



Bull Run Treatment Program

Even Greenfields Get the Blues

Jude Grounds, Carollo

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May 8, 2025










Things we want to discuss today:

- Overview of Portland's water system and planned improvements
- Guiding principles for layout of the site components
- Preferences for site layout concepts for further development
- Strategies for noise mitigation design

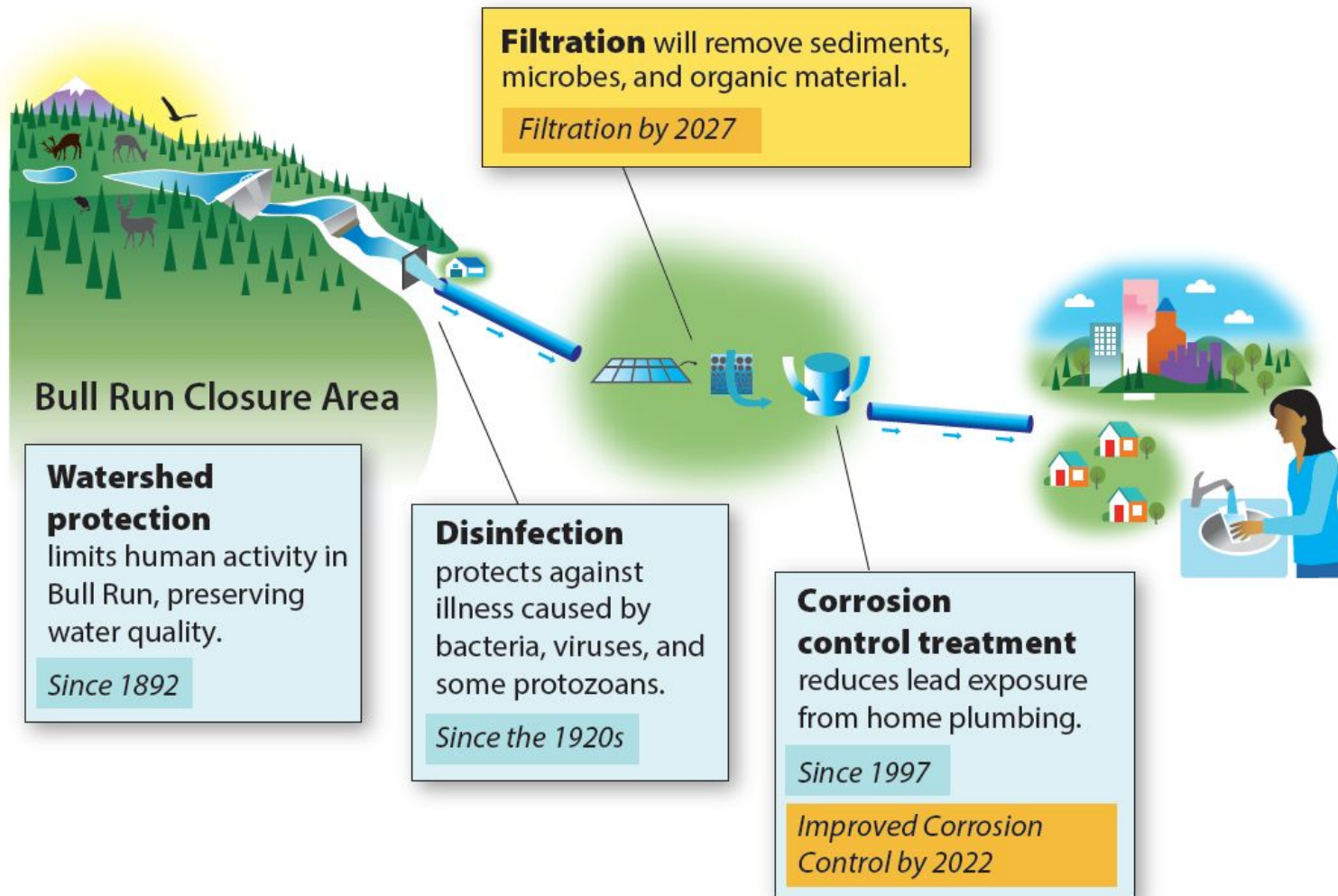
Portland's Water System



- | | |
|--|---|
|  Water Storage Facility |  Portland Water System Distribution Area |
|  Water Supply Pipes |  Water Source |
|  Water Treatment Facility |  Protected Area |
|  Dam | |

- Serves almost a million people
- Uses 100 million gallons of water on an average day
- Serves the City of Portland and 19 wholesale water districts

Bull Run Treatment Projects



Why are the projects needed?

These projects are being built to comply with Environmental Protection Agency (EPA) regulations.

Oregon Health Authority has set compliance schedules.

Site Layout Design Principles

Public Health and Water Quality

- Helps meet level of service goals

Resiliency/Reliability

- Emergency response considered
- Seismic and hazards resiliency

Community Interests

- Local impacts mitigated
- Safety prioritized
- Good use of buffer areas

Cost Benefit

- Minimizes capital costs
- Minimizes O&M costs

Future Needs

- Layout accommodates future expansion
- Constructability of future facilities

Environmental Impacts

- Optimizes energy use and renewables
- Optimizes sustainability measures
- Watersheds and wildlife habitat considered

Integration

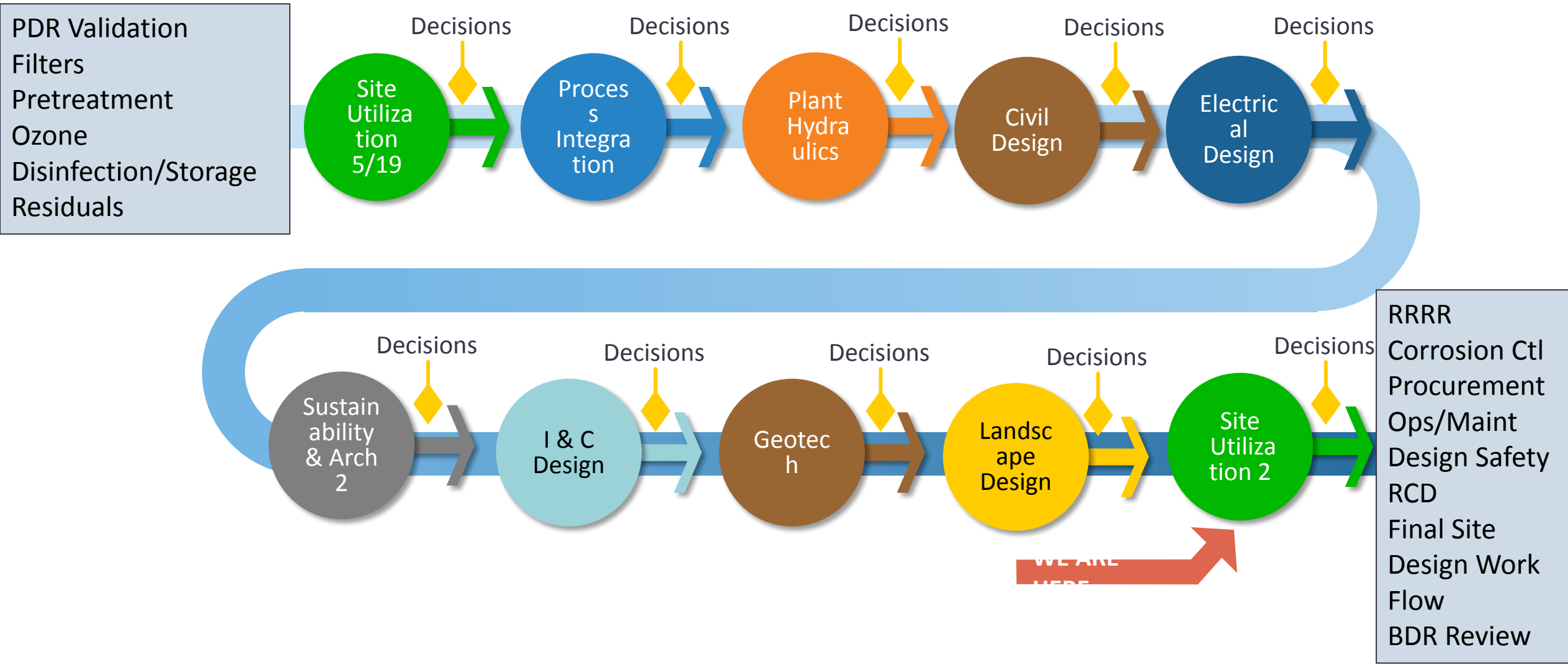
- Minimizes pumping
- Efficient day-to-day operations
- Safe working environment

