

Conceptual Stormwater Management Plan for Robert's Maine Grill and Market Kittery, ME

Robert's Maine Grill and Market is being constructed on a previously developed site and is required to submit a Stormwater Management Plan for review and approval by the York County Soil and Water Conservation District. The property is located on the north shore of tidal Spruce Creek with approximately 0.70 acres of impervious surface including rooftop and facility parking. Stormwater runoff is generated from the 0.70 acres of impervious surface with an additional 0.17 acres of Route 1 contributing runoff to the northwest corner of the parking area as overland flow. The majority of the stormwater runoff generated from the site flows to the southeast into a small vegetated swale and then into tidal portions of Spruce Creek.

The following conceptual plan describes innovative options for stormwater quality and quantity management given site constraints, permitting restrictions, the legal agreement and the probable costs and benefits associated with the implemented structure or activity. The implementation of any or all of these recommendations is the decision of the owner and the removal of any of the components may not prevent the approval of the stormwater management plan. It is our judgment that the following plan provides reasonable options for stormwater quantity and quality treatment and provides a demonstration of a variety of techniques advocated by the Maine DEP and the "Low Impact Development" community.

Stormwater best management focuses on three basic premises:


1. Control stormwater quantity through the reduction/separation of contributing areas. Large areas of connected impervious surface are much more difficult to manage than small, discrete areas.
2. Maintain or improve runoff quality through the minimization of contact between rainfall and polluted surfaces (i.e. parking lot pavement, disposal areas, etc.) and through infiltration/filtration/settling after contact.
3. Minimize the potential for human activity to contribute to pollution potential through stormwater pollution prevention practices. Keeping impervious surfaces free of pollutants is the best way to reduce stormwater pollution loads.

Conceptual Plan

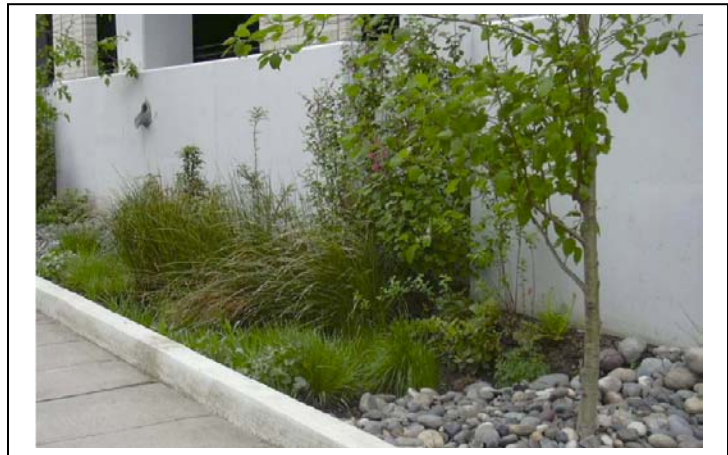
- ④ **Directly reduce impervious surface on the facility through the use of pervious parking technology.** Pervious parking technologies allow rainwater to move vertically through the parking surface into the soil media or underdrain below the parking area. Pervious parking can be constructed from asphalt, concrete, grid



pavers, or open aggregates. The site's soils (clay and fill) will likely limit infiltration of stormwater from any pervious parking areas but the use of products such as the GeoWEB (shown above) and designed subsurface storage areas will allow for the short-term storage and subsequent slow release of stormwater. This product and design will provide some quantity control of stormwater and may improve the quality of the stormwater through filtration and transformation of pollutants in the filter bed media below the GeoWEB product. The GeoWEB is underlain by crushed gravel, geotextile and backfilled with ¾" clean crushed stone. The top 1-2" can be covered with any variety of clean aggregate. The suggested GeoWEB product for use at Robert's Maine Grill is \$1.75 a square foot and is 6" deep. The total cost of product would be approximately \$12,000 to replace 0.18 acres of the parking area. Associated material costs would include clean gravel, geotextile and trucking (\$5000-7500). Approximately one foot of excavation over the 0.18 acre area would be required for the placement of the GeoWEB^R and underdrain. This excavation time will create some additional costs. Total probable costs: \$25,000 for the resurfacing of 0.18 acres of parking area with a pervious surface.

