Atkinson Elementary School 5800 SE Division Street, Portland, Oregon

PROJECT SUMMARY

Project Type:	Public school stormwater retrofit – demonstration project		
Technologies:	Downspout disconnection to grassy swales; asphalt removal for tree planting		
Major Benefits:	• Runoff from 9,000 square feet of rooftop was rerouted from the sewer system to a grassy swale.		
	• Eight 8-foot by 8-foot squares of asphalt (512 square feet total) were removed and eight trees were added.		
Cost:	\$17,854 total, with \$16,104 paid by EPA funds		
Constructed:	August 2004 through March 2006		

Overview of the Stormwater System

- Eight 8-foot by 8-foot squares of asphalt (512 square feet total) were removed from the playground (<u>Figure 1</u>). The squares were backfilled with topsoil and compost and planted with eight large-caliper trees to reduce impervious area and provide shade (<u>Figure 2</u>).
- A long grassy swale was installed in an existing grassed area along the northeast building, backfilled with topsoil, and seeded with native grasses for erosion control and low-maintenance groundcover (Figures 3 and 4). Three downspouts draining 9,000 square feet of rooftop were disconnected to the grassy swale with splash blocks (Figure 5).

Figure 1: Asphalt removed from playground







Figure 3: Grassy swale construction

Figure 4: Grassy swale following construction



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Figure 5: Downspouts disconnected to grassy swale





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STORMWATER CAPACITY AND SYSTEM COMPONENTS

Stormwater Management Goal

The stormwater facility was designed in accordance with the City of Portland's 2002 *Stormwater Management Manual*.

System Components

Grassy Swale

Catchment area: 9,000 square feet Facility footprint: 900 square feet

Overflow: Existing field inlet to combined sewer

(See Figure 6)

Landscaping

Once the swale was excavated and backfilled with topsoil, it was seeded with a native grass mixture for erosion control and low-maintenance groundcover. The following 2002 *Stormwater Management Manual*-approved grassy swale mix was used. No irrigation is provided for the mixture.

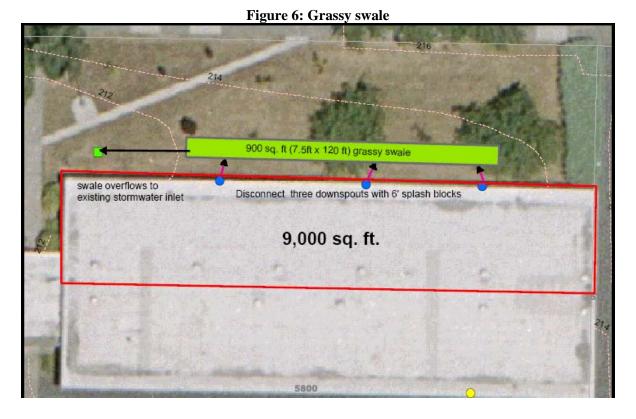
Hobbs and Hopkins Pro-Time 835, Bio-filter Summer Green Vegetative Cover

Perennial ryegrass Lolium perenne

Eureka hard fescue Festuca ovina duriuscula 'Eureka'

Dwarf white yarrow Yarrow millefolium

Dutch white clover Trifolium repens



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Trees

Under the direction of Friends of Trees, Atkinson Elementary School students installed eight large-caliper trees (two Japanese zelkovas, three forest green oaks, and three English hedge maples). Friends of Trees will maintain summer irrigation for the trees by water barrels for 3 years. If necessary, Friends of Trees will replace non-surviving trees.

NOTE: Vandals cut down all eight trees in May 2006. The trees were replaced in fall 2006, using volunteers and donations.

BUDGET

The Atkinson Elementary School project cost \$17,854 for construction, landscaping (including

plant installation using volunteer labor), and permits.

Item	Item Cost	Volunteer Effort	Total Cost
Construction			\$11,517
Excavation and backfilling of stormwater facility	\$6,729		
BES contract oversight	\$2,543		
Downspout disconnection plumbing	\$2,245		
Subtotal	\$11,517		
Landscaping			\$5,771
Plant material (trees, grasses)	\$938		
Geotextile fabric	\$1,350		
Vegetation installation – volunteers (175 students for 1 hour at		\$1,750	
\$10/hour)			
Irrigation and plant warranty	\$1,410		
Topsoil	\$323		
Subtotal	\$4,021	\$1,750	
Permitting			\$566
Commercial permit	\$461		
Plumbing permit	\$105		
Subtotal	\$566		
TOTAL	\$16,104	\$1,750	\$17,854

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Budget Elements

Non-Construction Activities

The cost for design and overall project management was not included in the budget because these elements were considered a part of existing staff responsibilities and were not tracked separately for this project.

Construction Activities

A contractor with an existing BES on-call services contract completed the construction of multiple school site projects. The contractor billed the work for each school site by general type of activity (labor, machinery used) and did not break down costs by specific project activity (excavation, backfilling, grading, landscaping).