Implementation

- Safe construction and phasing
- Minimizes cut/fill/haul
- Phased to meet budget
- Minimize impact to neighbors



Site Utilization is a Culture not a Workshop



Neighbor considerations influence layout

Will it be...

Bright?

Noisy?

Smelly?

Congested?

Safe?

Eyesore?

Blend in?



Site Advisor Comments (survey excerpts)

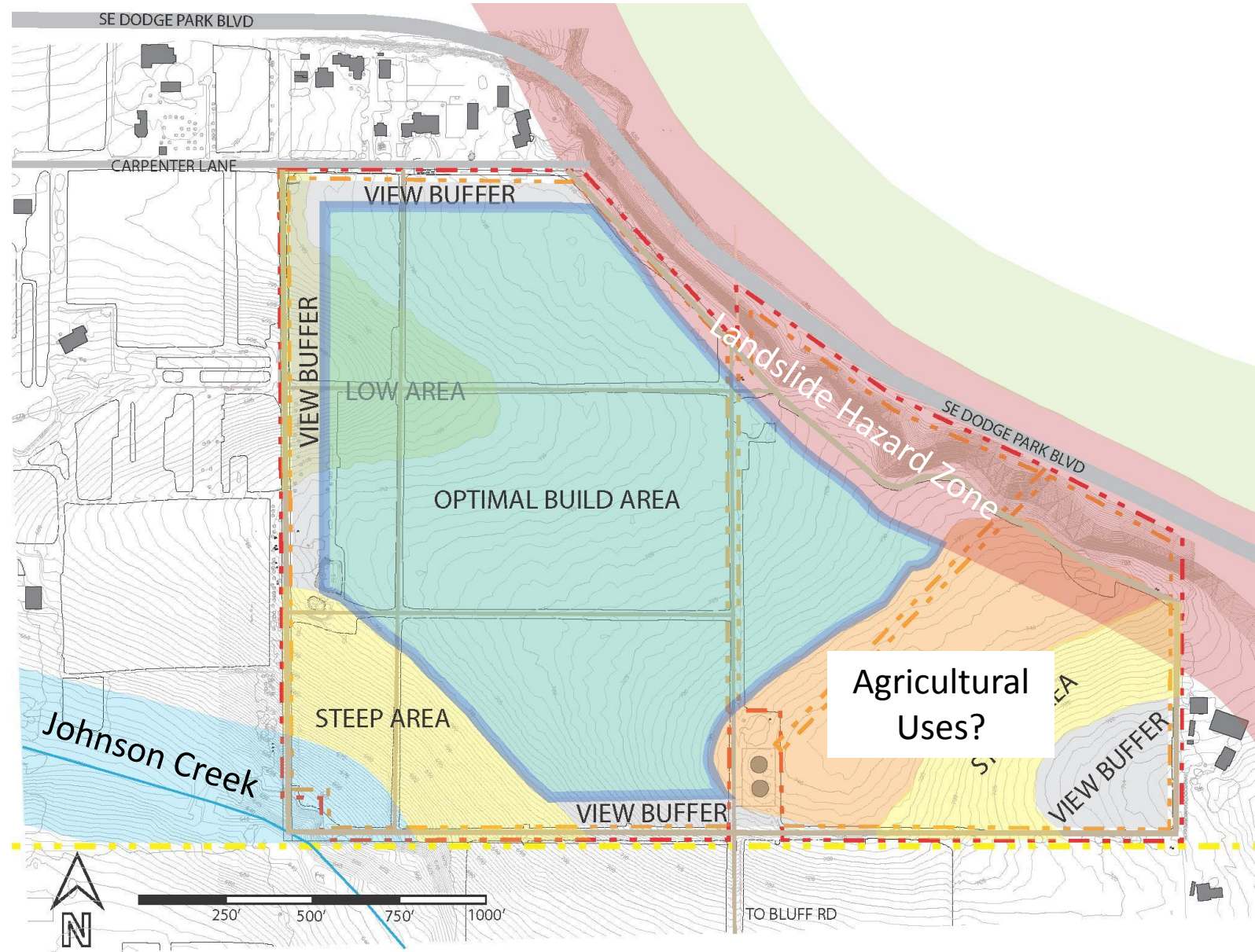
- Prefer **fencing the minimum area needed** for security. Fencing the entire property would appear hostile, to say nothing of the increased cost.
- I **prefer the wrought iron fencing** but instead of curved at the top shouldn't it be spiked for better security? The metal and wire fencing are "eye sores". Use **landscaping to block view of facility** but fencing for security. ...Even though I prefer the gate to be off the road, it does need to be a distance from the facility for maximum security. Don't build an **additional building**. This only means more staff, more money needed to maintain and secure.
- The use of **buildings as part of the security perimeter**. **Matching fence styles to topography** and visual approaches. Need less artistic style when perimeter faces only nature. (north side)
- Since there is a **deer and elk** issue in the agricultural area, the fencing needs to be an **appropriate height** to keep them out.

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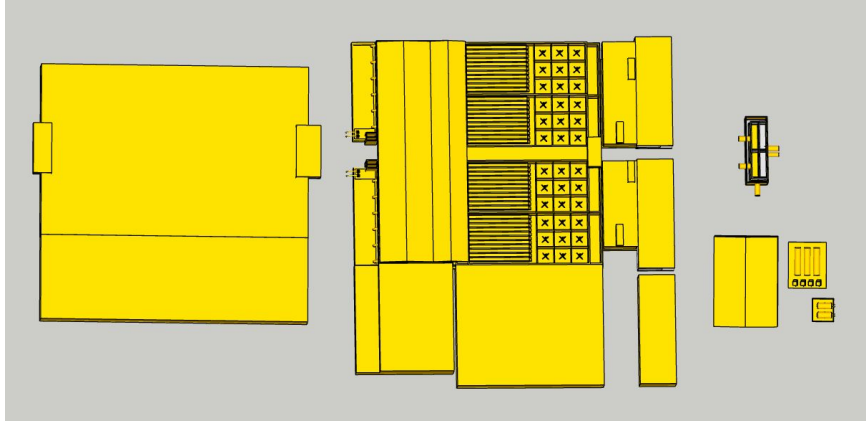
Site Opportunities and Constraints

Optimal Build Area (~50 acres)

- Best area for process facilities
- Ongoing study of eastern landslide hazard
- Johnson Creek watershed to Southwest
- Continued agriculture on east?



