



Bioretention (aka Rain Gardens)



Presentation

- Bioretention design parameters
- Design Ideas to consider



Tracy Tackett, PE

Low Impact Development Program Manager

Conveyance Zone



Bioretention Facility Design

Primary Components:

-Vegetation

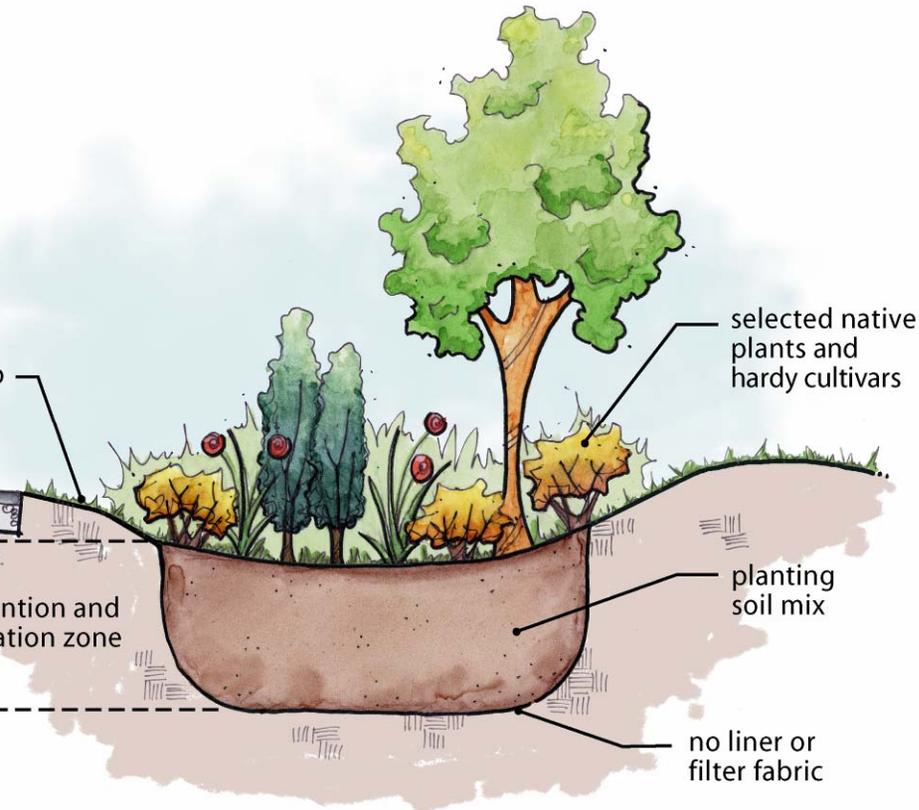
-Mulch/compost

-Surface Storage and Infiltration area

-Soil Storage

-Subsurface pipe (optional)

-Native Soil and design infiltration rates



Vegetation

Helps maintain
(or enhance)
infiltration rates.

UW monitoring
of SEA Street
found decrease
runoff with time.