Cost Components

Construction

Construction cost \$11,517 or 72 percent of the overall project cost (excluding volunteer labor). The contractor did not have a great deal of experience in stormwater retrofit projects, resulting in final costs higher than the original bid.

Landscaping

Landscaping cost \$4,021 (excluding volunteer labor), or 25 percent of the overall project cost (excluding volunteer labor).

Permitting

The permits for this project cost \$566, or 3 percent of the overall project cost (excluding volunteer labor).

Cost Comparisons

This project had a relatively simple design that used the existing grading of the vegetated swale site and the existing location of the nearby field inlet. The project is a good example of potential retrofits for existing development. Similar private-sector projects with more experienced contractors might cost less and take less time.

MAINTENANCE AND MONITORING

Portland Public Schools is responsible for the facility and its maintenance. Atkinson Elementary is responsible for any future vegetation or other modifications or enhancements to the project sites. After project completion, students planted native shrubs and groundcover under each of the trees for additional habitat. No monitoring will be performed at this site, but BES staff will make regular visits to photograph the site and ensure overall performance.

PUBLIC INVOLVEMENT

A one-page handout (<u>Attachment 1</u>) was developed to educate the local community about the benefits of the project. Copies were provided for each student at Atkinson Elementary School to take home, and extra copies were provided to school office staff to give to people who had questions (approximately 800 copies total). Seven classes of students (175 total students) were involved in planting the trees.

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SUCCESSES AND LESSONS LEARNED

Retrofit Projects at School Sites: Project sites at schools should be initiated by the schools when possible. A new principal came to this school one month before project construction and was unaware of the parent-led effort to place a stormwater facility onsite. If there is not a constant contact person within the school district (a teacher or other staff member) who advocates at the school for a stormwater retrofit project, it is difficult to coordinate with teachers and students for effective outreach and education. Project initiation by the school would better ensure that school calendar concerns, curriculum, and other school priorities are identified and met. In addition, stewardship-type projects are more likely to be maintained over the long term if they are initiated by the school. Outside partners that initiate projects—whether parents, non-governmental organizations, or governmental staff—should be willing to take on maintenance activities unless the site is specifically designed to have low or no maintenance.

Construction Budget: The contractor billed multiple school site projects by general activity rather than by project phase, making it difficult to make detailed cost comparisons.

Plumbing: Following construction of the swale, it was very difficult to find a plumbing contractor to disconnect the downspouts to the swale. The scope of work was too small and did not attract a bidder through the informal bidding process. The project manager contacted unions and MWESB (minorities, women and emerging small businesses) and publicly advertised the project. After much time and effort a contractor was finally hired. It would be more effective to bid the entire project to a prime contractor and let that contractor be responsible for finding a plumbing subcontractor.

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Atkinson Elementary School Innovative Wet Weather Project

September 2004

working for clean rivers, healthy watersheds, and a livable, sustainable community

ENVIRONMENTAL SERVICES CITY OF PORTLAND

working for clean rivers

vive probably noticed construction on the east side of the school grounds.

Portland's Environmental Services is working with Portland Public Schools on a project to reduce stormwater runoff from the school grounds. The project has two parts:

- Disconnecting three downspouts outside the northeast classrooms and re-routing stormwater to a new swale.
- Removing some pavement in the playground area to make room to plant eight trees.

After construction, the playground will be re-striped to replace play features, like four-squares.

Environmental Benefits

Removing asphalt lets more rainwater soak into the ground like it did before it was paved over. Instead of flowing into sewer pipes, the water will now help refresh natural groundwater supplies. Stormwater in sewer pipes can cause basement flooding and it contributes to combined sewer overflows (CSOs) to the Willamette River.

The disconnected downspouts will direct rainwater into the swale instead of into sewer pipes. The swale will allow pollutants to settle and filter out as water soaks into the ground.

The new trees will shade and help cool the school and the playground, and will attract wildlife. Trees also capture rainwater on their leaves and branches allowing it to evaporate, and they help reduce erosion by holding soil together with their roots.

A New Look

The swale will be a shallow, narrow depression planted with grass. The playground tree wells will be seeded with the same grass to prevent erosion until the trees are planted. Environmental Services and the school are working with Friends of Trees to schedule springtime planting days for students to plant deciduous and evergreen trees.

Environmental Education

Environmental Services has worked with Portland Public Schools to make the swale a safe and attractive part of the school grounds, as well as an educational resource. Over the next year, an Environmental Services educator will teach Atkinson students about water quality and stormwater management. The activities will show students how to be stewards of the new stormwater management areas on their own school campus.

For More Information

If you have questions or concerns about site activities please contact: Amber Marra, City of Portland Bureau of Environmental Services 503-823-4356 amberm@bes.ci.portland.or.us

Dan Saltzman, Commissioner

Dean Marriott, Director

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