Stormwater Scenarios, Discussion Forum, Next Steps

Massachusetts Department of Environmental Protection

Stormwater Advisory Committee

Meeting 5: December 2, 2020

Agenda

- Welcome, Agenda, Introductions, Meeting Protocols
- Stormwater Scenarios – Presentation and AC Discussion
- *Break (5 min)* ----------
- Facilitated AC Discussion Forum – All Stormwater Topics
- *Break (10 min)* ----------
- Public Q&A
- Next Steps and Schedule

Stormwater Scenarios

- **Project Background**
  - MassDEP is considering revisions to the Stormwater Management Handbook.

- **Project Objective:**
  - Perform analysis of three (3) potential development Scenarios to demonstrate changes that may result from proposed revisions.

Overview of Proposed Revisions

- **Standard 2, Peak Discharge:**
  - Change Design Storms from TP40 to NOAA Atlas 14 PLUS.

- **Standard 3, Recharge Volume**
  - Increase for New Development and Redevelopment to meet current regulation.

- **Standard 4, Pollutant Removal**
  - Increase for New Development and Redevelopment to align with MS4.

Scenario Identification

Scenarios represent a range of typical development and redevelopment situations:

- **Scenario 1:** New Residential Development
- **Scenario 2:** Roadway Redevelopment
- **Scenario 3:** Tight Urban Lot Redevelopment

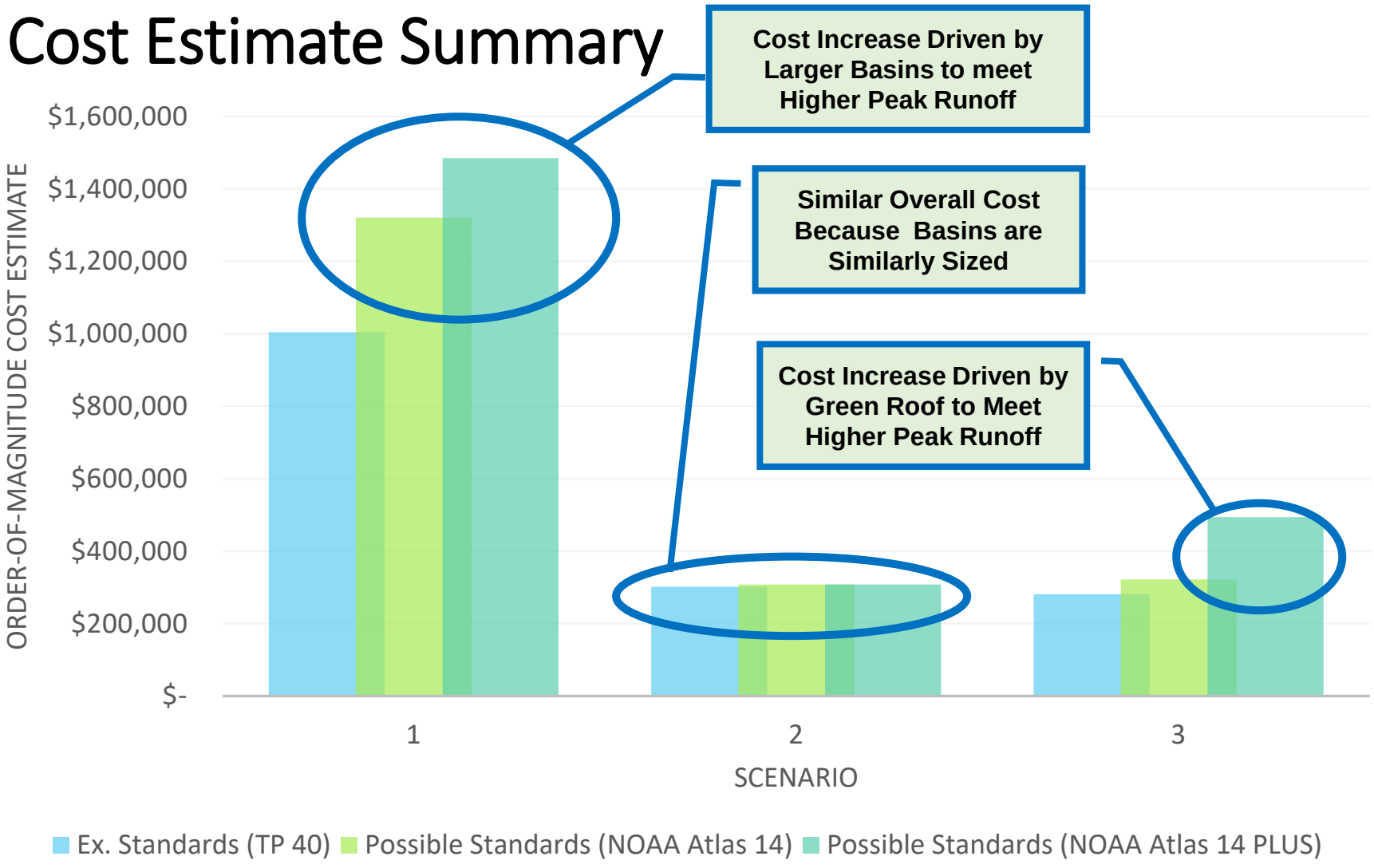
Stormwater Scenarios
Summary of Findings

Overall Conclusions for All Three Scenarios

Overall

- Proposed revisions appear to be generally feasible.
  - R_v and peak discharge were the most challenging standards to meet.
- Creative ESSD / LID / off-site mitigation may be required for space constrained sites.
- BMP sizing and associated costs are expected to increase.
- Different standards drive increases in sizing and cost
  - Standard 4 (Water Quality) did not drive sizing in any scenario