Vegetation



Compost/ Mulch



Surface Storage



culvert

Surface Storage

Dead storage
depth set by
structure
overflow



Bottom Swale
Area

weir

Surface Storage

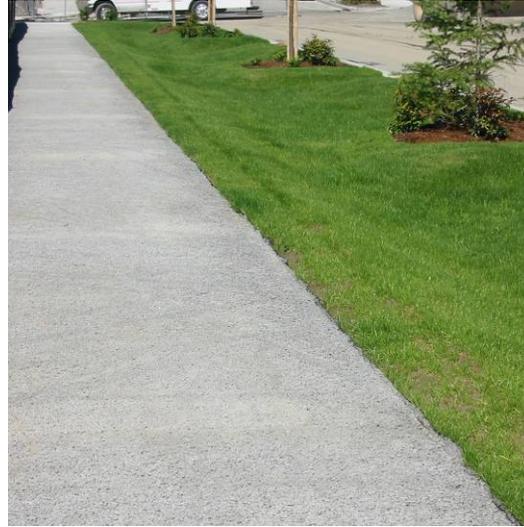


Surface Storage





Surface Storage



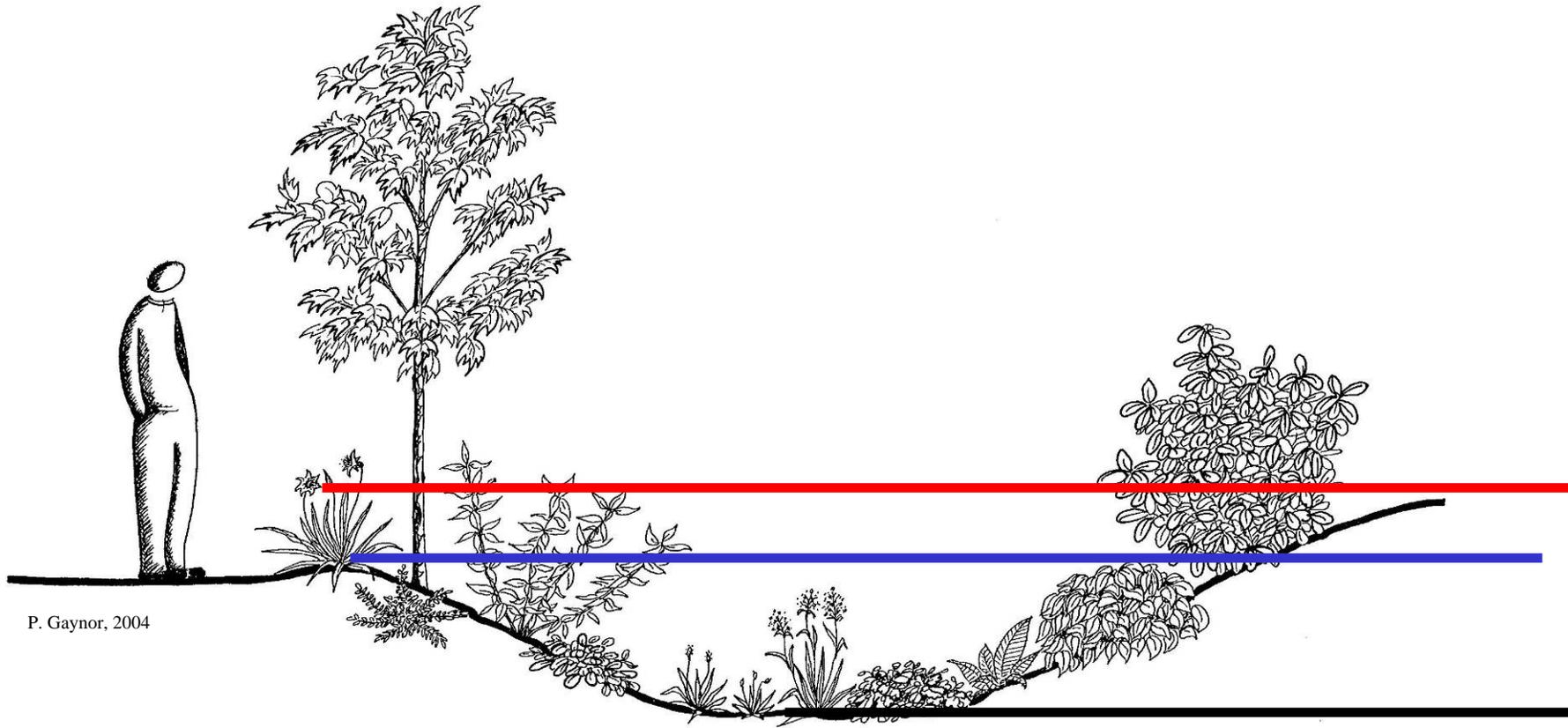
Berms

Surface Storage



