



CBP3 SUSTAINABLE STORMWATER INFRASTRUCTURE SUMMIT



The Challenge of Stormwater Runoff and Its Market Potential to Drive a New Economy

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And Dr's Welker, Wadzuk, Komlos and many grad and UG students!

VUSP Mission Statement

To advance the evolving field of sustainable stormwater management and to foster the development of public and private partnerships through research.

<http://www.villanova.edu/vusp>

Villanova's SCM Research and Demonstration Park



IGNITE CHANGE. GO NOVA.





IGNITE CHANGE. GO NOVA.



Zoo Rain Garden and Stormwater Trench

- Total Site Area = 810 ft²
 - RG = 630 ft²
 - SWT = 180 ft²
- Total Drainage Area = 12,500 ft²
 - DCIA = 8750 ft²
 - Grass Swale = 3750 ft²
 - Overflow from adjacent rain garden
- Inflows to Rain Garden
 - Surface Inflow from DCIA through trench drain
 - Overland flow from grassed swale (including overflow from adjacent rain garden)
- Overflow from RG through domed riser to stormwater trench (SWT)



Weather Station

Precipitation, Air Temperature, Relative Humidity, Wind Speed and Direction, Barometric Pressure, Pyranometer

Subsurface Storage
Soil Moisture Sensors
(3 clusters of 2 each)

Check Dam with Flow
Measurement Device

Subsurface Storage
Soil Moisture Sensors
(3 clusters of 2 each)