Design Objectives for Main Process Train

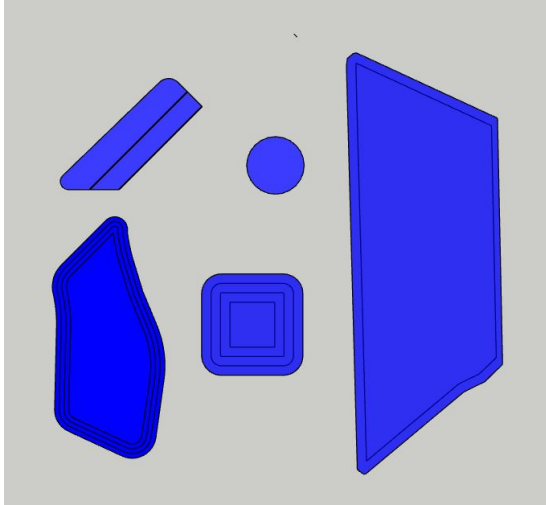


- Inlet Structure
- Ozone Gen/Contact
- Floc/Sed
- Filters/Backwash
- Clearwell (w/ vegetated cover)

Design Objectives

1. *Gravity Flow / Use site topography*
2. *Lowest site area for Clearwell*
3. *Limit large pipe runs within train and connections to RW and FW*
4. *Consider access to galleries*
5. *Consider O&M and future crane reach*
6. *Consider constructability for future expansion*

Design Objectives for Overflow / Catch Basins

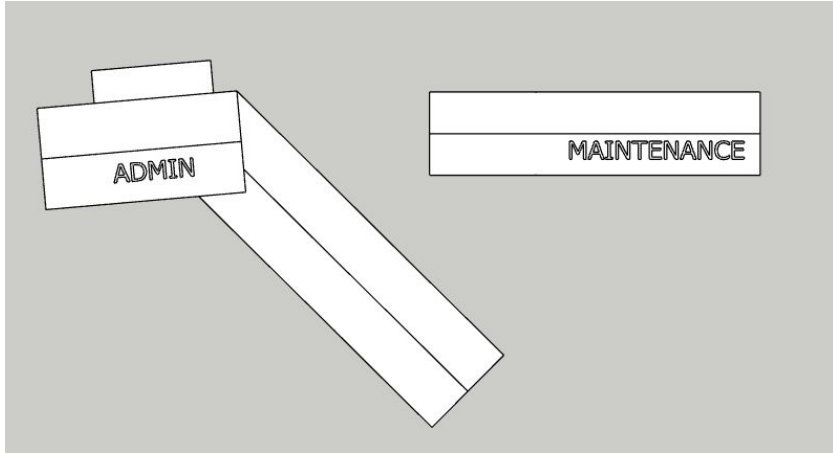


- Raw Water/EQ Overflow
- Clearwell Overflow
- Stormwater basins

Design Objectives

1. *Gravity Flow to basins desired*
2. *Utilize lower areas of site near edges*
3. *Can be linked together or combined*
4. *Consider dam regulations for design*
5. *Consider viewsheds for immediate neighbors*
6. *Stormwater design based on 25-year storm*

Design Objectives for Non-Process Facilities



- Administration (Lab, Control, Office, Lockers)
- Maintenance (Shop, Stores, I&C)

Design Objectives

1. *Admin close to Filters / Pilot*
2. *Admin the 'front door' for visitors*
3. *Maintenance close to Admin / common spaces*
4. *Incorporate south facing outdoor space*
5. *Yard space near Maintenance*

Design Objectives for Roads and Circulation

Design For

- Heavy Trucks (construction, deliveries, fire vehicles, buses)
- Personal Vehicles
- Fleet Vehicles
- Equipment
- Carts
- Bicycles
- Foot-traffic

Design Objectives

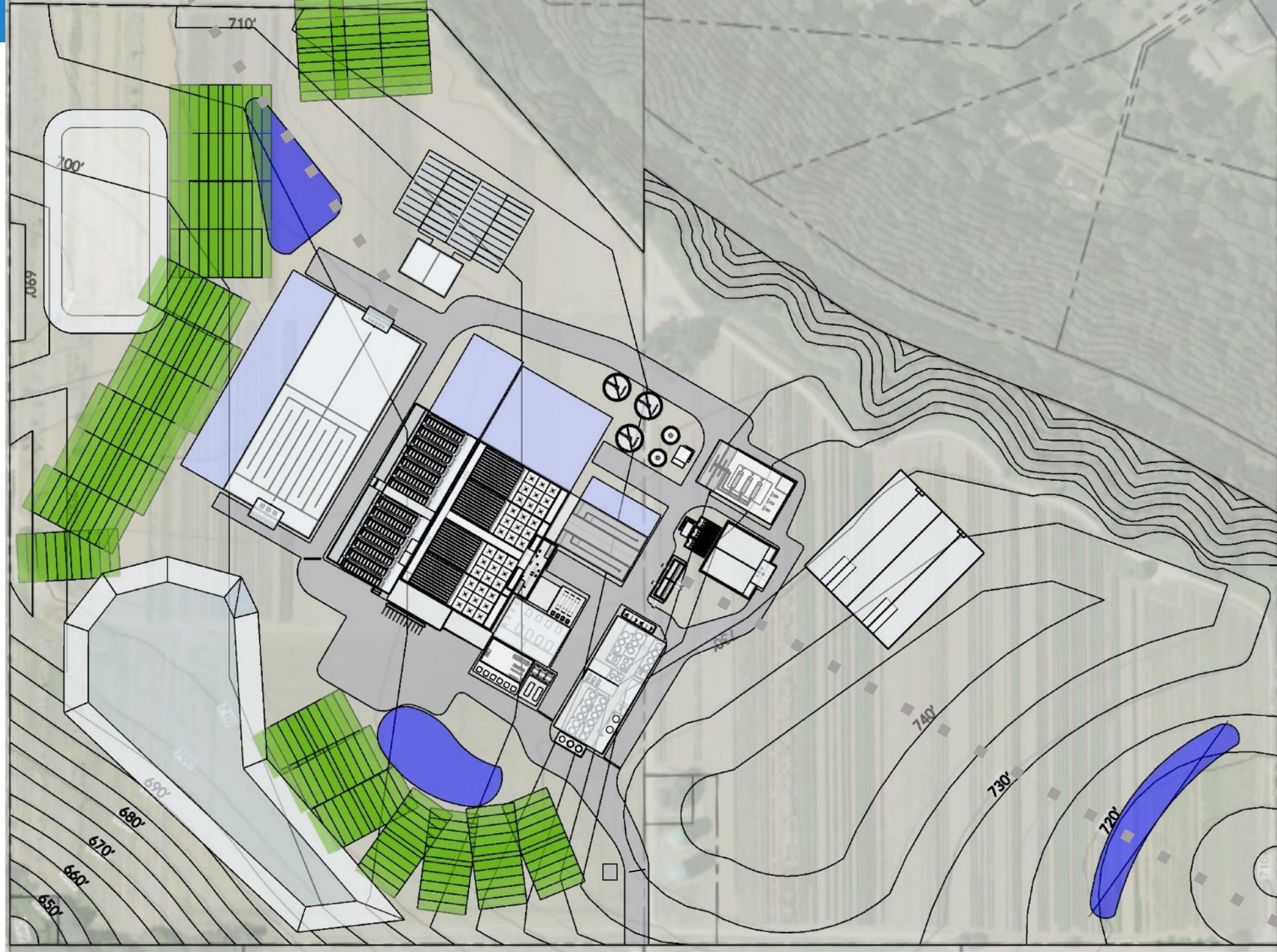
1. Road classification matches vehicle types
2. Separation of pedestrians and vehicles
3. Allow for gallery and maintenance access
4. Vehicle and ADA compliant tour paths
5. Provide two ways in and out of site