Grading – overflow by directing of Sheet flow

Surface Storage – Design note



P. Gaynor, 2004

Leave room for
grading

Surface Storage



Native Soil



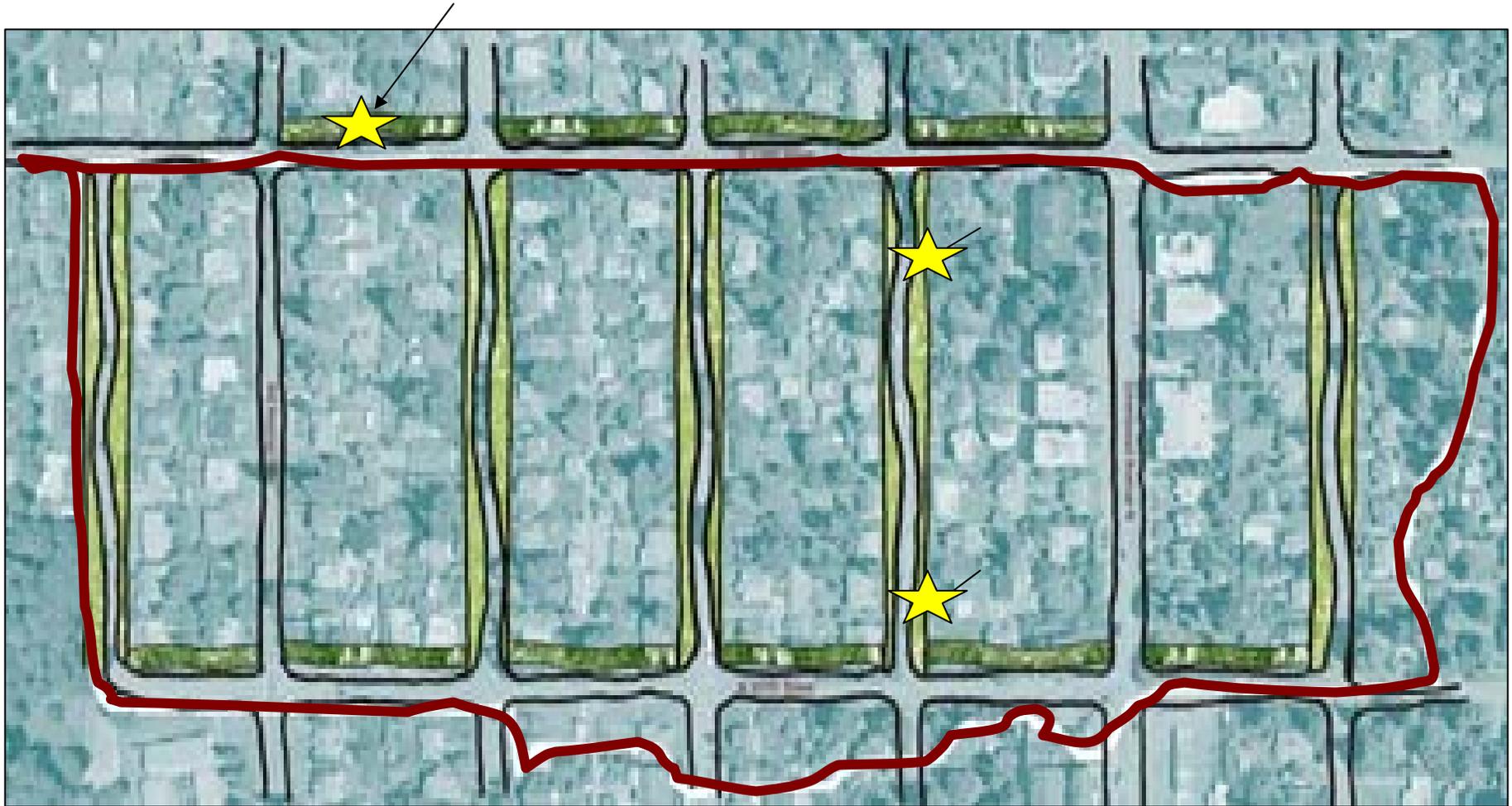
Native Soil



Native Soil



Broadview Green Grid



Sub-basin drainage area = 32 acres

Native Soil Infiltration Rates

Modified Full Scale Field Testing (PIT)



