



NuTone Site Redevelopment:

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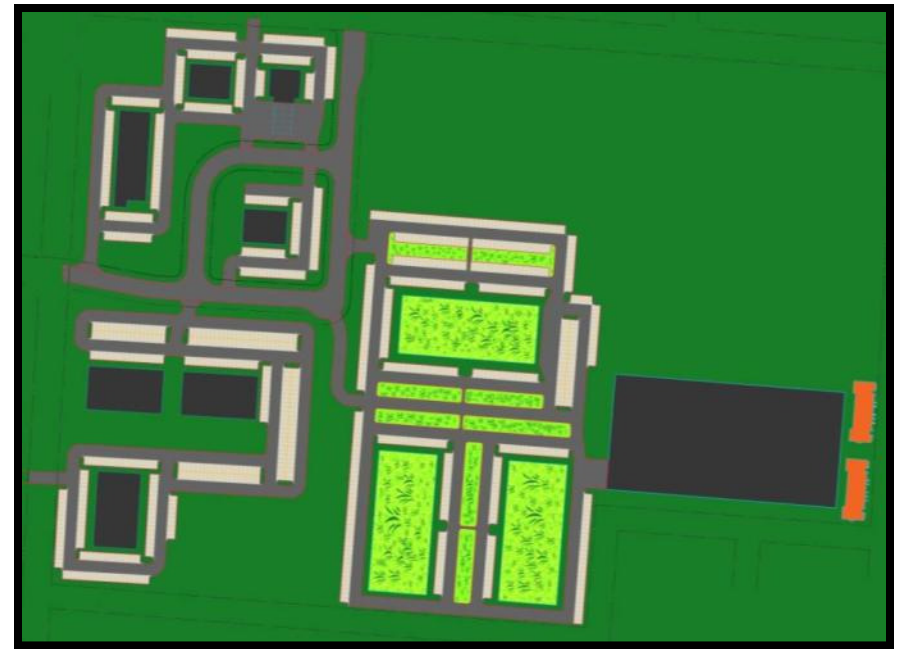
Parker Sues

Traditional vs.



Problems

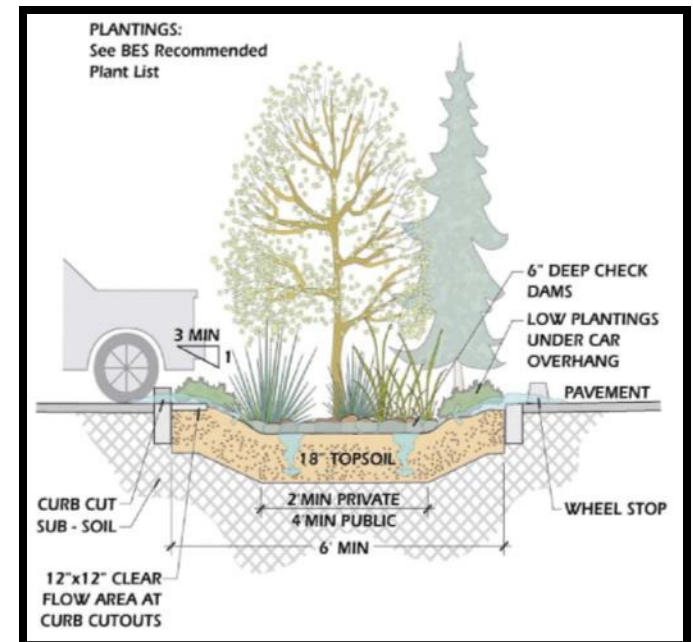
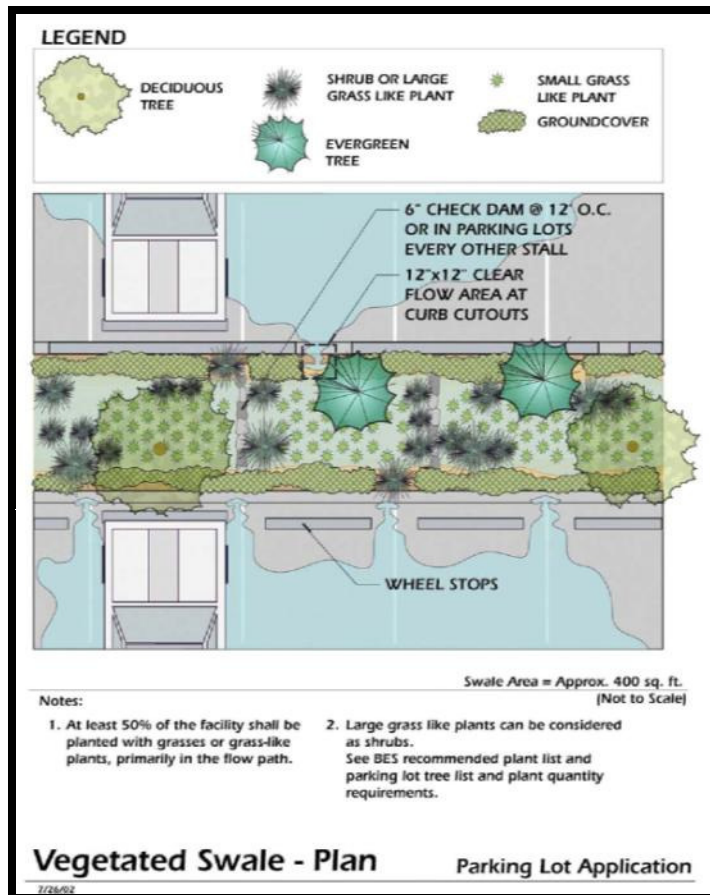
- 1) Required amount of parking
- 2) Traditional building layout
- 3) Amount of impervious area