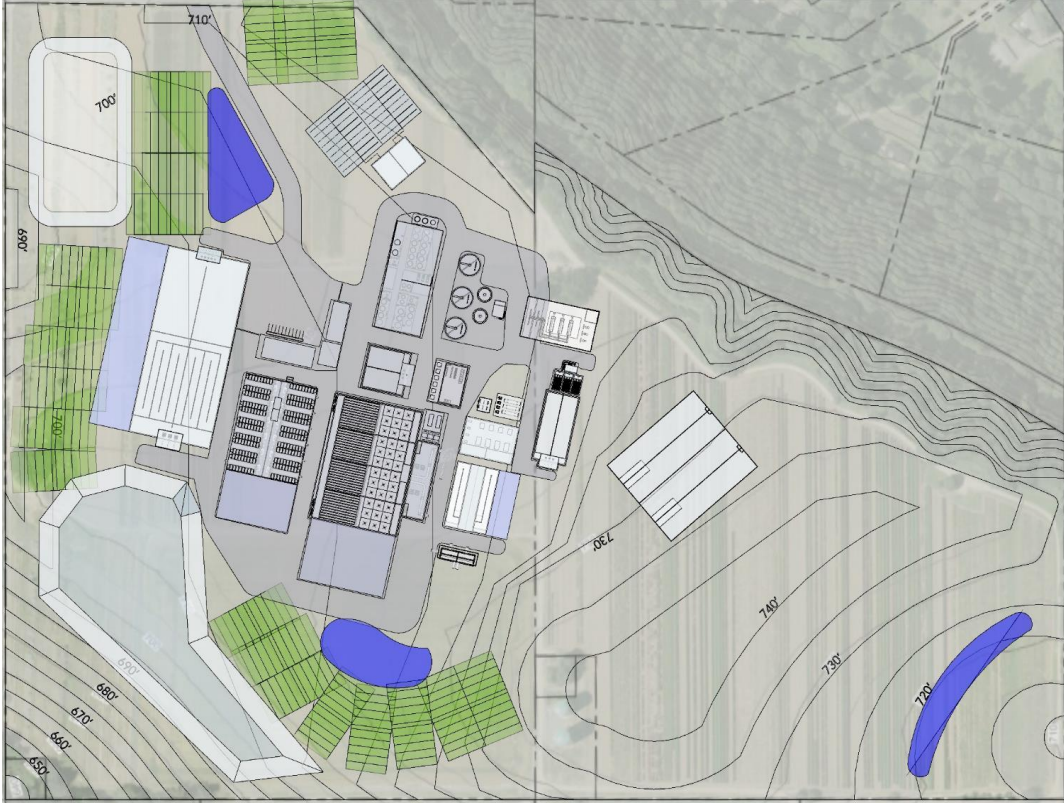
Site Utiliz. 1: Campus Strategy



Site Utiliz. 1: Compact Strategy



Site Utilization 1: Homework Feedback



Humberto Piedra-Ruiz

Christopher Bowker

Steve Schenk

Jaideep Singh

Angie Kimpo

Tim Brooks

Mark Graham

Alan Peck

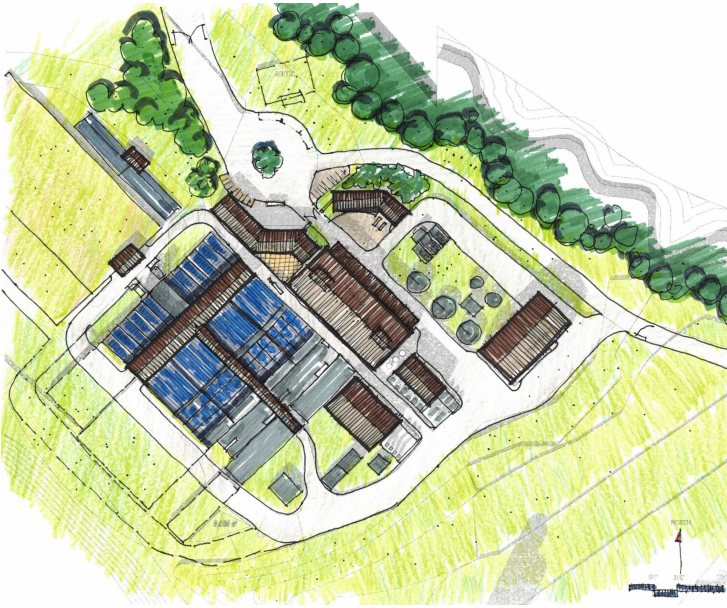
Ben Ngan

Tyler Bird

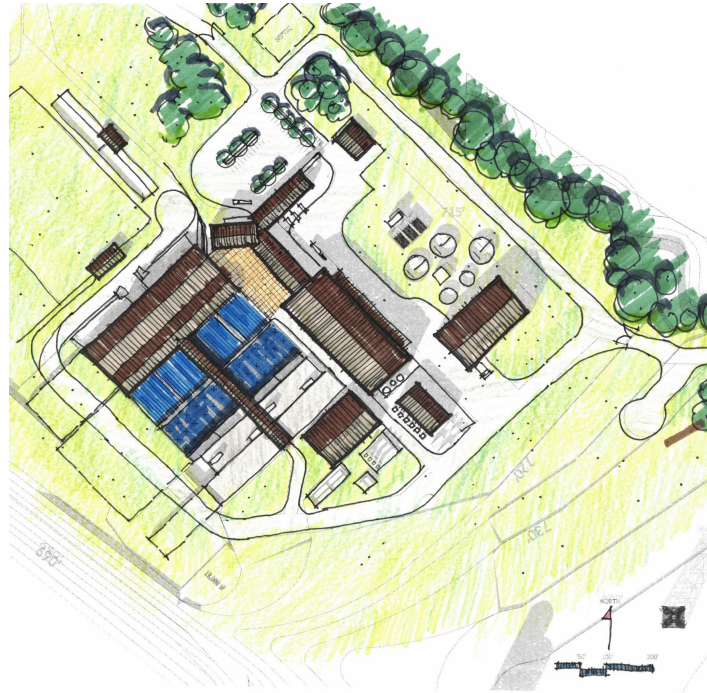
Site Utilization 1: Homework Feedback

- **Admin building centrally located** such that there is good visibility to the facilities
- **Separate driveways** for 'business/tour' access and delivery access
- **Align plant expansion areas**, so they are all on the same side of the facility
- Align main process facilities (ozone, flash mix, floc/sed)
- Prioritize traffic flow - make driveways wider with longer radius turns, especially for chemical and solids trucks
- Electrical building should be close to feed and distribution points
- **Consistent with Neighborhood character**, compact forms, stack functions.
- Adequate room for staff parking