Subsurface Pipe



Soil Storage – Imported soil specs key element



Bioretention Soil



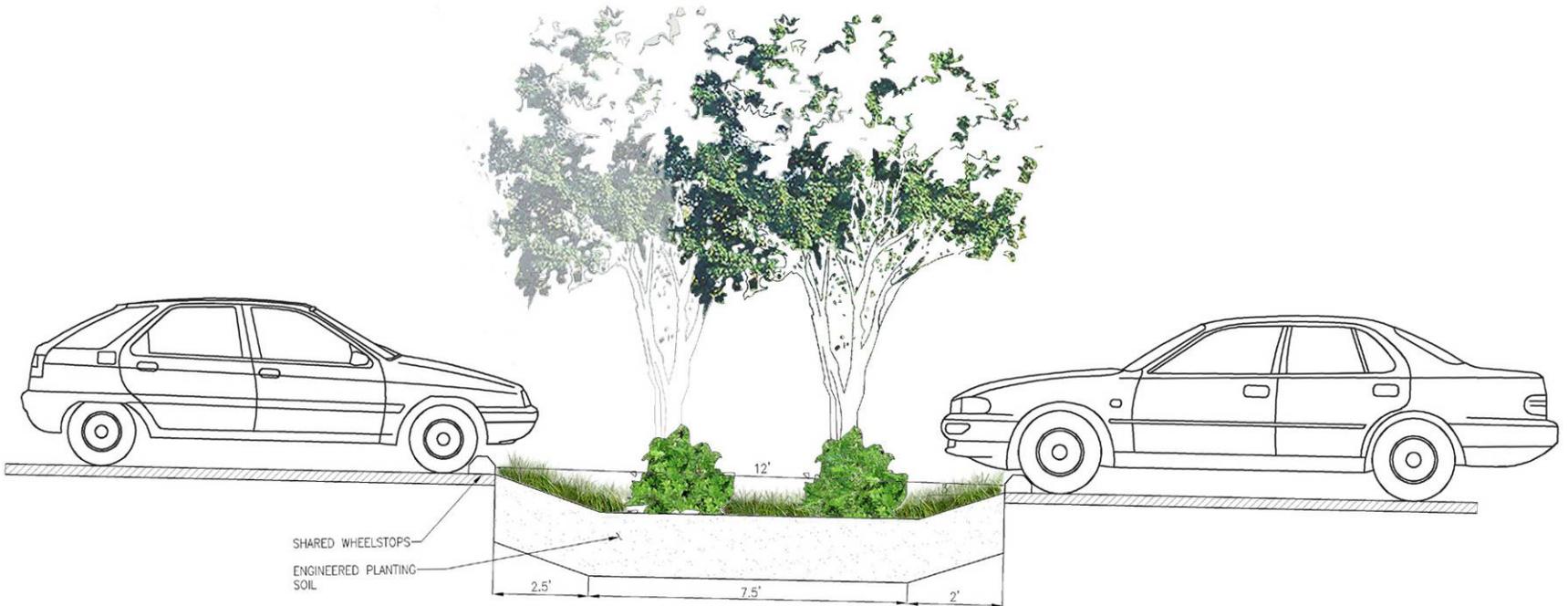
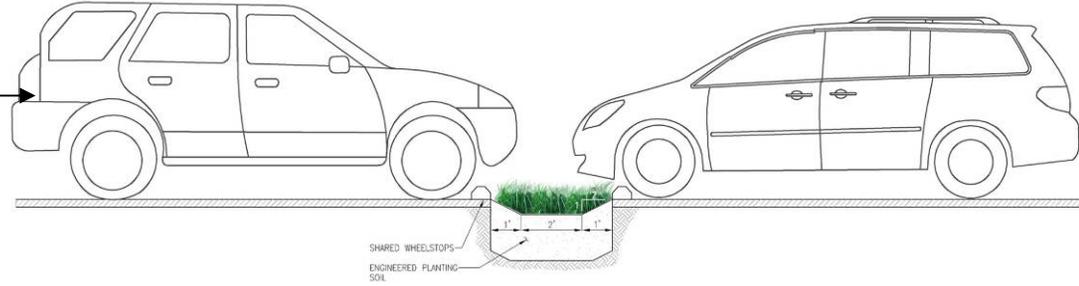
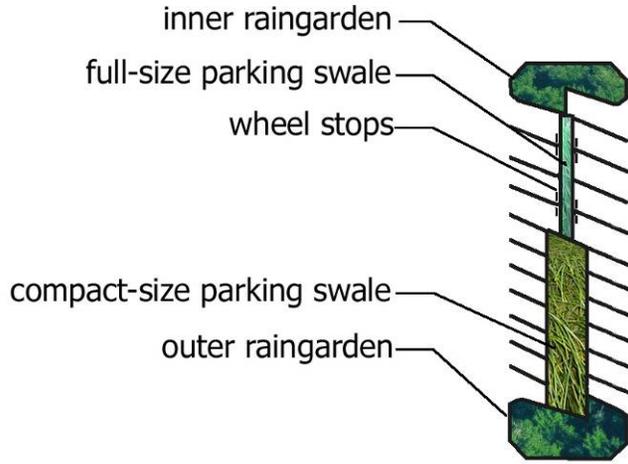
Design Ideas: Parking Lots



Bellevue Parks Site

Telescope Swale Details

Design Ideas: Parking Lots



Private Property: parking lots

Department of Planning and
Development

CAM

Client Assistance Memo

515

Seattle Permits

— part of a multi-departmental City of Seattle series on getting a permit

Green Parking Lots

September 30, 2005

WHO SHOULD CONSIDER GREEN PARKING LOTS?

If you're looking for a cost-effective option for meeting landscaping and water quality requirements when building or redeveloping a parking lot, consider "going green."

WHAT ARE GREEN PARKING LOTS?

Green parking lots reduce runoff that is discharged into local water bodies by using permeable paving

Natural Drainage Landscapes

Natural drainage landscapes include bio-swales, rain gardens, and bioengineered planting strips that can improve water quality and reduce runoff.

Bio-swales are open, linear channels that filter storm-water as the water flows through vegetation to the discharge point. Although their width and length vary as needed to achieve function, at a minimum they are two feet wide at the bottom and have a maximum slope of 2.5:1.

Rain gardens are shallow depressions in the landscape and are designed to hold and infiltrate runoff. They are amended with bioengineered soil and vegetated with plants that are adapted to both wet and dry conditions.

http://www.ci.seattle.wa.us/dpd/Sustainable_Building

Portland's Green Streets



NE Siskiyou Green Street



SW 12th Avenue Green Street



Glencoe Elementary Raingarden

Drawn by: Kevin Perry



Others...

April 27, 2005

Construction Note:

TESC Enforcement procedures in place prior to construction





11/02/2005

SPU NDS Project Information:

[http://www.ci.seattle.wa.us/util/
naturalsystems/](http://www.ci.seattle.wa.us/util/naturalsystems/)