THE MEMBRANE FOR 48 HOURS TO CONFIRM THE INTEGRITY OF THE WATERPROOFING SYSTEM. ALTERNATELY, ELECTRIC FIELD VECTOR MAPPING (EFVM) CAN BE DONE TO TEST FOR THE PRESENCE OF LEAKS. HOWEVER, NOT ALL INTEGRABLE MEMBRANES ARE TESTABLE WITH THIS METHOD. PROBLEMS HAVE BEEN NOTED WITH THE USE OF EFVM ON BLACK EPDM AND WITH ALUMINIZED PROTECTIVE COATINGS COMMONLY USED IN CONJUNCTION WITH MODIFIED BITUMINOUS MEMBRANES.**

- **ADD ADDITIONAL SYSTEM COMPONENTS (E.G., INSULATION, ROOT BARRIER, DRAINAGE LAYER AND INTERIOR DRAINAGE SYSTEM, AND FILTER FABRIC) PER THE MANUFACTURER’S SPECIFICATIONS, TAKING CARE NOT TO DAMAGE THE WATERPROOFING. ANY DAMAGE OCCURRING MUST BE REPORTED IMMEDIATELY, OR NAILS AND PROTECTIVE FLASHING SHOULD BE INSTALLED TO ENSURE FREE FLOW OF EXCESS STORMWATER.**

- **THE GROWING MEDIA SHOULD BE MIXED PRIOR TO DELIVERY TO THE SITE. MEDIA MUST COVER EVENLY OVER THE FILTER FABRIC SURFACE AS REQUIRED BY THE MANUFACTURER. IF A DELAY BETWEEN THE INSTALLATION OF THE GROWING MEDIA AND THE PLANTS IS REQUIRED, ADEQUATE EFFORTS MUST BE TAKEN TO SECURE THE GROWING MEDIA FROM EROSION AND THE SEEDING OF WEEDS. THE GROWING MEDIA MUST BE COVERED AND ANCHORED IN PLACE UNTIL PLANTING. SHEETS OF EXTERIOR GRADE PLYWOOD CAN ALSO BE LAID OVER THE GROWING MEDIA TO ACCOMODATE FOOT OR HONEYCOMB TRAFFIC, FOOT TRAFFIC, AND EQUIPMENT TRAFFIC SHOULD BE LIMITED OVER THE GROWING MEDIA TO REDUCE COMPACTION BEYOND MANUFACTURER’S RECOMMENDATIONS.**

- **THE GROWING MEDIA SHOULD BE MOISTENED PRIOR TO PLANTING, AND THEN PLANTED WITH THE GROUND COVER AND OTHER PLANT MATERIALS, PER THE PLANTING PLAN OR IN ACCORDANCE WITH ASTM E2480. PLANTS SHOULD BE WATERED IMMEDIATELY AFTER INSTALLATION AND ROUTINELY DURING ESTABLISHMENT.**

- **IT GENERALLY TAKES 2 TO 3 GROWING SEASONS TO FULLY ESTABLISH THE VEGETATED ROOF. THE GROWING MEDIA SHOULD CONTAIN ENOUGH ORGANIC MATTER TO SUPPORT PLANTS FOR THE FIRST GROWING SEASON, SO INITIAL FERTILIZATION IS NOT REQUIRED. EXTENSIVE GREEN ROOFS MAY REQUIRE SUPPLEMENTAL IRRIGATION DURING THE FIRST FEW MONTHS OF ESTABLISHMENT. HAND WEEDING IS ALSO CRITICAL IN THE FIRST TWO YEARS.**

GREEN ROOF INSTALLATION MAINTENANCE:

1. THE INSTALLATION MAINTENANCE SHALL BE A MINIMUM OF THREE MONTHS. THE MAINTENANCE PERIOD SHALL CONSIST OF PERIODIC WEEDING AND HAND WATERING DURING THE MONTHS OF JULY AND AUGUST IN THE EVENT OF DROUGHT OR AS DETERMINED.

2. THE GROWING MEDIA WILL BE DURABLY SOAKED PRIOR TO COMMENCING PLANTING.

3. THE PLANTS SHALL BE SET INTO THE MEDIA TO THEIR FULL DEPTH AND THE EDGES OF PLANTS WILL BE SOAKED.

4. AT THE END OF THE MAINTENANCE PERIOD, PLANTED AREAS SHALL HAVE NO BARE SPOTS GREATER THAN ONE SQUARE FOOT OVER GREATER THAN 5 PERCENT OF THE OVERALL PLANTED AREA. IF PLANTED AREAS ARE DEFICIENT, THE CONTRACTOR’S RESPONSIBILITY FOR MAINTENANCE OF ALL PLANTED AREAS SHALL BE EXTENDED UNTIL DEFICIENCIES ARE CORRECTED. PLANTED AREAS TO BE CORRECTED SHALL BE PREPARED AND REPLANTED IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.

5. CONTRACTOR SHALL PROVIDE PROPER PROTECTION OF THE PLANTED AREAS AGAINST WEEDS AND WILDLIFE DURING THE MAINTENANCE PERIOD. TEMPORARY BARRIERS WILL BE REMOVED AT THE TIME OF ACCEPTANCE.

6. ABSOLUTELY NO DEBRIS WILL BE LEFT ON THE SITE. CONTRACTOR WILL REPAIR ANY DAMAGE TO THE SITE OR STRUCTURE AND RESTORE THEM TO THEIR ORIGINAL CONDITION AT NO COST TO THE OWNER.