Cost Estimate Summary



Scenario 1
New Development
26-Lot Residential Subdivision

Scenario 1: Narrative

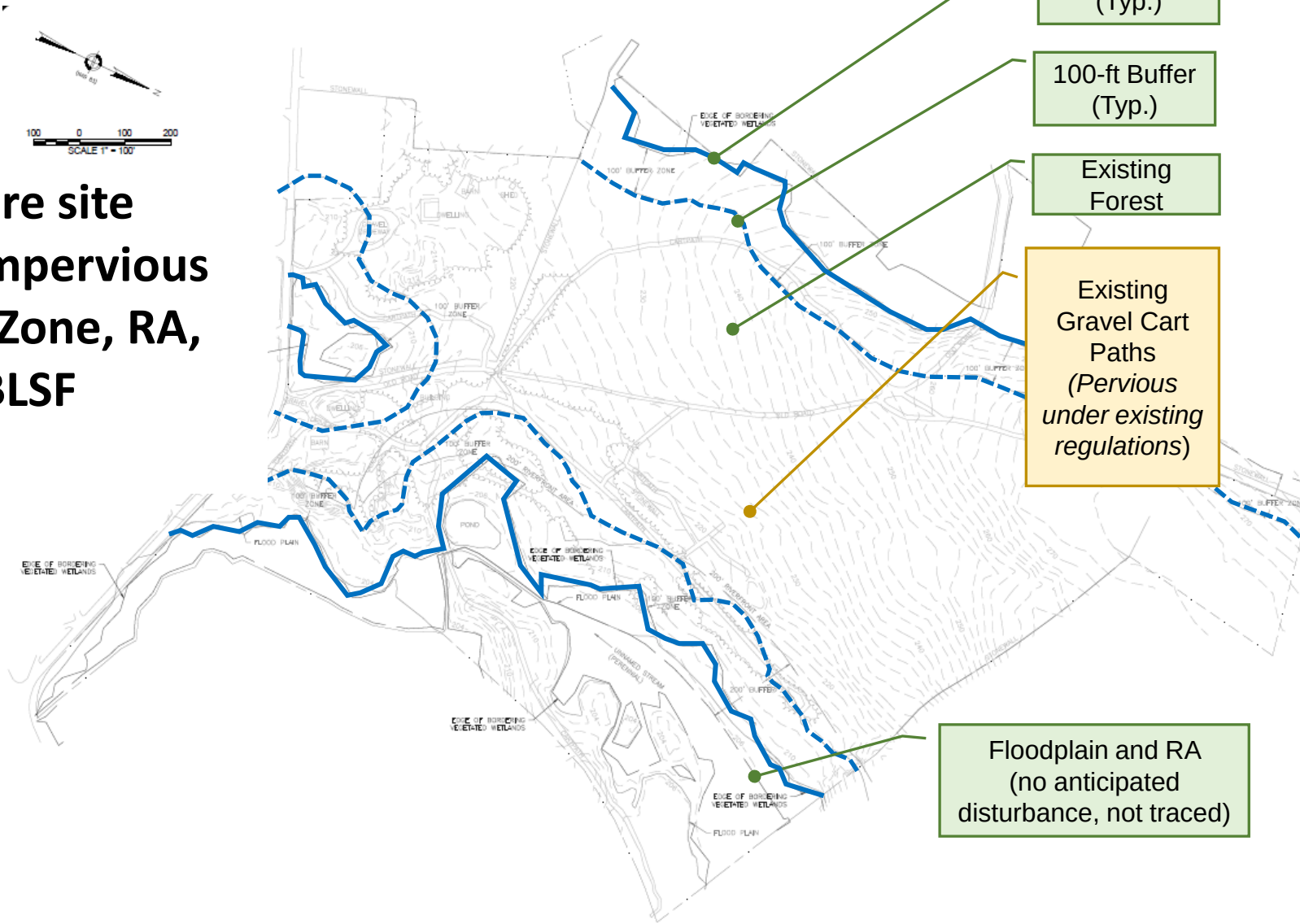
- **Existing Conditions:** 40.1 acre parcel primarily comprised of open space and forest.
  - Freshwater wetlands, two unnamed streams present on site. Site is crisscrossed by old gravel cart paths.

- **Proposed Conditions:** Subdivide the site into 26 half-acre single family lots.
  - Proposed ESSD: leave surrounding wetlands undisturbed, keep development out of 100-ft buffer as feasible, leave forested areas intact as feasible, and limit driveway sizing to 24-ft wide by 30-ft long.

- **Proposed Stormwater Treatment:** See forthcoming slides.

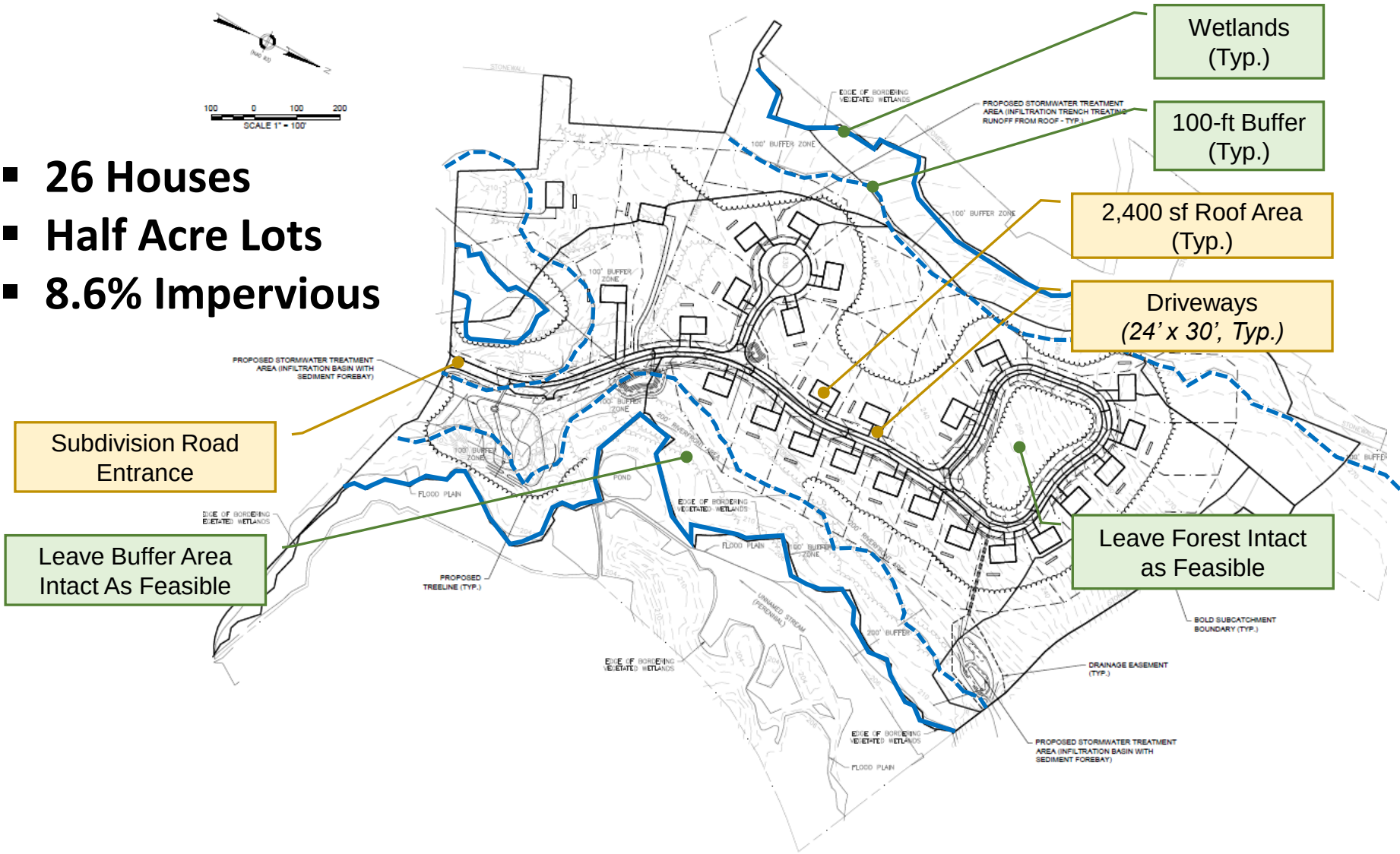
Scenario 1:Existing Conditions

- **40.1 acre site**
- **1.3% Impervious**
- **Buffer Zone, RA, BVW, BLSF**
- **MS4**