Solutions

- 1) Reduced based on code
- 2) Kept existing, in order to be realistic
- 3) Reduced using green infrastructure

Bioretention



Benefits

- Reduces runoff to storm sewers
- Improves water quality
- Reduces heat island effect
- Creates landscape diversity to create a sense of space

Bioretention Description

Bioretention is a practice that utilizes the chemical, physical, and biological properties of plants and soils to control the quality and quantity of stormwater runoff. It seeks to mimic preexisting site conditions, allowing runoff to infiltrate back into the ground.

Green Roof



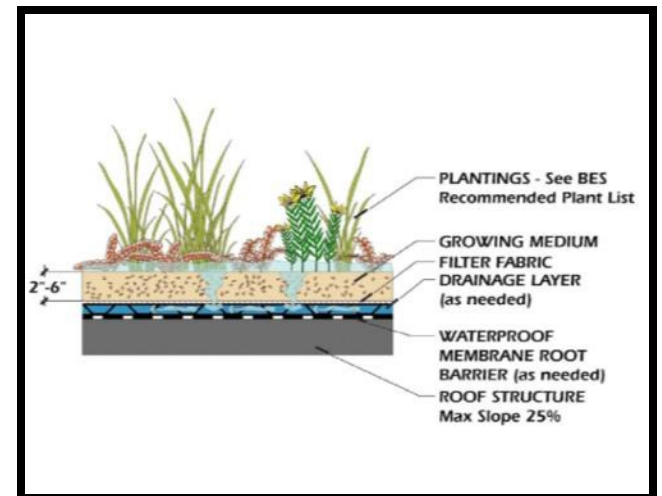
Green Roof Description

Green roofs consist of a soil layer, a drainage layer and an impermeable membrane. Special plants are utilized that can withstand the extreme conditions found on roofs. An extensive roof is proposed that would minimize the weight of the green roof.



Benefits

- Reduces runoff to storm sewers
- Increases the lifespan of the roof
- Reduce heating and cooling costs for the building
- Reduce the CO₂ impact of the building