GREEN ROOF 2-YEAR MAINTENANCE SERVICE:

THE INSTALLER SHALL GUARANTEE 50 PERCENT COVER RATE AFTER 12 MONTHS AND 80 PERCENT COVER AT THE END OF 24 MONTHS. AS NECESSARY, PLANTS SHALL BE REPLANTED TO ACHIEVE THIS REQUIREMENT.

GREEN ROOF ONGOING MAINTENANCE:

1. BOTH PLANT MAINTENANCE AND MAINTENANCE OF THE WATERPROOFING ARE REQUIRED.

2. FOR PLANT MAINTENANCE, MONTHLY INSPECTIONS WILL OCCUR TO CHECK FOR WEEDS OR DAMAGE, OR FOR IRREGULARITIES, PRUNING, AND/OR REPLANTING.

3. THE FREQUENCY OF PLANT MAINTENANCE INSPECTIONS MAY INCREASE DURING THE SUMMER MONTHS IN THE CASE OF DROUGHT.

4. INSPECTION OF THE WATERPROOFING MEMBRANE WILL TAKE PLACE TWO TO THREE TIMES A YEAR.

GREEN ROOF MAINTENANCE CRITERIA

<table>
<thead>
<tr>
<th>SCHEDULE (FOLLOWING CONSTRUCTION)</th>
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<tbody>
<tr>
<td>AS NEEDED OR REQUIRED BY MANUFACTURER</td>
</tr>
<tr>
<td>WATER TO PROMOTE PLANT GROWTH AND SURVIVAL</td>
</tr>
<tr>
<td>INSPECT GREEN ROOF AND REPLACE ANY DEAD OR DYING VEGETATION</td>
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<tr>
<th>SEMI-ANNUALLY</th>
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<tbody>
<tr>
<td>INSPECT THE WATERPROOFING MEMBRANE FOR LEAKS AND CRACKS</td>
</tr>
<tr>
<td>NEED TO REMOVE INVASIVE PLANTS (DO NOT DIB OR USE POISONED TOOLS WHERE THERE IS POTENTIAL TO HARM THE ROOT BARRIER OR WATERPROOFING MEMBRANE).</td>
</tr>
<tr>
<td>INSPECT THE ROOF DRAINS, SCOURERS, AND GUTTERS TO ENSURE THEY ARE NOT OVERGROWN AND HAVE NOT ACCUMULATED ORGANIC MATTER DEPOSITS. REMOVE ANY ACCUMULATED ORGANIC MATTER OR DEBRIS.</td>
</tr>
<tr>
<td>INSPECT THE GREEN ROOF FOR DEAD, DYING, OR INVASIVE VEGETATION, PLANT REPLACEMENT OR VEGETATION AS NEEDED.</td>
</tr>
</tbody>
</table>
CISTERN STORAGE AREA MAINTENANCE

The access cover to the cistern storage area shall be opened. Following all confined space entry requirements, using proper ventilation equipment and training as required by OSHA, the cistern storage area shall be entered for inspections. No one shall enter the cistern unless they are properly trained, equipped, and qualified to enter a confined space as identified by local occupational safety and health regulations.

Inspection and maintenance of the cistern must be performed during a three (3) day dry weather forecast. The cistern shall be cleaned using a submersible pump and water discharged into the city’s sewer. Prior to entering the cistern, all lift and transfer pumps shall be turned off for safety. All areas of the cistern area shall be inspected for sediment accumulation. Sediment accumulation shall be measured at all sectors of the cistern storage area.

The property shall maintain copies of these inspection records. If the sediment depth reaches eight inches (8”) in any of these areas, cleaning of the entire cistern shall be required as described below.

The system shall be completely cleaned back to 100 percent (100%) of the originally designed storage volume whenever the above sediment levels have been reached. The cistern shall be completely drained prior to proceeding with cleaning.

Maintenance is typically performed using a vacuum truck. Sediment shall be flushed towards a vacuum hose for thorough removal at the manhole access to the cistern storage area. A vacuum hose shall be lowered into the cistern system. Using sewer jetting equipment, sediment shall be flushed at the opposite end of the cistern toward the vacuum hose at the manhole access.

When finished, covers that were removed shall be replaced and the collected material shall be properly disposed. The material that is removed may be considered low-level hazardous waste and must be disposed of in accordance with any and all local and national regulations.

The property owner shall maintain copies of all inspection and maintenance records.

CISTERN STRUCTURE COVER INSPECTIONS AND MAINTENANCE

All cistern covers and hatches shall be inspected and any debris around covers or hatches shall be removed. If any debris is blocking grated access cover to cistern overflow, it shall be removed. If any cistern covers are damaged, they shall be repaired or replaced as necessary.

The property owner shall maintain copies of all inspection and maintenance records.

CISTERN MAINTENANCE CRITERIA

RESPONSIBLE PERSON: OWNER

- Four times a year, inspect and clean prescreening devices and first flush diverters
- Twice a year, keep gutters and downspouts free of leaves and other debris
- Once a year, inspect and clean storage cistern filters, paying special attention to vents and screens on inflow and outflow spouts. Check mosquito screens and patch holes or caps immediately. Inspect condition of overflow pipes, overflow filter path and/or secondary stormwater treatment practices.
- Every third year, clear overhanging vegetation and trees over roof surface

RESPONSIBLE PERSON: QUALIFIED THIRD PARTY INSPECTOR

- According to manufacturer, inspect water quality devices.
- As indicated in tram, provide water quality analysis to date.
- Every third year, inspect cistern for sediment buildup, check integrity of backflow preventer, inspect structural integrity of cistern, pump, pipe, and electrical system, and replace damaged or defective system components.