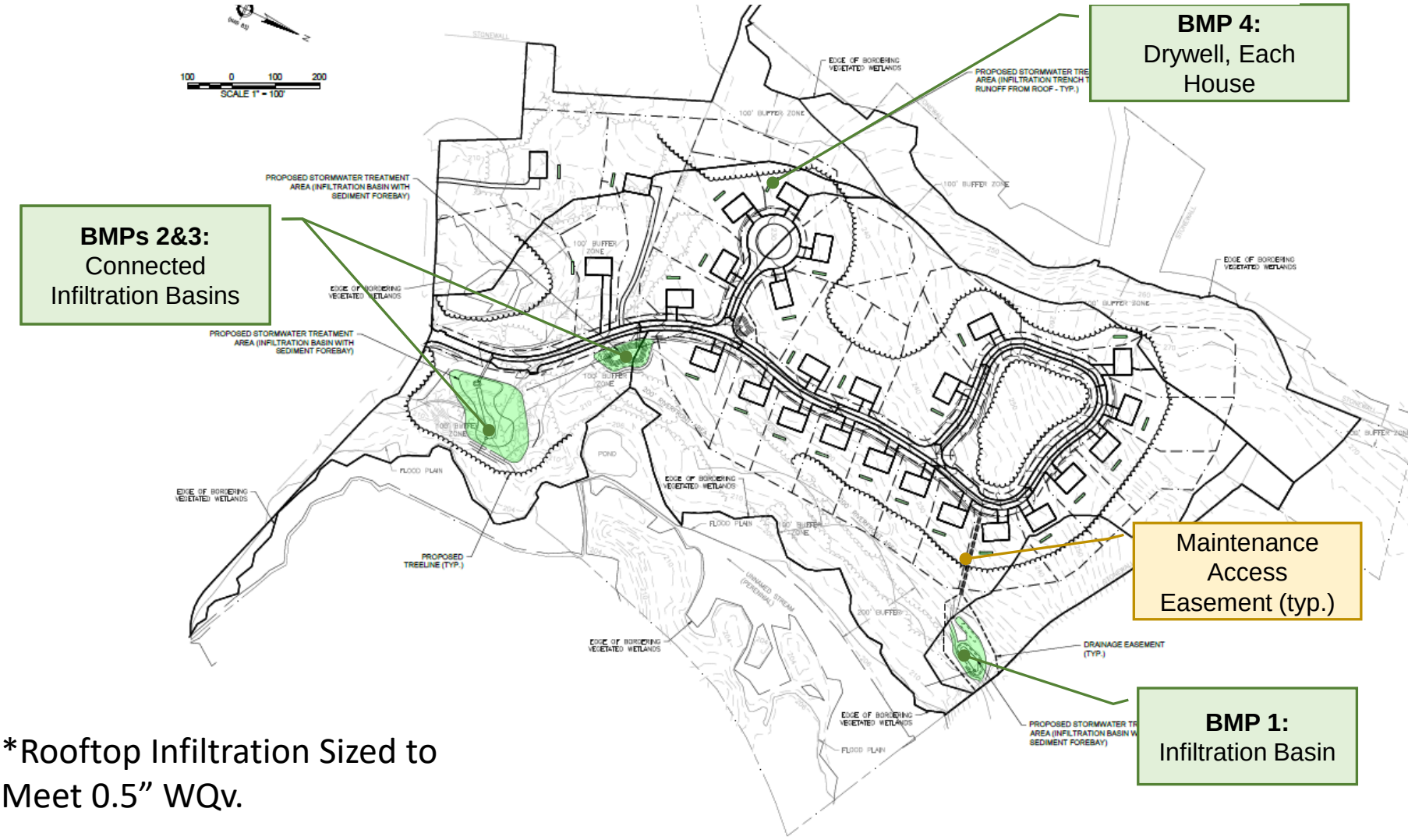
Scenario 1: Proposed Project Conditions without Stormwater Treatment

- **26 Houses**
- **Half Acre Lots**
- **8.6% Impervious**



Scenario 1A:

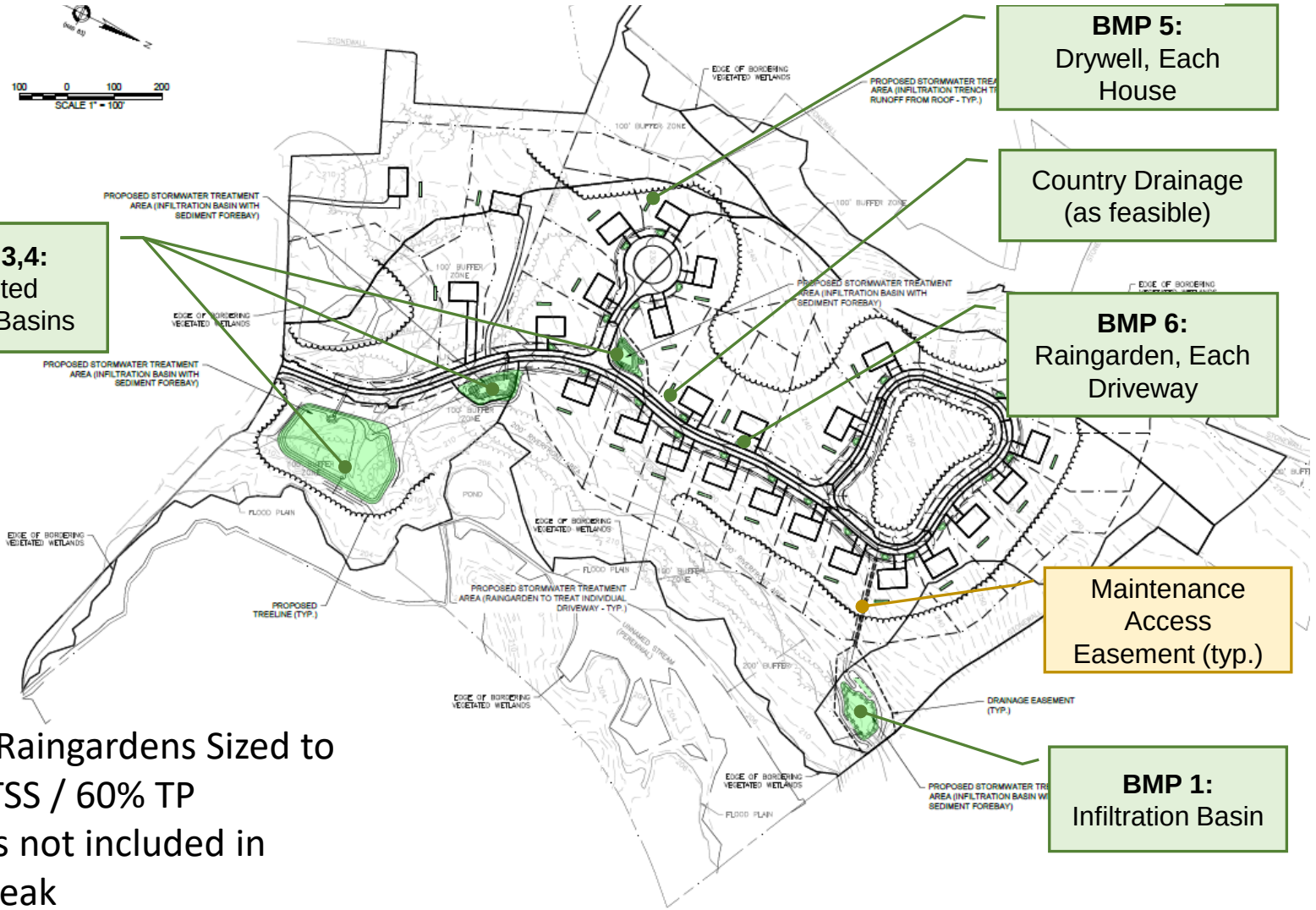
Treatment Option Under **Existing** Regulation



*Rooftop Infiltration Sized to Meet 0.5” WQv.