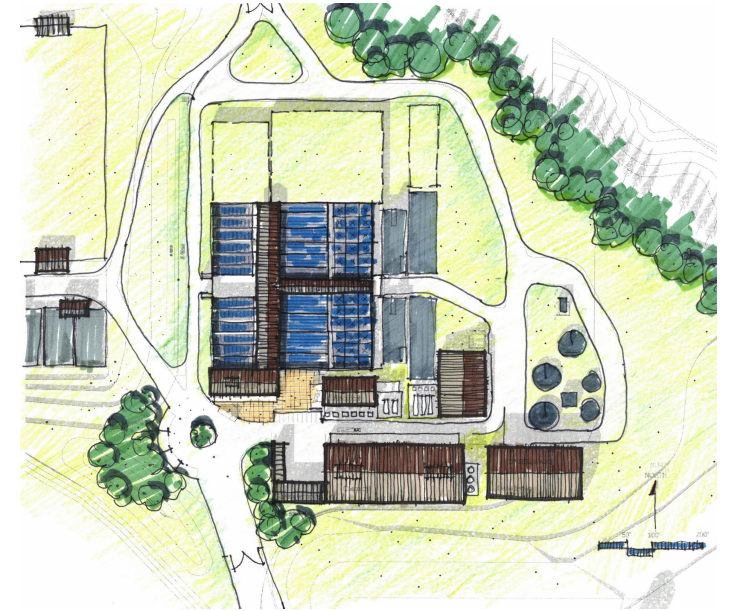
Three Site Layout Options



OPTION 1 – CIRCULAR CAMPUS



OPTION 2 – LINKED CAMPUS



OPTION 3 – SOUTH CAMPUS

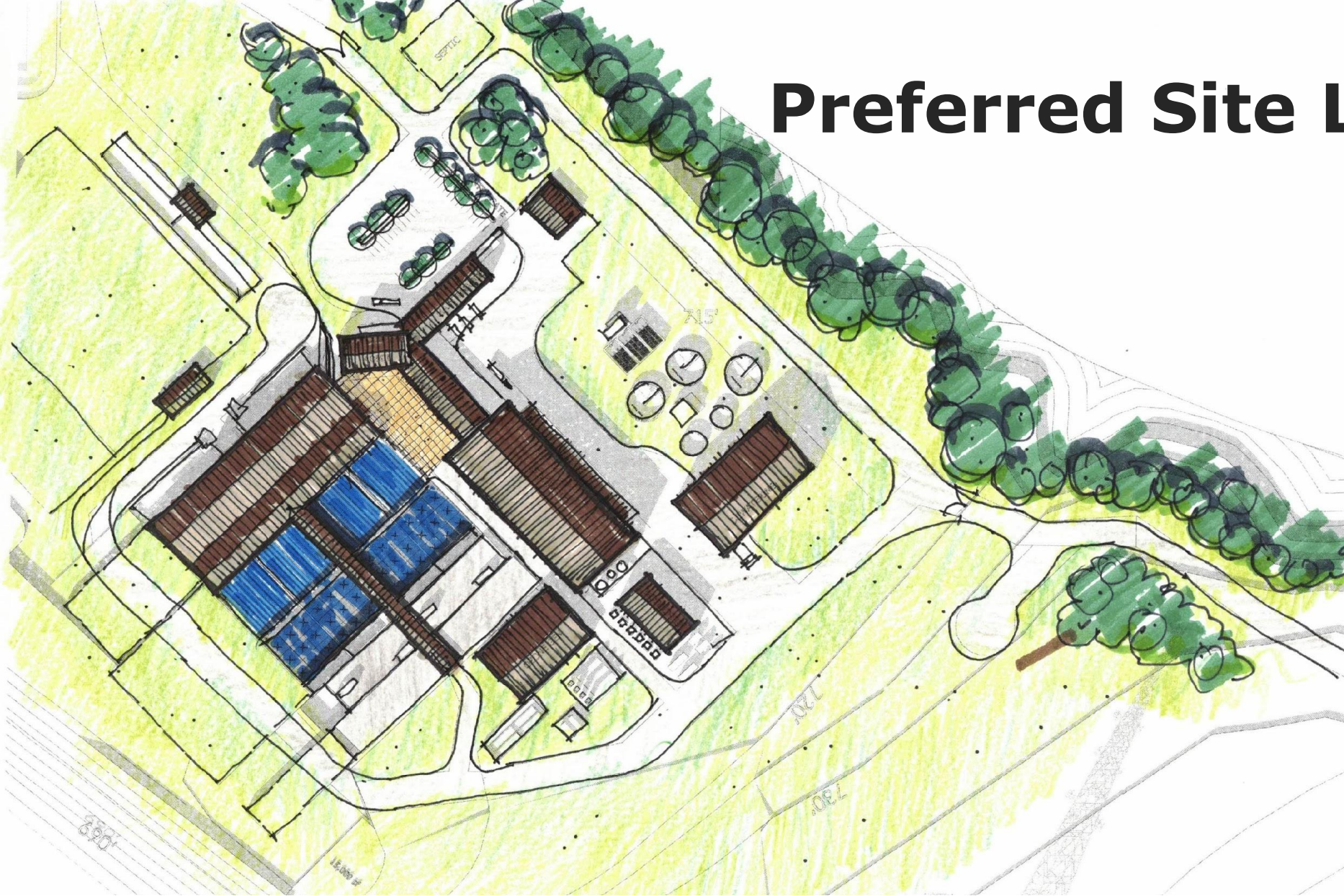
Revised Site Layouts – Initial Comparison

Which Option is best for each topic?

