



**WILLOWBROOK ROAD SITE
CONCEPT PLAN
SUBMISSION EXAMPLE**

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PREFACE

- This was a working process- it took three submissions before both Paul and I were comfortable.
- My first, so I would expect the next one to be much easier (hopefully just a single submission)
- Complexities with a pad site made this interesting exercise
- Evolved into a group review

WILLOWBROOK ROAD PAD SITE

- Located South of Golden Lane
- Total property area = 25 ac.
- Design constraints
 - ‘Pad site’
 - Road to be constructed first
 - Pad constructed to suit when tenant is available
 - Pad will be rough graded
 - Need to accommodate 24000 sf office space in two floors
 - Could not connect to Golden Lane
- Permitting Jurisdiction: City of Cumberland



PRE-ESD DESIGN



- Disturbed area = 8.9 acres
- Total impervious area = 4.33 acres
- 9'x18 parking stalls
 - Already reduced size (City ordinance allows for down to 8.5x18)
 - 200 Total spaces
- 24' wide drive aisles
- 24' wide street with 6' paved shoulders
- Relied on conventional BMPS
 - difficult to work into site

WILLOWBROOK ROAD CONCEPT PLAN SUBMISSION

- Why not go through with one of the original designs?
 - Timing
 - Cost
 - Alternatives



ALONG COMES ESD TO THE MEP

CHANGE WAS ON THE
HORIZON



CHALLENGES

- What is ESD?
 - Lack of complete examples
 - No ‘practical design guidelines’
 - MDE’s examples all say “assume that a P_E of xx was met.”
- And to the ME what?
 - Who defines practical?
 - What will my client live with?
 - Like many out-of-state clients, he was not at all familiar with ESD let alone SWM.
 - Need to educate- both the client *and the designer*

FIRST SUBMISSION

- Examine site
- Perform a site and resource mapping
 - Identified need for protection of wetlands
 - Steep slopes
 - “But its all steep”
 - Downstream conditions
 - Willowbrook
 - SHA
- Mapping
- Narrative

Site Resources Map

EX. DRAINAGE AREA MAP

NARRATIVE

- Written based around the guidelines presented in Chapter 5 and Pending City Ordinance
- Discussed the natural resources and corresponding regulatory activities
- Included Web Soil Survey report
- Preliminary ESD (P_E Goal) calculation
- Evaluation of suitable ESD practices

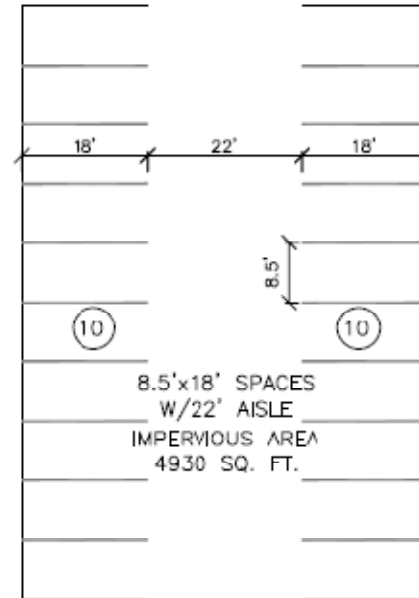
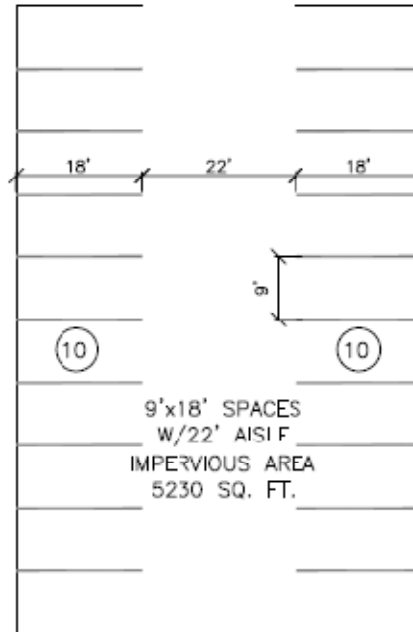
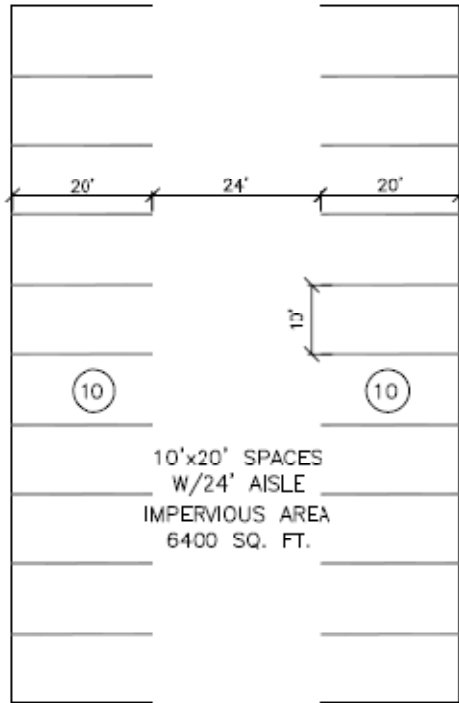
ESD