 **Store, reuse and filter rooftop stormwater runoff.**

Approximately 70% of the restaurant facility rooftop can be diverted to a storage cistern or dripped into temporary storage planter beds. The storage cistern recommended for use can be acquired through SkyJuice, Inc. in Durham, NH and will store approximately 550 gallons of water. This is



equivalent to the rainfall from a 0.75 inch rainstorm on the portion of roof that contributes to the cistern (assuming the routing of runoff from the flat section of roof). The cistern would be placed on the second floor within the "lighthouse". Overflow would be designed into the system to accommodate storms exceeding the capacity of the cistern. Drip irrigation would be established from the system to water the landscaped elements around the facility. The system would completely drain in approximately 30 hours. The system, configuration and consulting design would cost close to \$3000 not including any required changes to lighthouse structural design to accommodate the weight, or the cost of gutters and downspouts. Additionally, rooftop areas draining to the southwest and northwest could be directed to constructed raingardens at or near pathways around the building. The sections of rooftop could drip off to hardened surfaces (i.e. walkways) and then drain via overland flow into planted landscape planters. These drip edges would require 18"-24" of protected surface from the edge of the roofline. Gutters and downspouts could also be used in lieu of a drip edge. Design details would be incorporated into the "landscape buffer" in the site plan. Overall

cost for the raingardens would include the extra excavation for the underdrain system and the additional aggregate material required for backfill rainwater storage. It is assumed that any other costs of the “landscape buffer”, including planter boxes, are already accounted for within the site plan. Total probable costs: \$5000-\$10,000

Install treatment system and diversion for Route 1 runoff.

The Route 1 runoff is considered off-site contribution of stormwater and is required to be accommodated under the Surface Drainage Code for the Town of Kittery. Discussions with the municipality indicates that there is some interest in a cooperative solution that would divert a portion of the runoff back along Route 1 if there was some stormwater treatment on



the Robert’s Maine Grill property. The placement of a small catch basin at the existing “curb break” in the north corner of the parking lot could be installed by the municipality as a part of a planned sidewalk improvement project across the Route 1 causeway and extending to the Burger King lot. This catch basin would capture smaller stormflows from Route 1 and would direct runoff through a proprietary stormwater treatment device called the StormTreat. The StormTreat System is part holding tank/settling device and wetland gravel filter system. The systems are self contained and can be placed on-site with typical excavation equipment (<1000lbs). One system would only treat a particular flow rate from Route 1. The outlet from the system would drain under the “pervious parking” portion of the north parking area and outlet into the wet swale on the northeast side of the parking area. Overflow from the system would drain back along the curb of Route 1 to the existing catch basin at the exit of Robert’s Maine Grill. The StormTreat unit would need to be placed in the unused northwest portion of the parking area and would require a portion of the area dedicated to the placement of subsurface propane tanks. Initial evaluation indicates that both pieces of infrastructure could be accommodated in the area. Total probable costs: \$10,000 assuming town placement of catch basin system (\$7500 unit, \$2500 construction on site).

Best management pollution prevention practices for facility management.

Reducing or eliminating the interaction of rainfall and site pollutants can be the most effective method of reducing stormwater loads. A best management pollution prevention plan will be developed for the restaurant and parking facility under the stormwater management plan. This will include standard BMP’s for the

minimization of potential pollutants on the site that could end up in stormwater runoff. Please see the attached example guides for BMP's for restaurant facilities. Unfortunately, the location of the site will make many of the typical BMP's difficult or impossible, but efforts in training and management can be accomplished for some. Please review the following lists to decide which BMP's will be possible, probable or unlikely given the site and facility constraints. Training time/employee handbook, facility infrastructure adjustments (i.e. covered dumpster area) are possible costs associated with this activity. Total probable costs: Less than \$1500

- ④ **Buffer planting and augmentation on edges of parking lot.** As required under the agreement with previous landowner and municipality, the southwest edge of the parking area will be replanted and improved as an aesthetic buffer. The five feet from the edge of the parking area will be mulched using standard erosion control mulch and replanted with native vegetation. Two areas within this buffer area have the potential to store and treat some of the parking lot runoff overflow. These two areas can be improved to store and filter overflows using clean crushed gravel and erosion control mulch. Total probable cost: \$4500

Maintenance and Risks

Each of these suggested physical stormwater improvements to the site have required maintenance for the proper functioning and success of the system. There will be costs associated with these maintenance activities. In addition, the development of innovative stormwater systems has some element of risk as there has been less study and evaluation of these products and systems over the years. There is no reason to believe that the systems, thoughtfully designed, will not function, but there are inherent risks involved in innovation.

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