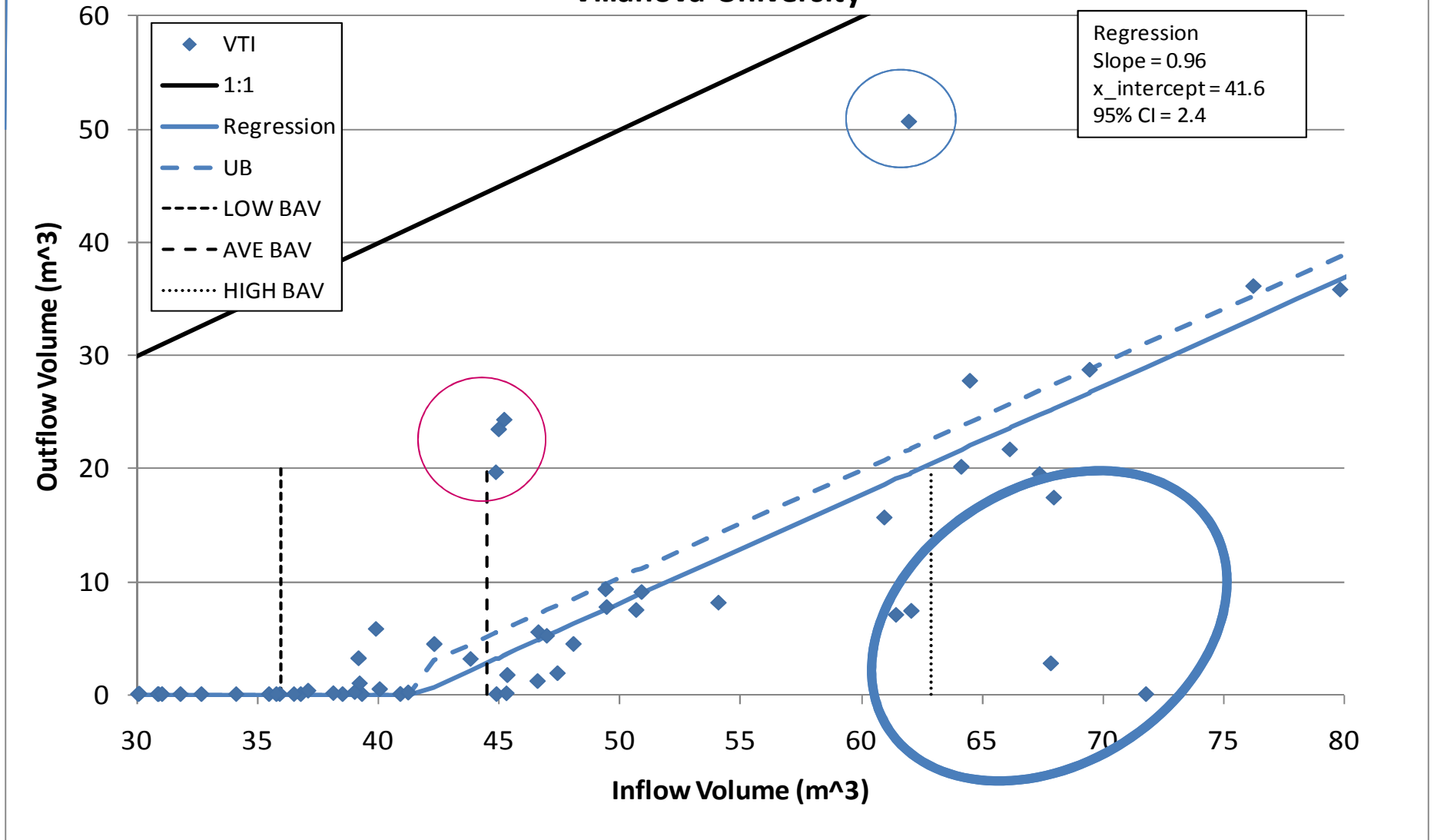
VILLANOVA URBAN
STORMWATER PARTNERSHIP

VILLANOVA UNIVERSITY
COLLEGE OF ENGINEERING

Green Infrastructure

- What I know
 - It works
 - It is resilient
 - Performance goals depend on region and challenges
 - We underestimate performance
 - It requires maintenance
 - Over last decade we have doubled our knowledge
 - But we haven't taken advantage of that
 - Infiltration – ET Powerful
 - Back to back storms not a challenge
 - It is a system - Soil / Water / Plants
 - We do not treat it that way

Inflow vs. Outflow for All Storm Events Villanova University



Partnership?

- Need to create an environment for success
 - It is a system – treat it that way!
 - Design Stds/ goals
 - Inspection
 - Construction
 - Maintenance
 - Funding
 - Partnerships - Retrofits
 - Incorporate Innovation – into EVERYTHING
 - Static vs dynamic
 - Credit performance, not “Standard design”
 - Static – Dynamic are the future
 - Example- Infiltration DURING the event?
10:1 0.25 in/hr 18 Hours (ignore first 4)
= 0.45 watershed inches