Scenario 1B:

Treatment Option Under **Proposed** Regulation



- Drywells & Raingardens Sized to Meet 90% TSS / 60% TP
- Raingardens not included in model for peak

Scenario 1A/1B Results

Treatment Goal:	Meet Existing Handbook Criteria	Meet Proposed Handbook Update Criteria
Rainfall Type	TP40	NOAA Atlas 14 PLUS
BMP Design Volumes	- Total: 17,000 cf - Rv: 17,000 cf - WQv: 17,000 cf	- Total: 66,400 cf - Rv: 26,900 cf - WQv: 26,900 cf
Standard 2: Peak Discharge (2-yr)	**- Criteria:** Post < Pre **- Result:** 20% Reduction	**- Criteria:** Post < Pre **- Result**: 43.8% Reduction
Standard 2: Peak Discharge (100-yr)	**- Criteria:** Post < Pre **- Result:** 7.4% Reduction **(Criteria Drives Sizing)**	**- Criteria:** Post < Pre **- Result:** 2.3% Reduction **(Criteria Drives Sizing)**
Standard 3: Recharge Volume	**- Criteria:** 0.25" (Type C Soil) **- Result:** 1.35"	**-Criteria:** 1" (Type C Soil) **-Result:** 2.13"
Standard 4: Pollutant Removal	**- Criteria:** 0.5" WQv, 80% TSS **-Result:** 1.35" WQv, 81% TSS	**- Criteria:** EPA Curves, 90% TSS / 60% TP *(Appx. Min. WQv Depth = 0.58")* - **Result:** 2.13" WQv, 94% TSS / 79% TP
Cost Estimate for Stormwater System	Total: $1,004,000 (*Per Unit: $38,615.38*)	Total: $1,485,000 *(Per Unit: $57,115.38)*

Cost Diff./Unit

- **TP40 to NOAA 14 = $12,192.31**
- **TP40 to NOAA 14 PLUS = $18,500.00**

Scenario 2
1,500-foot Existing Roadway
Widening Less Than Single Lane
To Add Sidewalk and Bicycle Path/Shoulder

Scenario 2: Narrative

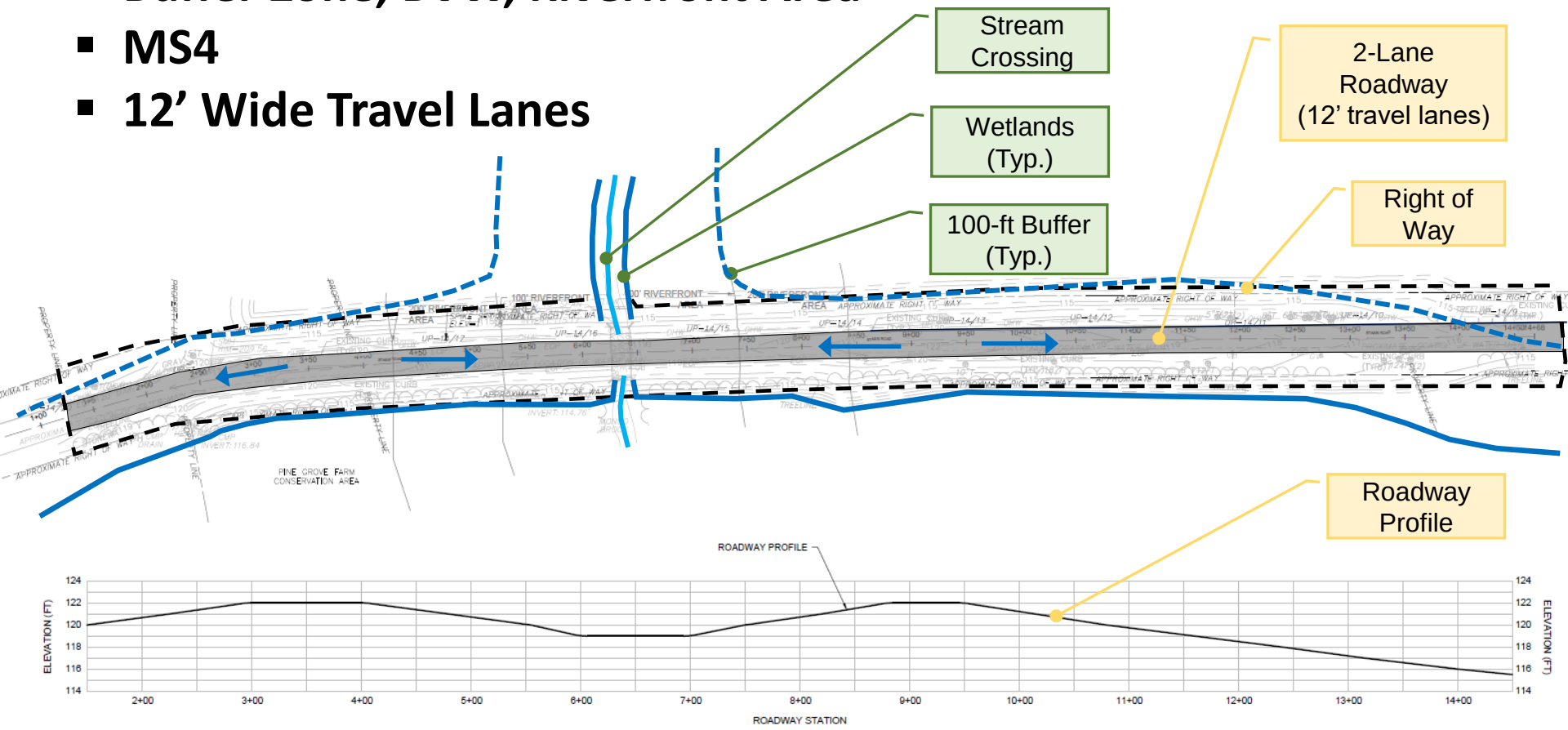
- **Existing Conditions:** Two lane ~1,500 ft long by 23-ft wide roadway with no shoulders (center line markings only). Roadway is constructed on earthen embankment and includes wetlands on both sides and crosses a stream in a culvert. Curbing and a stormwater collection system conveys roadway runoff directly into the stream.

- **Proposed Conditions:** Roadway reconstruction to improve pedestrian and bike access by adding a 5-ft wide bike lane on the northern side and a 5-ft wide pedestrian sidewalk on the southern side of the road with a 1-ft wide shoulder.
  - ESSD site practices: reduce each travel lane to 10-ft. Reconstructed road will not include shoulder parking – i.e., shoulder will be shared with the bike lane to reduce width. Overall road width will be 26-ft (1-10-10-5).

- **Proposed Stormwater Treatment:** See forthcoming slides.