- Needed to show implementation of ESD to MEP
- Performed rudimentary calculations to develop P_E
 - Based on A_f equations included in the manual
- Worked through process with City
 - required three submissions before acceptable to City.
 - provided P_E increased with each submission. Also reduced P_E requirements.
- Site Plan

PRELIMINARY ESD REQUIREMENTS FIRST SUBMISSION

- Target RCN = 70 (HSG 'C', woods in good condition)
- P_E required = 1.8 inches
- P_E provided = wasn't submitted
- Employed various site development strategies
 - Reduced parking space sizes
 - Reduced aisle width
 - Reduced access road width
- Listed Green Roofs and Grass swales as the possible ESD Practices
- Total impervious area = 4.41 acres
- Total disturbed area = 9.5 acres

PARKING STALL WIDTH



CITY RESPONSE

- City responded wanted to see more in terms of calculations to verify P_E provided
- Still needed work
- Areas were left untreated
- City asked me to address each of the suggested ESD's for the site
 - Referenced City ordinance requiring each ESD to be addressed

SECOND SUBMISSION

- Developed a chart referencing each ESD practice and their applicability to the site.
- Implemented more ESD practices
 - Landscape infiltration
 - Grass swales
 - Infiltration berm
 - Sheetflow to conservation
 - Non-rooftop disconnection
- Still did not achieve the ESD goal of 1.8 inches
 - But I thought I reached MEP
 - I was wrong
- [Revised plan](#)

CITY COMMENTS

- Demonstrate MEP
 - Still didn't meet goals
- Why not grass roofs
 - Difficult to come up with a valid reason that was not directly related to cost
 - Discussed this with the Owner – “NO WAY”
 - Impractical – could even make the property un-marketable
 - But it meet P_E requirements

THIRD TIMES A CHARM

- Looked at site layout- how can you get more ESD into the same space
- Revisited the parking layout
- Reduced site imperviousness to 2.67 acres
- Total disturbance = 9.51 acres
- Reduced P_E goal to 1.6 inches
- P_E Provided exceeded 1.7 inches
 - Exceeded P_E required
 - Good cushion going into Site Development Phase
- Revised Plan

THIRD SUBMISSION

- Added more ESD practices
 - Permeable paving
 - great for reduction of impervious areas
 - Reduced P_E .
 - Limited applicability- but perfect for parking lots
 - Removed sheet flow to conservation areas
 - Not correctly applied in second submission
 - Needed sheet flow from lots into area- difficult or next to impossible to achieve with topography
- Modified the narrative
 - Expanded on the review of [appropriate ESD practices.](#)

NEXT STEPS

- Site Development phase starts after concurrence from City on Concept Plan
- Need to evaluate ESD applications
 - Will they fit- detailed proposed topo required
 - Will they work- particularly infiltration
 - Solid calculations required
- Evaluate use of grass and gravel shoulders
- Evaluate downstream impacts
 - What will SHA accept? Q_{10} and Q_{25} impacts