Figure 3 - Proposed redevelopment of Villanova Main Lot

Urban

Sidewalk

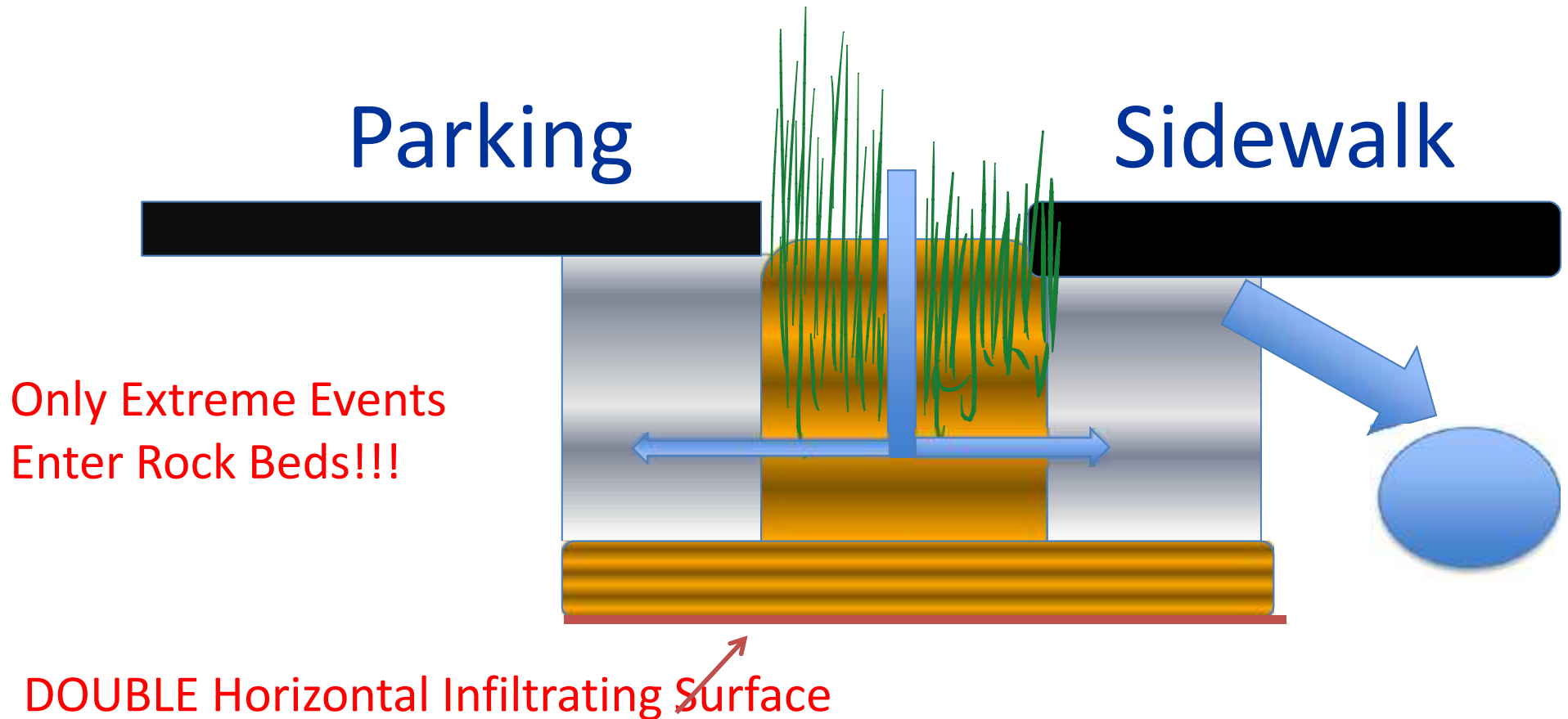
Street

Temporary Storage in Rock Bed
Below root zone
(Every Storm)