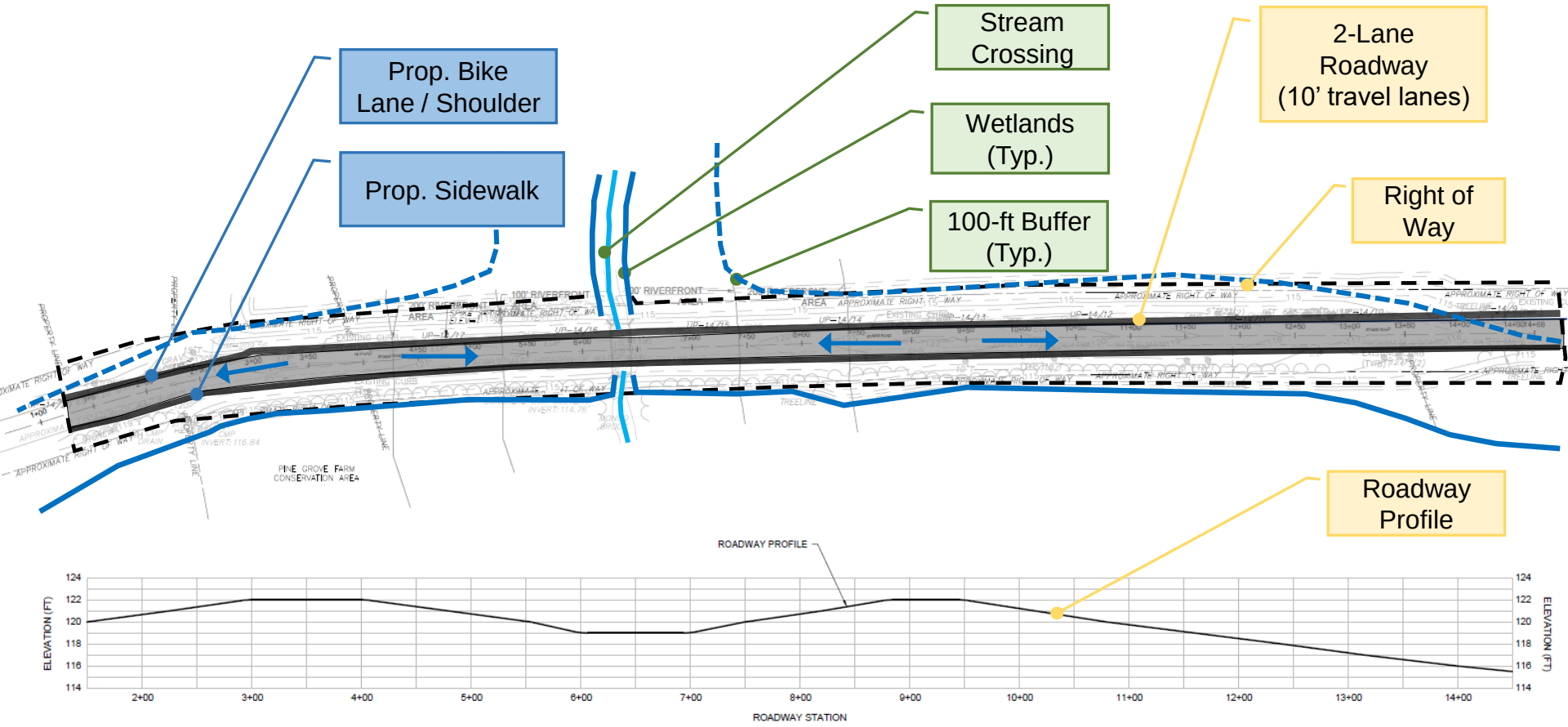
Scenario 2: Existing Conditions

- **2.23 acre Right of Way**
- **34.1% Impervious**
- **Buffer Zone, BVW, Riverfront Area**
- **MS4**
- **12’ Wide Travel Lanes**



Scenario 2: Proposed Project Conditions without Stormwater Treatment

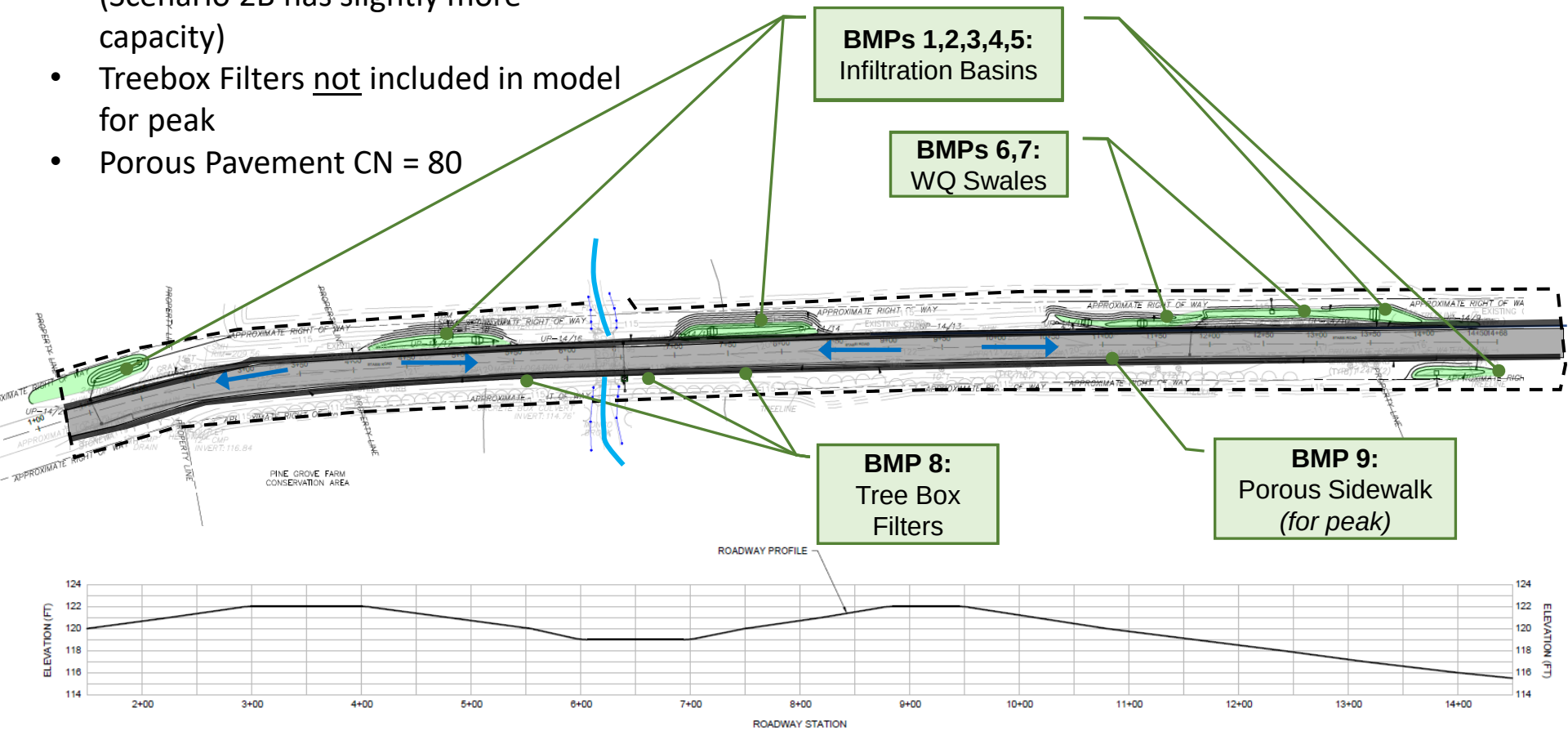
- **2.23 acre Right of Way**
- **35.4% Impervious**
- **10’ Wide Travel Lanes**



Scenario 2A / 2B:

Treatment Options Under **Existing & Proposed** Regulation

- Same treatment for Scenario 2A / 2B (Scenario 2B has slightly more capacity)
- Treebox Filters not included in model for peak
- Porous Pavement CN = 80