	Meets design objectives	Provides correct adjacencies	Provides access and circulation flexibility	Optimizes excavation /grading	Ease of future expansion	Allows for proper buffers/screening
Option 1 Circular Campus	3	3	1	2	1	2
Option 2 Linked Campus	1	2	2	1	2	1
Option 3 South Campus	2	1	3	3	3	3

RANKING: 1 = BEST, 3 = LEAST

Preferred Site Layout

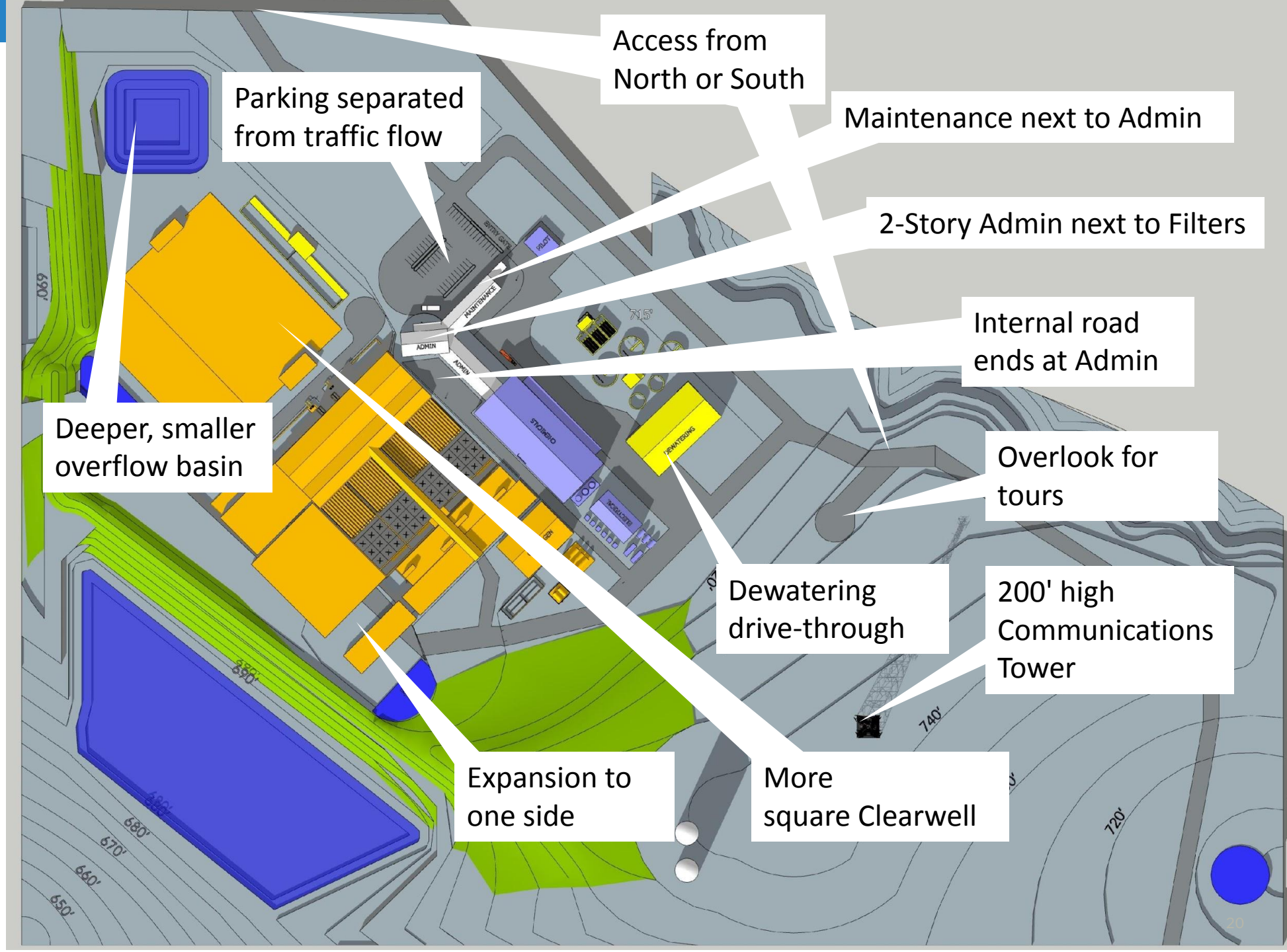


Option 2: Linked Campus

Option 2

Linked Campus

Features



Option 2 Linked Campus

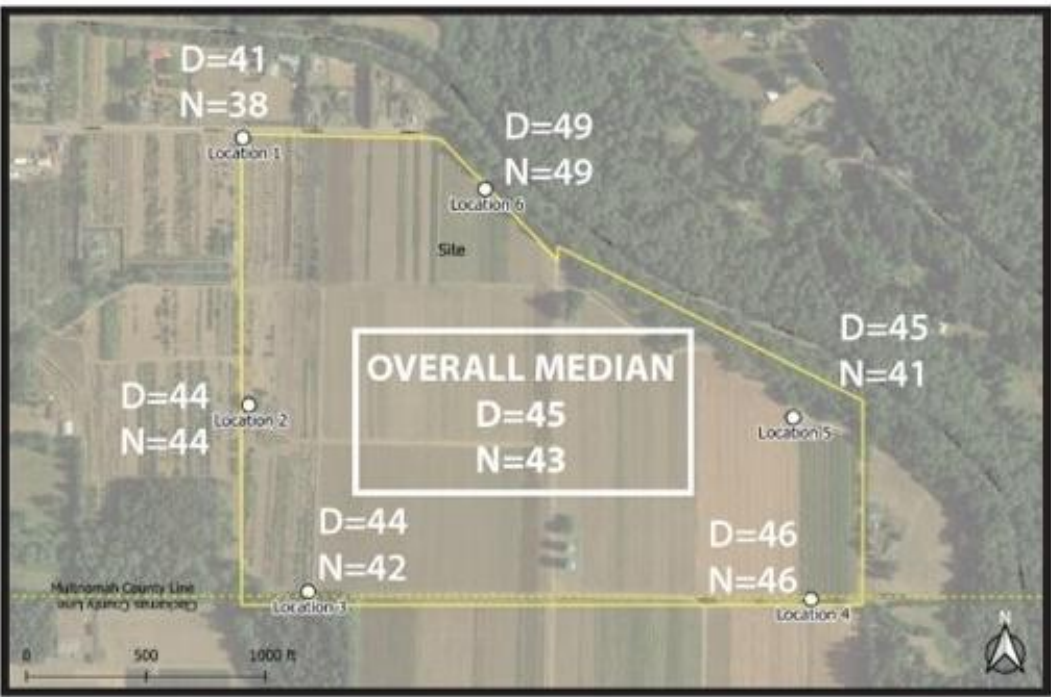
Preliminary Civil Analysis

PDR		
	Cut (CY)	Truckloads
Mass Grading	840K	-
Structural Excavation	385K	-
Total	1.2M	100K