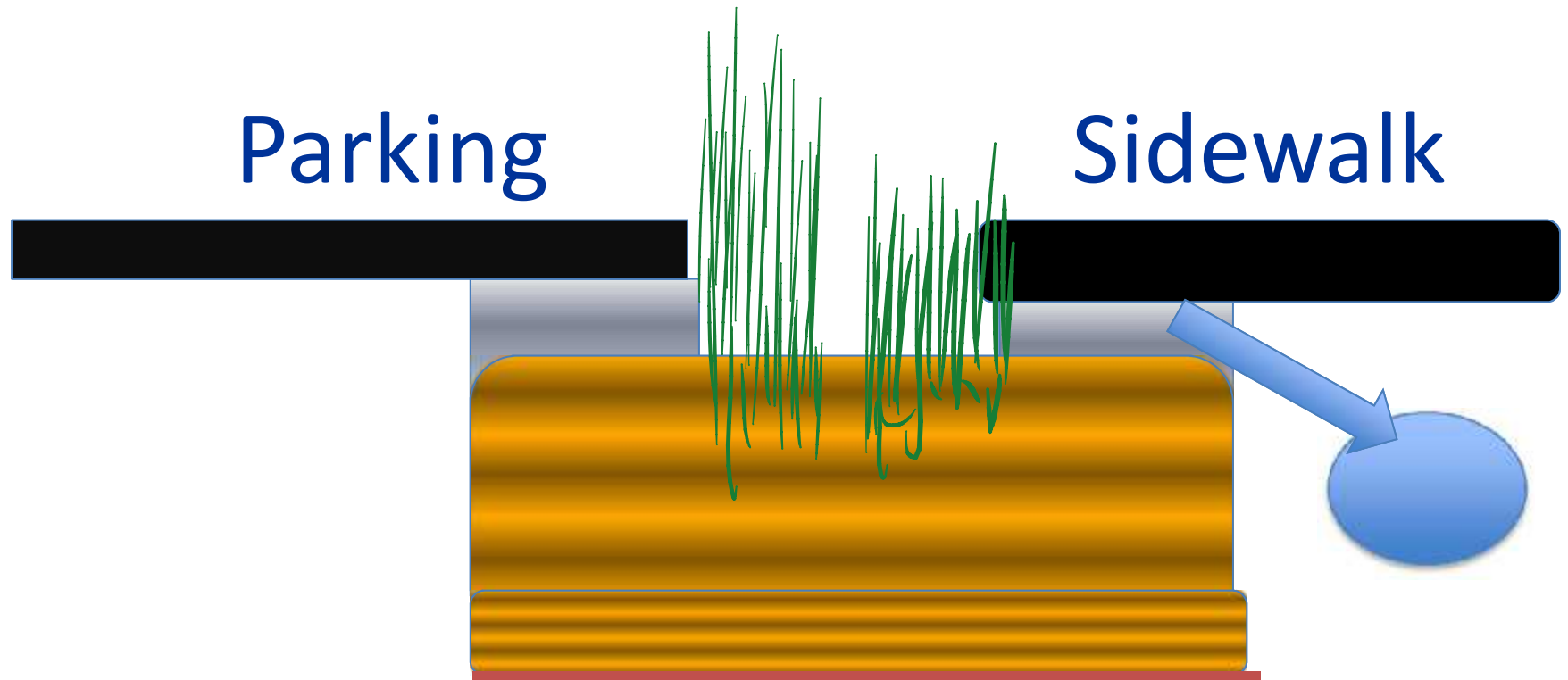
Flood overflow
To storm sewer

Horizontal Infiltrating Surface

VUSP SCM Enhanced Bioinfiltration



VUSP SCM Enhanced Bioinfiltration

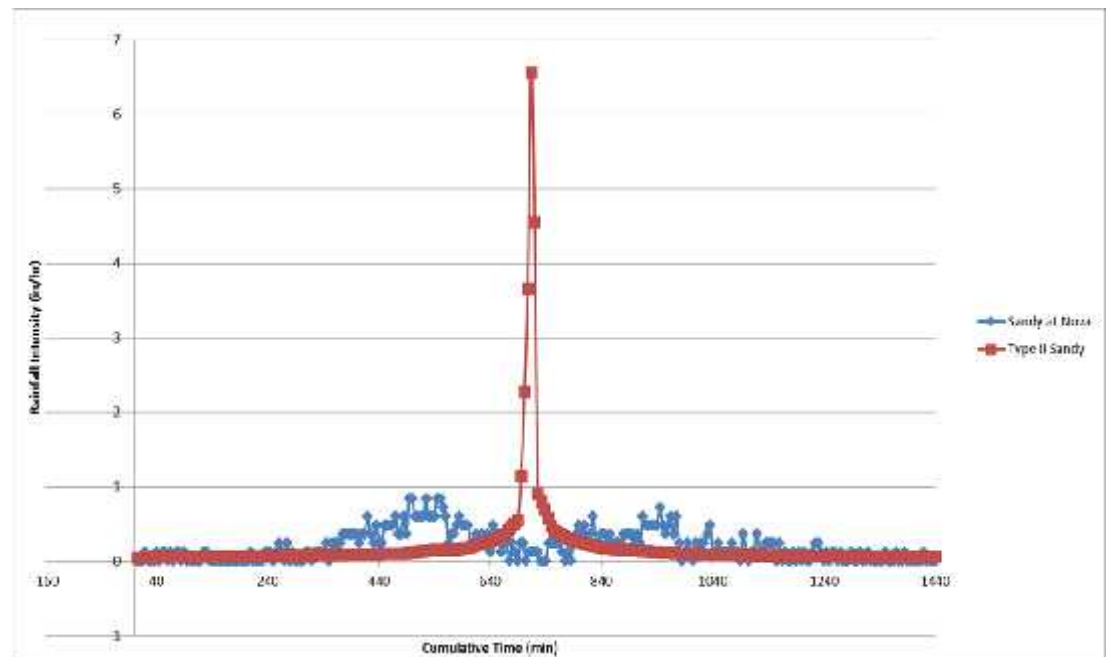


Double Horizontal Infiltrating Surface

6" Pool, 24" Media, No Gravel --- > NO runoff

To incorporate Dynamic Design

- New Tools
- New Regulations
- New Mindset
- New Products



Real time Controls



Green Roof - Lots of Capacity

Grey Roof - Lots of Water --- Solution?



2015



Figure 1 - Villanova Main Lot under existing conditions

2019?



Figure 3 - Proposed redevelopment of Villanova Main Lot