Scenario 2A/2B Results

Treatment Goal:	Meet Existing Handbook Criteria	Meet Proposed Handbook Update Criteria
Rainfall Type	TP40	NOAA Atlas 14 PLUS
BMP Design Volumes	- Total: 1,810 cf - Rv: 1,690 cf - WQv: 1,810 cf	- Total: 2,411 cf - Rv: 2,211 cf - WQv: 2,411 cf
Standard 2: Peak Discharge (2-yr)	**- Criteria:** Post < Pre (MEP) **- Result:** 4.6% Reduction	**- Criteria:** Post < Pre (MEP) **- Result**: 10.1% Reduction
Standard 2: Peak Discharge (100-yr)	**- Criteria:** Post < Pre (MEP) **- Result:** 0.2% Reduction	**- Criteria:** Post < Pre (MEP) **- Result:** 4.8% Reduction
Standard 3: Recharge Volume	**- Criteria:** 0.25" (MEP) **- Result:** 0.49"	**-Criteria:** 1" (MEP) **-Result:** 0.65" **(Criteria Drives Sizing)**
Standard 4: Pollutant Removal	**- Criteria:** 0.5" WQv, 80% TSS (MEP) **-Result:** 0.53" WQv, 82% TSS **(Criteria Drives Sizing)**	**- Criteria:** EPA Curves, 80% TSS / 50% TP *(Appx. Min. WQv Depth = 0.40")* - **Result:** 0.70" WQv, 89% TSS / 66% TP
Cost Estimate for Stormwater System	Total: $302,000 *(Per Linear Foot: $201.33)*	Total: $308,000 *(Per Linear Foot: $205.33)*

Cost Diff./Linear Foot

- **TP40 to NOAA 14 = $4.00**
- **TP40 to NOAA 14 PLUS = $4.00**

Scenario 3
Redevelopment
Manufacturing to 300 Unit Residential Building
On Small Urban Lot

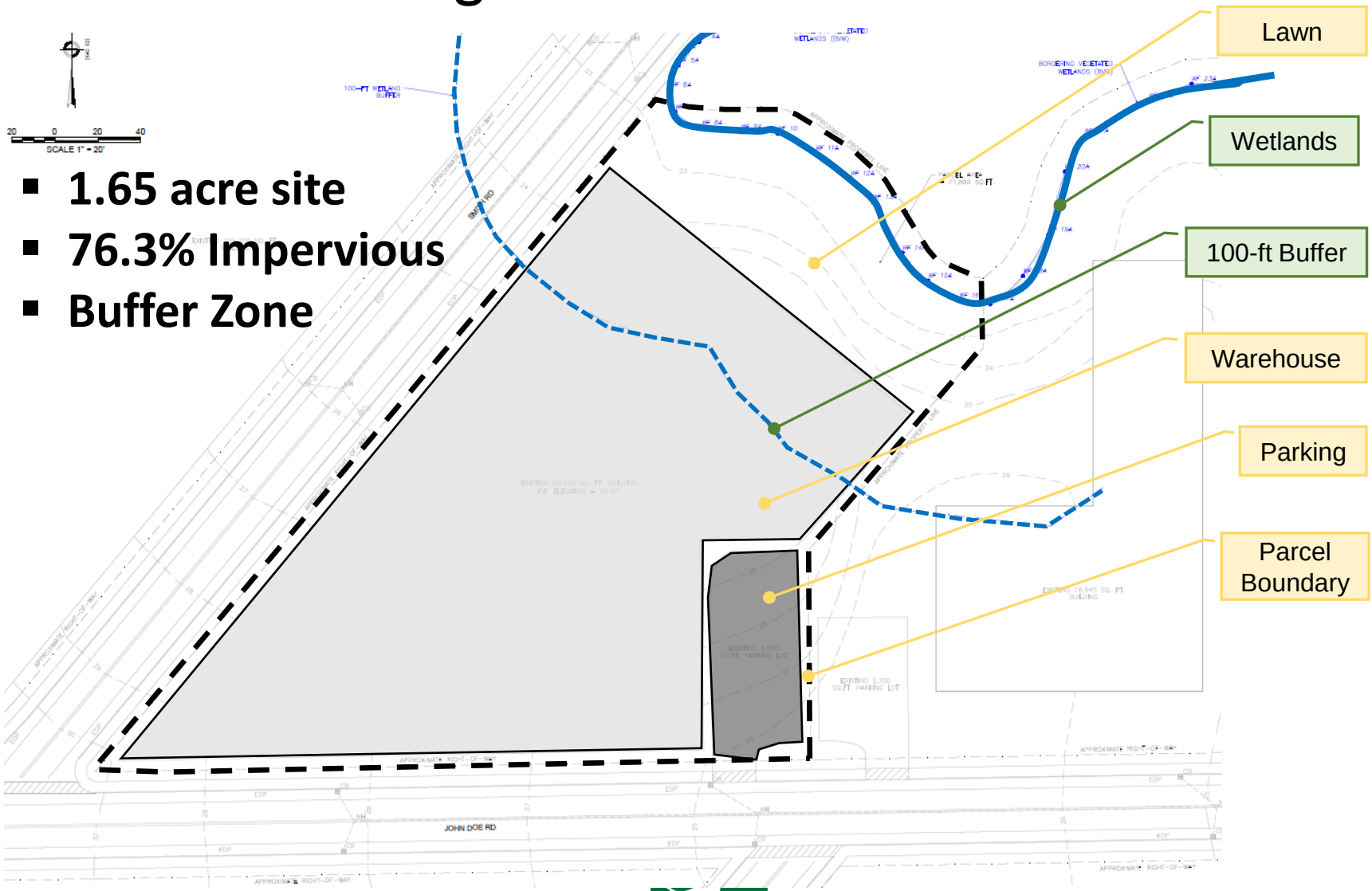
Scenario 3: Narrative

- **Existing Conditions:** 1.65 acre lot in a highly urbanized with an existing warehouse and parking area. Warehouse takes up most of the lot. Site is bordered by two roadways, a freshwater wetland, and an existing building and parking lot. Drainage from the building and parking lot discharges to the existing MS4. A grassed area to the northwest discharges to the freshwater wetland.

- **Proposed Conditions:** Demolish existing building and construct a 300-unit multi-family housing structure with a slightly larger footprint.
  - ESSD site practices will include: 1) decrease the existing building and parking lot footprint and 2) convert existing grassed area to brush (i.e., shrubs and wildflowers). The building will have 7 floors and parking for ~ 720 vehicles (i.e., 2.4 vehicles per unit) in an underground parking garage.
- **Proposed Stormwater Treatment:** See forthcoming slides.

