

LID APPLICATION TO THE ROADWAY LANDSCAPE

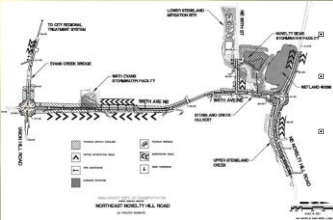
solutions, results, and questions



Mike O'Neil, P.E. King County Department of Transportation

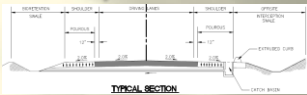
Mike.Oneil@kingcounty.gov

Novelty Rd. Design Adaptations



- 97% of the rainfall falls at rate of less than 0.2 inches/hour. An 8 foot permeable shoulder with a subgrade infiltration rate of 1 inch per hour, can infiltrate flow from a 40 foot road section.
 - Use permeable asphalt only on shoulder to reduce wear
 - Avoid the use of open-graded rock under pervious pavement to extend its application to steeper grades.
- Using check dams of streambed gravel, and seeding with dry/wet seed mix allowed greater use in diversity landscape
- Dispersion can be found along publicly owned properties such as parks, stormwater facilities, and lands adjacent to mitigation sites.
 - Use treatment trains; pervious shoulders draining to bio-retention ditches, then traditional treatment facilities. (Belt and Suspenders - To receive stormwater permit approval we needed to provide conventional detention and water quality because water quality benefit for much of the LID applications were not proven. DOE grant balanced the cost to the County for this approach.)

Novelty Hill Road LID Applications



Regulatory issues for Permeable pavement

- Only 50% flow control credit for rain falling directly on porous surface. No credit for flow from contributing impervious surface
- Slopes must be less than 5%
- No credit for water quality treatment



Porous Concrete Maintenance Issues



- Moss
- In one year infiltration rate dropped from over 100"/hr. to almost 0
 - Slipping hazard
 - Annual maintenance Cost



Regulatory Issues

- To get water quality credit, the use of permeable pavement requires placing organic material in the road bed. Organic material in the road bed leads to structural failure. No credit for soil chemical breakdown and bonding, mechanical retention, biological activity
- Only 50% quantity control credit for runoff if the falls directly on permeable pavement and no credit for flow entering from adjacent impervious surfaces.
- Recommended not to use permeable asphalt on slopes greater than 5%
- No credit for flow dispersion if slope is greater than 15% and less than 20 feet in width

Accidental LID

Would we be able to obtain permits to allow these as new improvements?

Can this slope retain and treat?

Many of our high steep road slopes are similar to this

40 to 70% of our rural roads look like this

Would we be able to have credit for dispersion on private land?

30 to 50% of our rural roads look like this

Can LID modification improve this?

30 to 60% of our ditches appear to carry little to no flow

Does this ditch provide LID benefits?

Ability to Fund LID

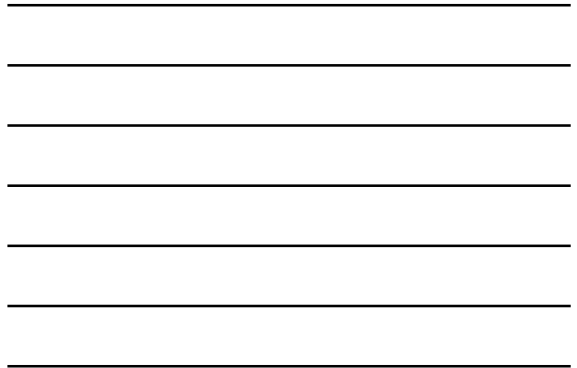




End

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Permeable Pavement Video

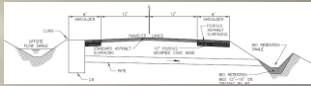


Western Washington rainfall intensities are extremely light compared to much of the United States. The following table is a probability analysis of 18 years of rainfall data in the vicinity of the project demonstrates that

This probability analysis excludes periods of no rainfall and it is based on records taken at 15 minute intervals. From this record there were on 8 instances of the rainfall exceeding a rate of 0.25 inches per hour:

12/26/1996 12:00	1.04
12/27/1996 12:00	0.79
12/29/1996 11:30	0.55
10/18/1990 17:30	0.33
6/15/1991 17:15	0.31
6/10/1995 21:15	0.29
8/17/1995 9:45	0.27
7/22/2000 15:00	0.26

These rates were sustained for only the 15 minute period. The most important outcome of this data is that 97% of our rainfall occurs at rate of less the 0.20 inches per hour.



Bioinfiltration Seed Mix (75% Dry/wet tolerant):	% SEED by Wt.	Min. % Pure Seed	Min. % GERMINATION	
Meadow Fescue (<i>Festuca elatior</i>)	50%		95%	95%
Creeping Red Fescue (<i>Festuca rubra</i> var. <i>rubra</i>)	20%		98%	96%
Western Mannagrass (<i>Glyceria occidentalis</i>)	10%		95%	90%
Blue Wildrye (<i>Elymus glaucus</i>)	7%		95%	90%
Redtop Benigrass (<i>Agrostis alba</i>)	5%		98%	95%
Alaska Clover (<i>Trifolium hybridum</i>)	5%		98%	98%
Weed Seed	1.0% (maximum)			
Inert Matter	2.0% (maximum)			
bioinfiltration Mix rates:				
Seed slurry mix rate @ 3 pounds per 1,000 s.f. (130 lbs./Ac.)				
Wood fiber mulch rate @ 45 pounds per 1,000 s.f. (2,000 lbs./Ac.)				
Tackifier rate @ 1.0 pounds per 1,000 s.f. (40 lbs./Ac.)				
No fertilizer				
Hand seed mix @ rate of 4 pounds per 1,000 s.f. = (174 lbs./Ac.)				
11/19/09				

