



HAMPTON ROADS PLANNING DISTRICT COMMISSION MEETING

Building A-50 Green Roof

2 December 2010



Chesapeake Bay Program
A Watershed Partnership

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Objectives



- Green Roof Benefits
- Site Specific Information
- Actual Project Information including Cost
- Maintenance and Contracts



Naval Station Norfolk Building A-50

Green Roof Benefits

Energy, Sustainability, & Environment



Green roofs have many benefits, all of which can be assigned a monetary value:

- Increase Thermal Efficiency
 - Reduction of heating and cooling costs. Eliminates the daily temperature variations in roofing materials.
 - Up to twice as efficient as white reflective roof surfaces
 - Reduces the “Heat Island” effect
 - Pre-green roof R-13/Post-green roof R-28 (avg.)
- Extended Service Life of the underlying waterproofing system
 - Expectation is the roof will last 40 plus years vice 20 years
- Air Quality Improvements
 - Plants absorb air pollutants and filter the air



Green Roof Benefits (cont.)

Energy, Sustainability, & Environment



- Storm Water and Run-off Improvements
 - A typical 3-inch green roof will retain rain events until the volume exceeds 0.6-inches. On an annual basis the total runoff quantity will be reduced by 50 percent or more.
 - Facilities/Industry/Municipalities with Phase I and Phase II NPDES permits, green roofs can satisfy the requirements for storm water quality.
 - Other retention devices (storm water ponds) can be reduced/eliminated, which reduces site development costs and increased commercial space
- Reduce sound reflection and transmission
- Enhance property values and Positive Cultural Perception
 - “Soft” environment vice hard-scapes

Site Specifics

Existing Condition



- Flat, 11,000 S.F. asphalt-aggregate rock roof
- Roof down spouts drain internally through the building and tie directly into the storm water system leading to a VPDES outfall



Site Specifics

Existing Condition

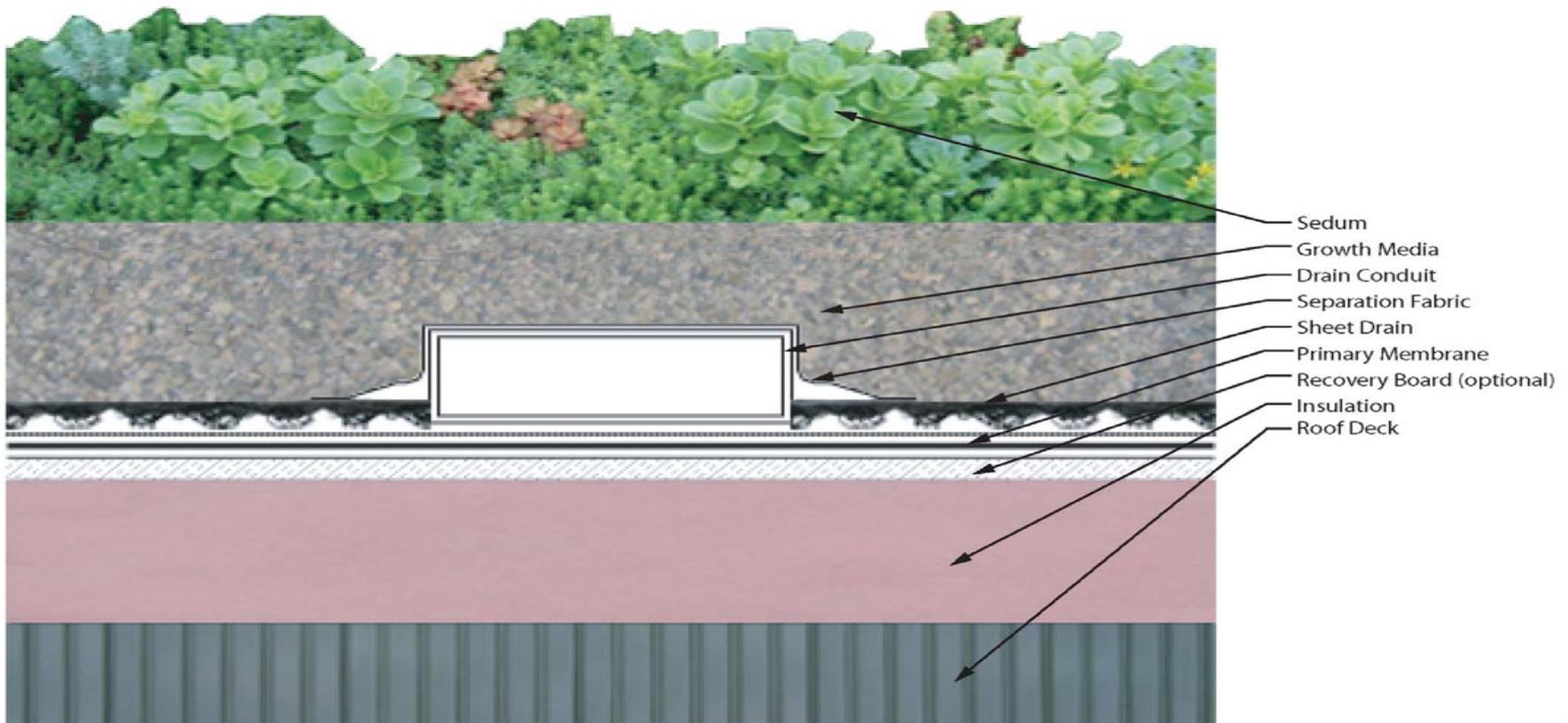


Storm Water Monitoring Data (Pre)