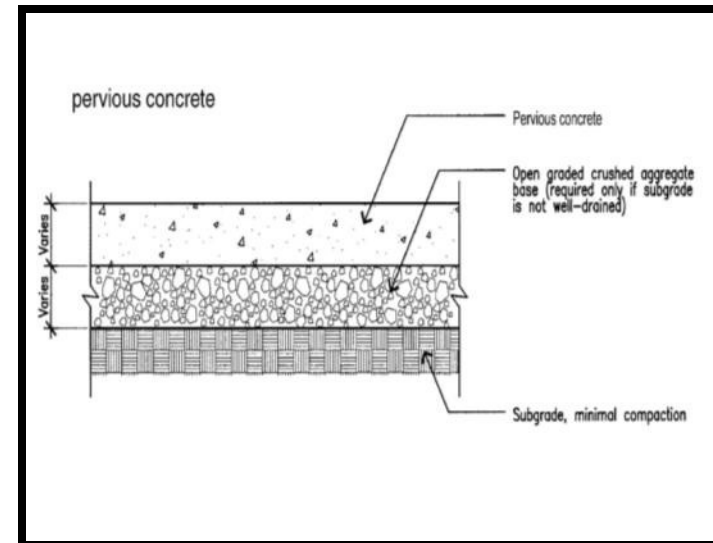
Pervious Concrete

Pervious Concrete Description

Pervious concrete seeks to reduce runoff from parking lots by allowing rain water to infiltrate through the pavement. It is proposed that pervious concrete only be utilized in low traffic areas and parking spots.

Benefits

- Reduces runoff to storm sewers
- Improves water quality
- Aesthetic improvement over traditional paving



Calculations

Traditional Design

18.5 acres impervious area

$(18.5/6) \times 4.08'' = 12.5$ acres of bioretention

Proposed Design

14.3 acres impervious area

$(14.3/6) \times 4.08'' = 9.7$ acres of bioretention

*able to provide 6.9 acres by reducing parking

* $9.7 - 6.9 = 2.8$ acres of total untreated area

Runoff Calculations

$Q = CIA$

C = runoff coefficient = .9

I = intensity = 5.45'' for 10-year storm

A = area = 2.8 acres

Q = 13.8 cubic feet per second

Cost Analysis

Bio Retention Vs. Pipe Network

	Construction Cost Per square foot	Total Construction Cost	Maintenance Cost Per square foot	Component Lifespan (yrs)	
Bio Retention	\$1.50	\$310,080.00	\$0.01	50	By reducing the parking area and adding Bio Detention a pipe network is not require. Savings of \$213,075
Pipe Network		\$523,155.90	\$0.01	50	

Porous Concrete Vs. Standard Concrete

	Construction Cost Per square foot	Total Construction Cost	Maintenance Cost Per square foot	Component Lifespan (yrs)	
Porous Concrete	\$5.30	\$928,146.60	\$0.04	18	Porous concrete will be added to parking spots only, the amount of Porous concrete reflects parking reduction. Savings of \$370,116
Concrete	\$3.40	\$1,298,262.80	\$0.03	30	

Green Roof Vs. Standard Roof

	Construction Cost Per square foot	Total Construction Cost	Maintenance Cost Per square foot	Component Lifespan (yrs)	
Green Roof	\$12.00	\$1,242,720.00	\$0.75	50	Extensive Green Roof was considered. Green Roofs can reduce cooling cost by 25-50% and reduce heat loss by 25% or more Addition cost of \$769,460
Standard	\$4.57	\$473,269.20	\$0.20	23	

Funding



Pipe Network
Construction Cost:\$523,155
Life Span of 50 years



Bio Retention
Construction Cost:\$310,080
Maintenance Cost:\$2,067/yr
Life Span of 50 years



Standard Concrete
Construction Cost:\$1,821,418
Maintenance Cost:\$11,080/yr
Life Span of 30 years



Porous Concrete
Construction Cost:\$928,146
Maintenance Cost:\$6,305/yr
Life Span of 18 years



Standard Roof
Construction :\$473,270
Maintenance :\$20,712/yr
Life Span of 23 years



Green Roof
Construction : \$1,242,720
Maintenance :\$77,670/yr
Life Span of 50 years
Additional Savings of 25% of energy cost

- MSD may offer to fund all or a portion of green infrastructure construction cost through “Green Infrastructure Demonstration Program”
- With the location, size, and scope of work proposed, this project would meet MSD’s review criteria
- Max funding awarded so far = \$500,000

Total cost for proposed project is **\$2.48 Million**
Total cost for Traditional design is **\$2.29 Million**
Total cost with potential funding is **\$1.98 Million**

*Yearly energy savings as a result of the green roof should also be considered

Conclusion

- Green infrastructure will not cost MedPace significantly more money
- Reduce runoff by a significant amount/ Reduce CSOs
- Reduction of Heat Island Effect in area
- Reduce runoff pollution through water quality
- Provide education to the public
- MedPace will receive positive recognition from public and Cincinnati