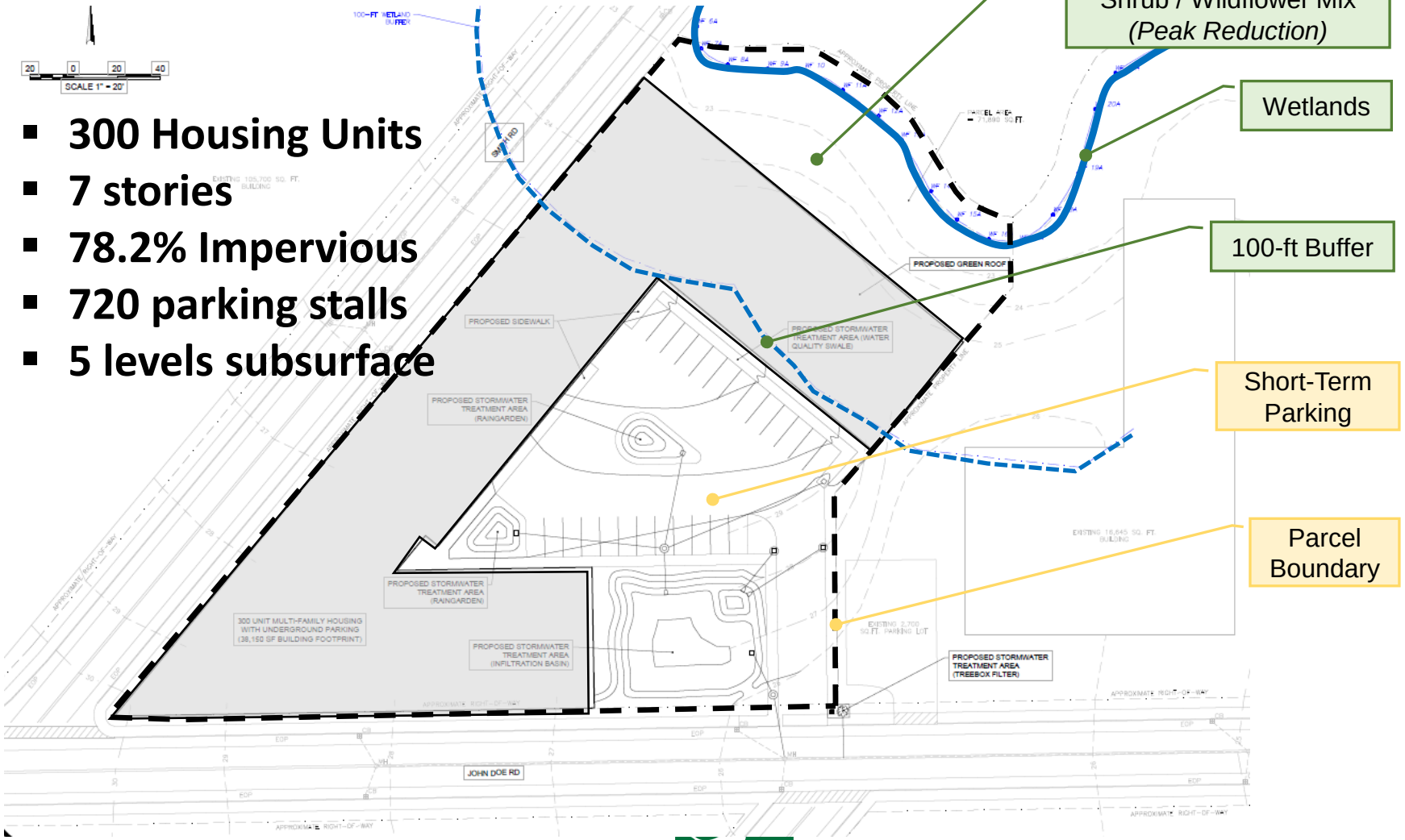
Scenario 3: Existing Conditions

- **1.65 acre site**
- **76.3% Impervious**
- **Buffer Zone**



Scenario 3: Proposed Project Conditions without Stormwater Treatment

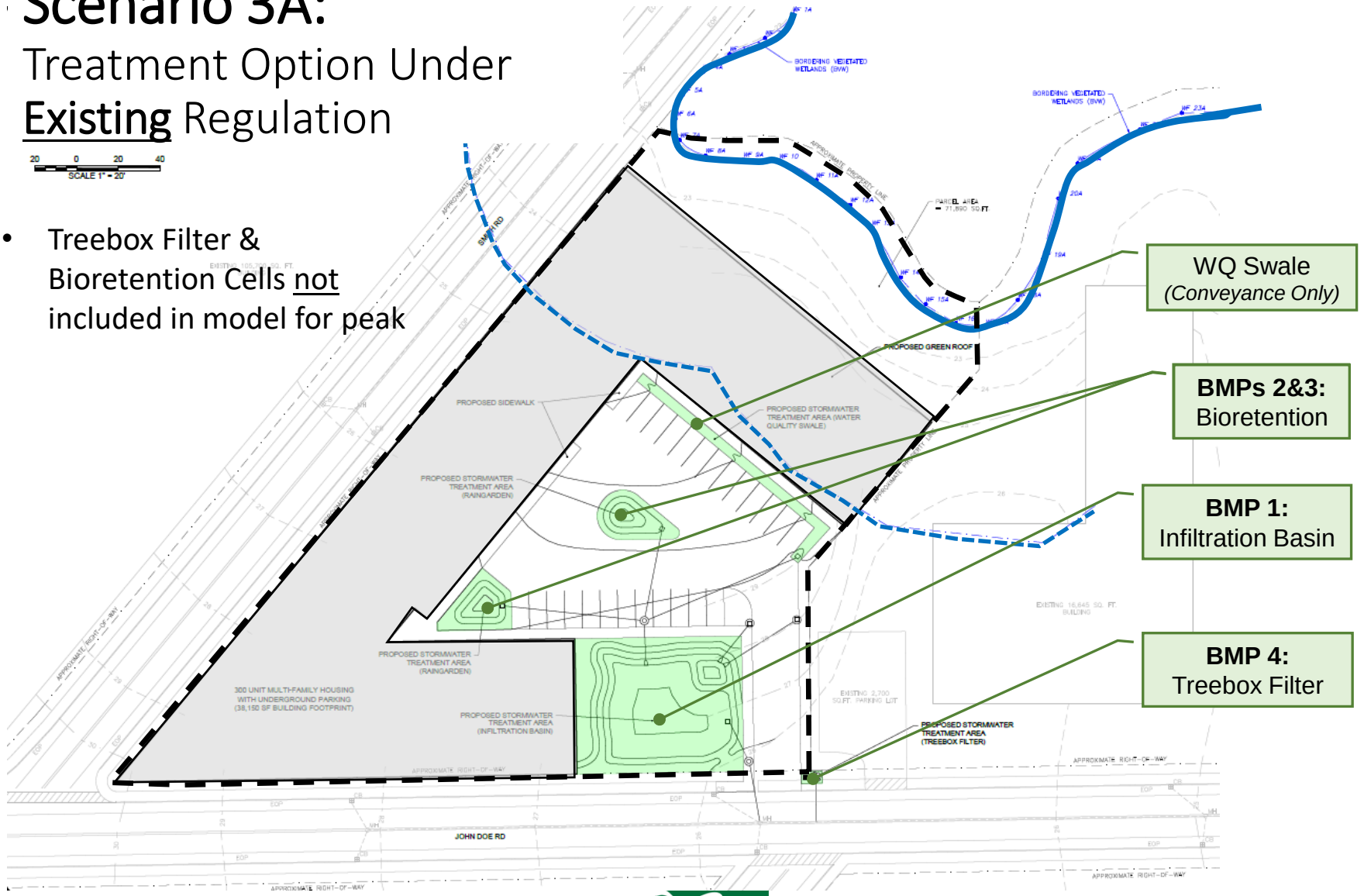
- **300 Housing Units**
- **7 stories**
- **78.2% Impervious**
- **720 parking stalls**
- **5 levels subsurface**



Scenario 3A:

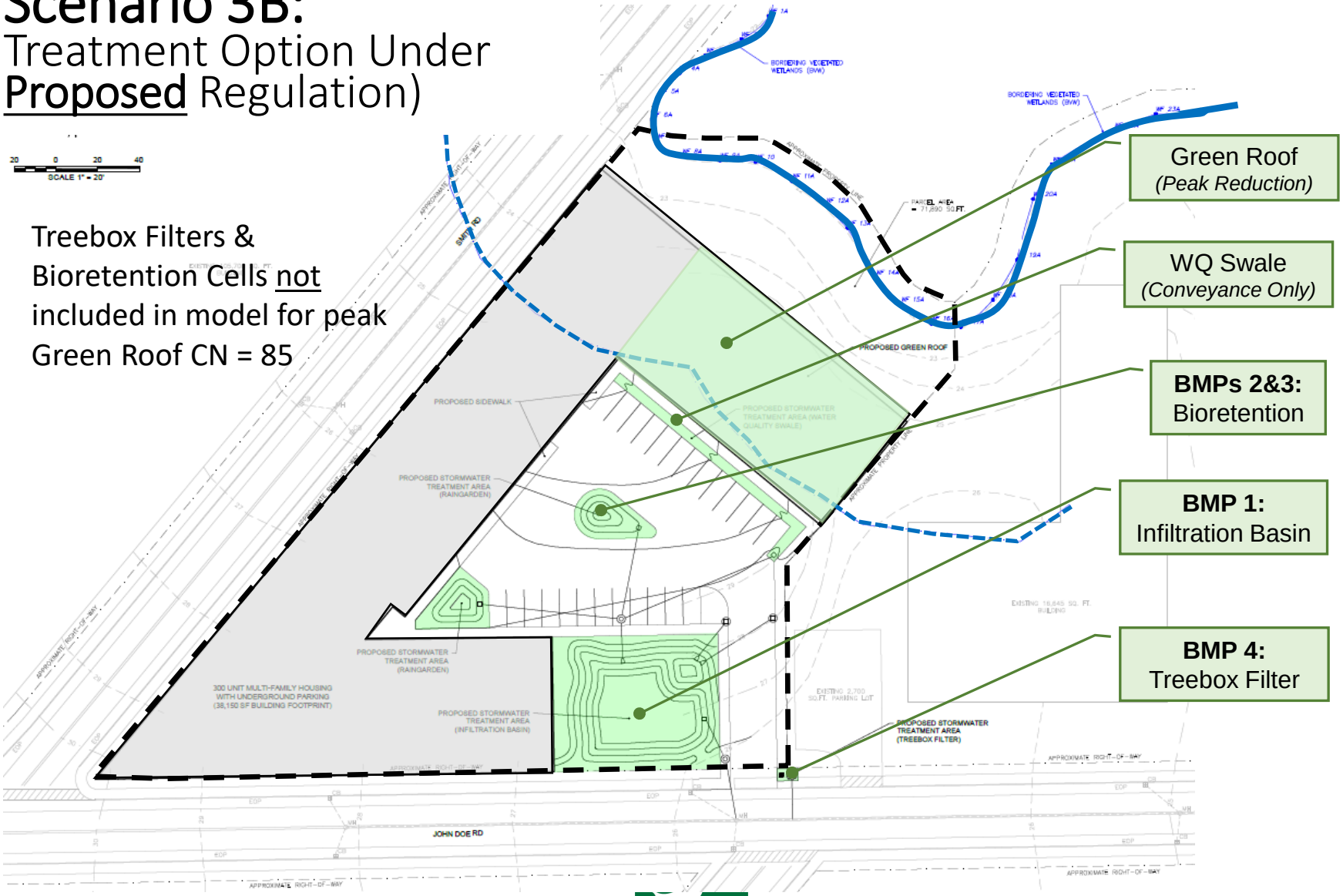
Treatment Option Under **Existing** Regulation

- Treebox Filter & Bioretention Cells not included in model for peak



Scenario 3B:
Treatment Option Under **Proposed** Regulation)

- Treebox Filters & Bioretention Cells not included in model for peak
- Green Roof CN = 85



Scenario 3A/B Results

Treatment Goal:	Meet Existing Handbook Criteria	Meet Proposed Handbook Update Criteria
Rainfall Type	TP40	NOAA Atlas 14 PLUS
BMP Design Volumes	- Total: 2,620 cf - Rv: 1,345 cf - WQv: 2,620 cf	- Total: 5,320 cf - Rv: 2,045 cf - WQv: 3,320 cf
Standard 2: Peak Discharge (2-yr)	**- Criteria:** Post < Pre (MEP) **- Result:** 10.3% Reduction	**- Criteria:** Post < Pre (MEP) **- Result**: 23.2% Reduction
Standard 2: Peak Discharge (100-yr)	**- Criteria:** Post < Pre (MEP) **- Result:** 8.0% Reduction	**- Criteria:** Post < Pre (MEP) **- Result:** No Change **(Criteria Drives Sizing)**
Standard 3: Recharge Volume	**- Criteria:** 0.25" (MEP) **- Result:** 0.29"	**-Criteria:** 1" (MEP) **-Result:** 0.44" **(Criteria Drives Sizing)**
Standard 4: Pollutant Removal	**- Criteria:** 0.5" WQv, 80% TSS (MEP) **-Result:** 0.56" WQv, 89% TSS **(Criteria Drives Sizing)**	**- Criteria:** EPA Curves, 80% TSS / 50% TP *(Appx. Min. WQv Depth = 0.45")* - **Result:** 0.71" WQv, 94% TSS / 63% TP
Cost Estimate for Stormwater System	Total: $281,000 *(Per Unit: $936.67)*	Total: $494,000 *(Per Unit: $1,646.67)*

*1" R_v not met, can't drawdown in 72 hours within available space

Cost Diff./Unit

- **TP40 to NOAA 14 = $136.67**
- **TP40 to NOAA 14 PLUS = $710.00**

Overview of Comments

- AC comments from mtng summaries, web submissions, correspondence, etc.
- Six main “buckets” stood out, each with key subtopics

<u>Consistency between MassDEP and EPA Stormwater Requirements</u>

- Pollutant removal/treatment requirements (who’s fully subject, MEP etc.)
- New and redevelopment definitions
- Differences in standards for roadways
- Offsite mitigation (proposed for redevelopment Stds 3&4, allowed for MS4)
- Interim guidance to inform municipal bylaws/ordinances
- Impervious surface definition
- TMDL’s – align with EPA permit

Overview of Comments

Updating Precipitation Data
- Peer review NOAA PLUS
- Use NOAA14 full upper confidence interval, not 0.9
- Impact on conveyance systems
- Change in BLSF and ILSF boundaries (in the event of a conflict)

Recharge/LID
- Recharge should be based on soil type
- MEP for C and D soils
- Size BMP's to provide recharge on an annual basis

Overview of Comments

Low Impact Development

- LID can reduce costs of stormwater management
- Consider options to incentivize LID /higher levels of protection
  - strong standards
  - expedited permitting (carrot)
- Look at zoning and site regulations

Redevelopment - Maximum Extent Practicable Standard (MEP)

- Clarify to avoid loophole (e.g. to address peak runoff)
- Clarify proposed recharge requirement includes MEP for D soils
- Concern about DEP 5-9 lot subdivision proposal
- Keep for new sidewalks, foot/bike paths, bike travel lanes, etc.

Schedule / Timing

- Uncertainty - how will state & EPA reqmnts apply now & post-MS4 settlement
- Transition provisions for projects already in pipeline

Next Steps and Schedule

- Conclude Advisory Committee - Fall 2020
- Prepare Draft SW Handbook & Reg Revisions – Winter 2021
- Issue Draft SW Handbook & Regs for Public Comment – Spring 2021
  - Review and prepare response to public comments
- Promulgate – Summer 2021