- TKN: 2.27 mg/L
- Nitrate/Nitrite: 0.78 mg/L
- Total Phosphorus: 0.23 mg/l
- Total Recoverable Copper: 58 ug/L
- Dissolved Copper: 52 ug/L
- Total Recoverable Zinc: 275 ug/L
- Dissolved Zinc: 237 ug/L
- Total Suspended Sediment: 16 mg/L

Site Specifics

Design: Typical Green Roof System





Roof re-work



Modified Bitumen Membrane



Sheet Drain



Sheet Drain



Engineered growth media: Constructed of heat expanded shale and clay to maintain a high porosity to retain water



Pre-grown Mats: Grown in Virginia, rolled-up like sod and delivered in temperature controlled trucks.



Final Product



Final Product

Project Information

Cost, Contract, and Maintenance



- Actual Construction Schedule:
 - 3 Months
- Total Project Cost
 - \$ 612,816
- Cost per S.F.
 - \$ 55.60 (re-roof so cost was higher due to demolition)
 - \$ 18.00 to \$ 22.00 per SF
- 10 to 20 year warranty

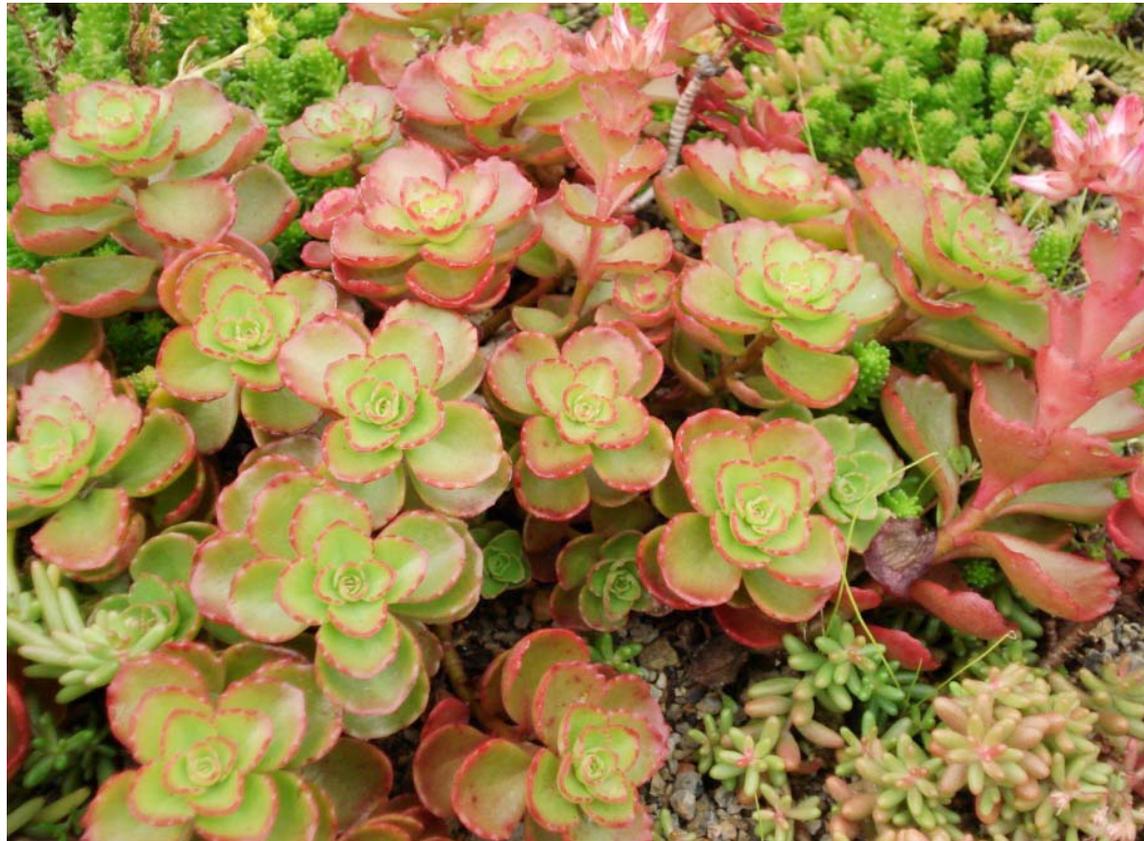


Project Information

Cost, Contract, and Maintenance



- Maintenance:
 - Contract included 1st two years maintenance from green roof supplier
 - 4 times per year inspection and maintenance report
 - Weeding, watering, and cutting of sedum and sprinkle cuttings in thin areas
 - Check drains for clogs
 - Soil sample collected on annual basis to ensure optimal soil chemistry





Questions?