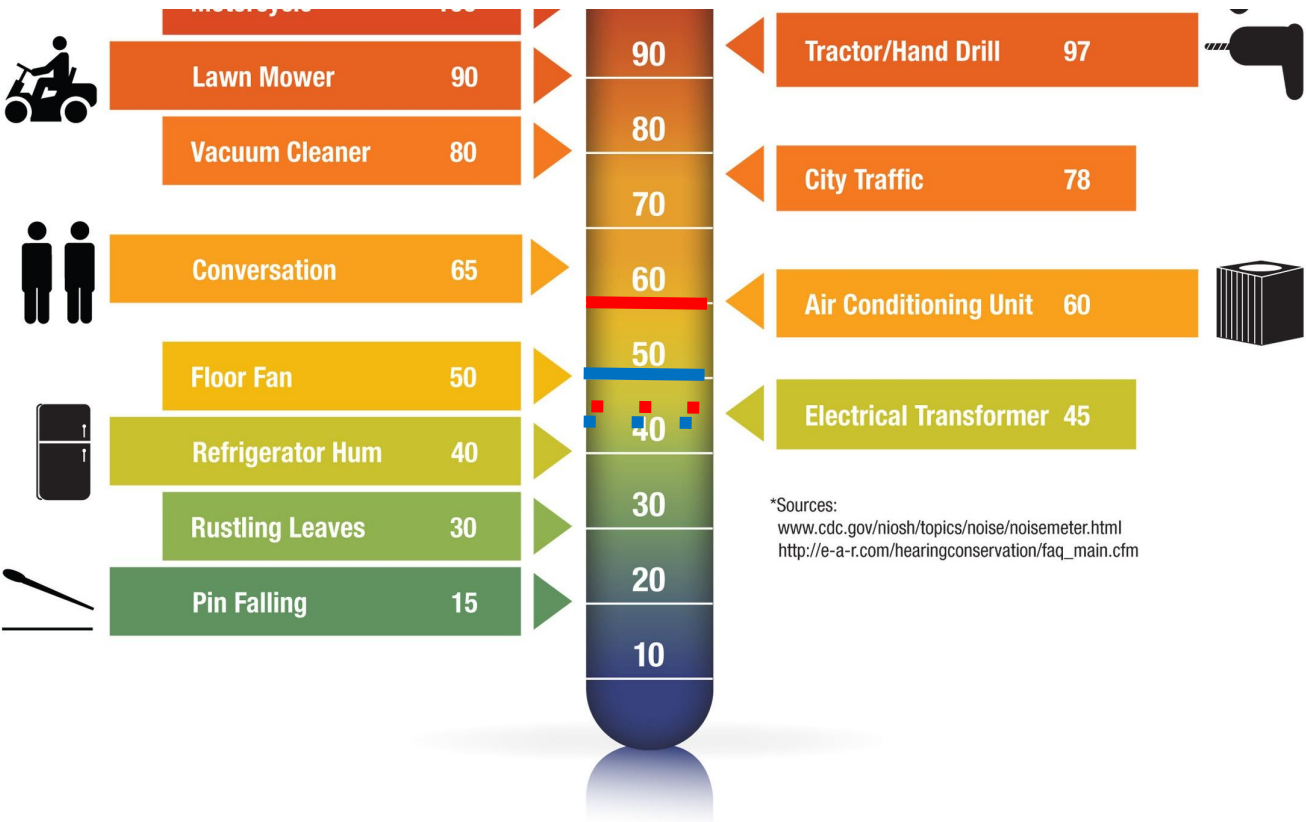
	Cut (CY)	Fill (CY)	Net (CY)	Truckloads
Structural Excavation + Mass Grading	702K	-	702K Cut	-
Finished Ground	-	139K	139K Fill	-
Total	702K	139K	563K cut	47K

Note: Assumed dump truck carries 12 CY per load

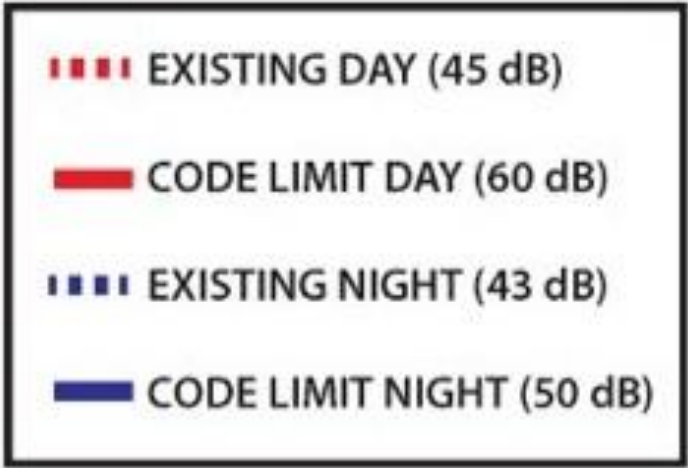
Noise Conditions



DIFFERENCE BETWEEN EXISTING AND CODE LIMITS:
DAYTIME = 15 dB
NIGHTTIME = 7 dB



*Sources:
www.cdc.gov/niosh/topics/noise/noisemeter.html
http://e-a-r.com/hearingconservation/faq_main.cfm



Noise Mitigation Strategies

Electrical Equipment

- Enclose in building if possible
- Sound walls for transformers

Pumps

- Enclose in building if possible
- Sound walls for any exterior equipment

Building HVAC

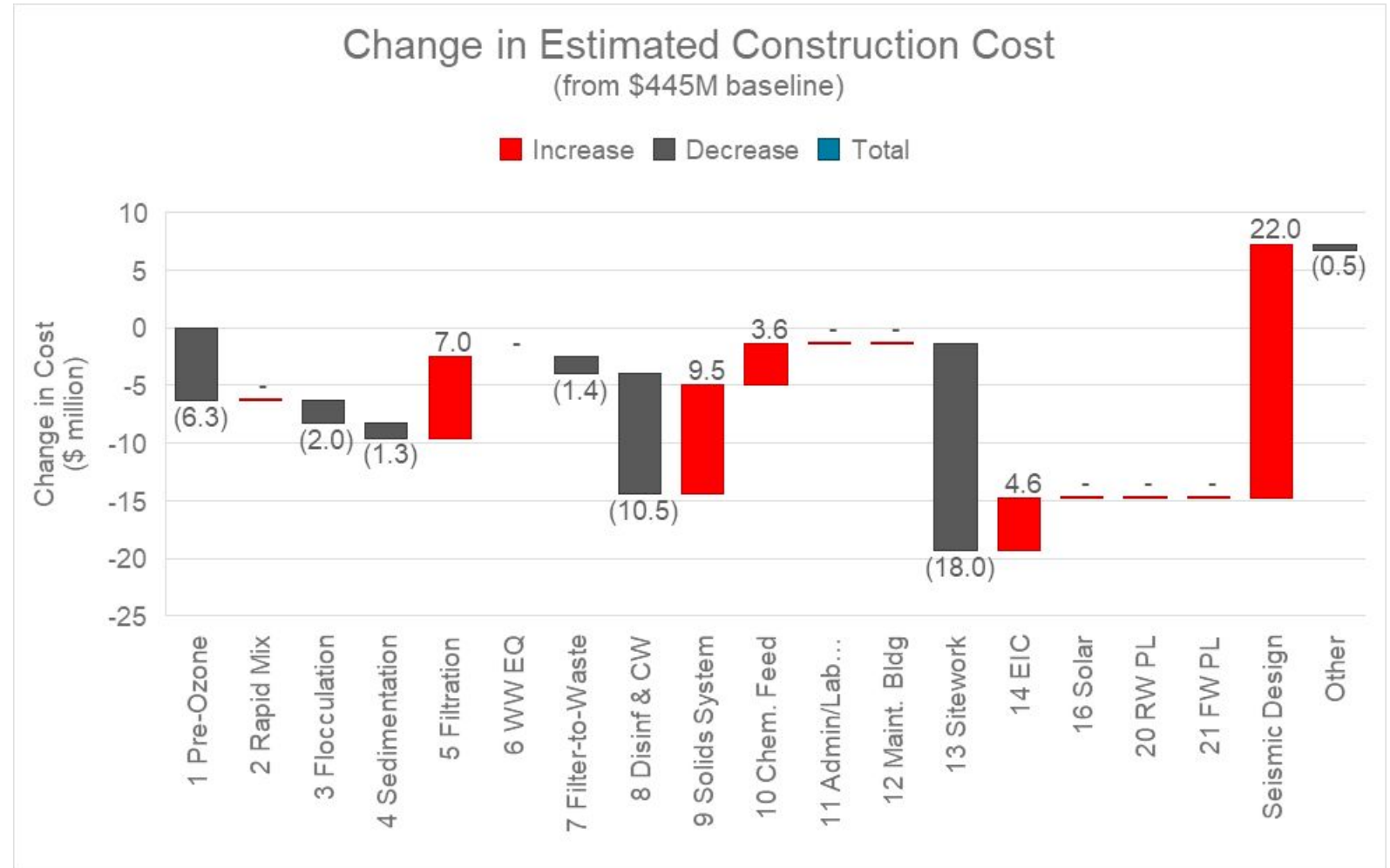
- Roof enclosures for fans, HVAC equip.
- Acoustic louvers for intake/exhaust

Truck Traffic

- Limit delivery times
- Landforms where possible to absorb sound
- Sound walls if near property line

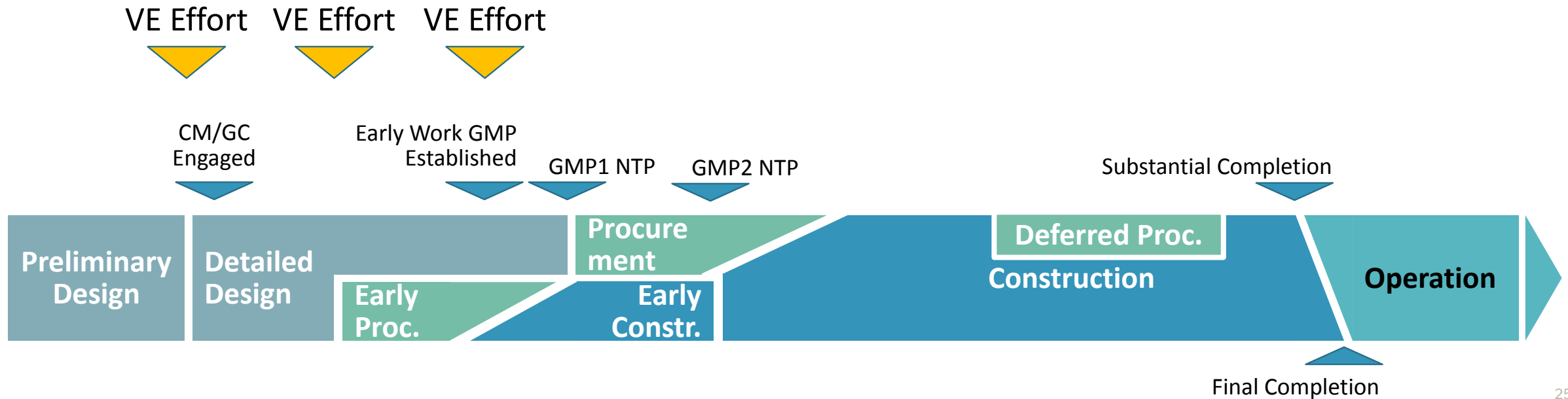
Option 2 advanced and adjusted

- Schedule slide
- 30/60/90 and massive VEs (visual of the cuts)

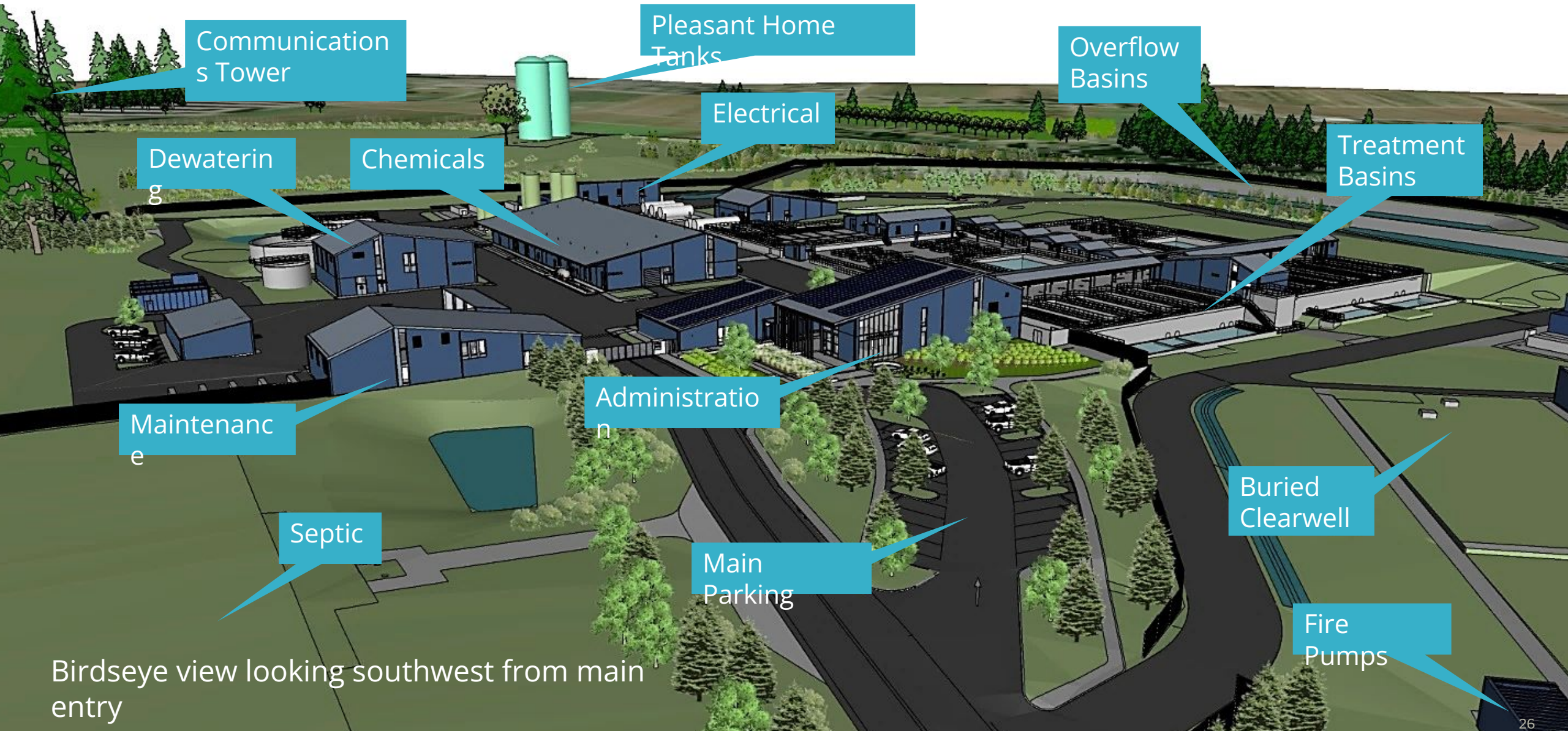


Option 2 advanced and adjusted

- Schedule slide
- 30/60/90 and massive VEs (visual of the cuts)



Proposed filtration facility



Birdseye view looking southwest from main entry

Questions?



Bull Run
TREATMENT
PROJECTS

*Our water: Safe and abundant
for generations to come*

Learn More portland.gov/bullrunprojects



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