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Galbreath Field Station Master Plan

Sonoma State University



RIM Architects

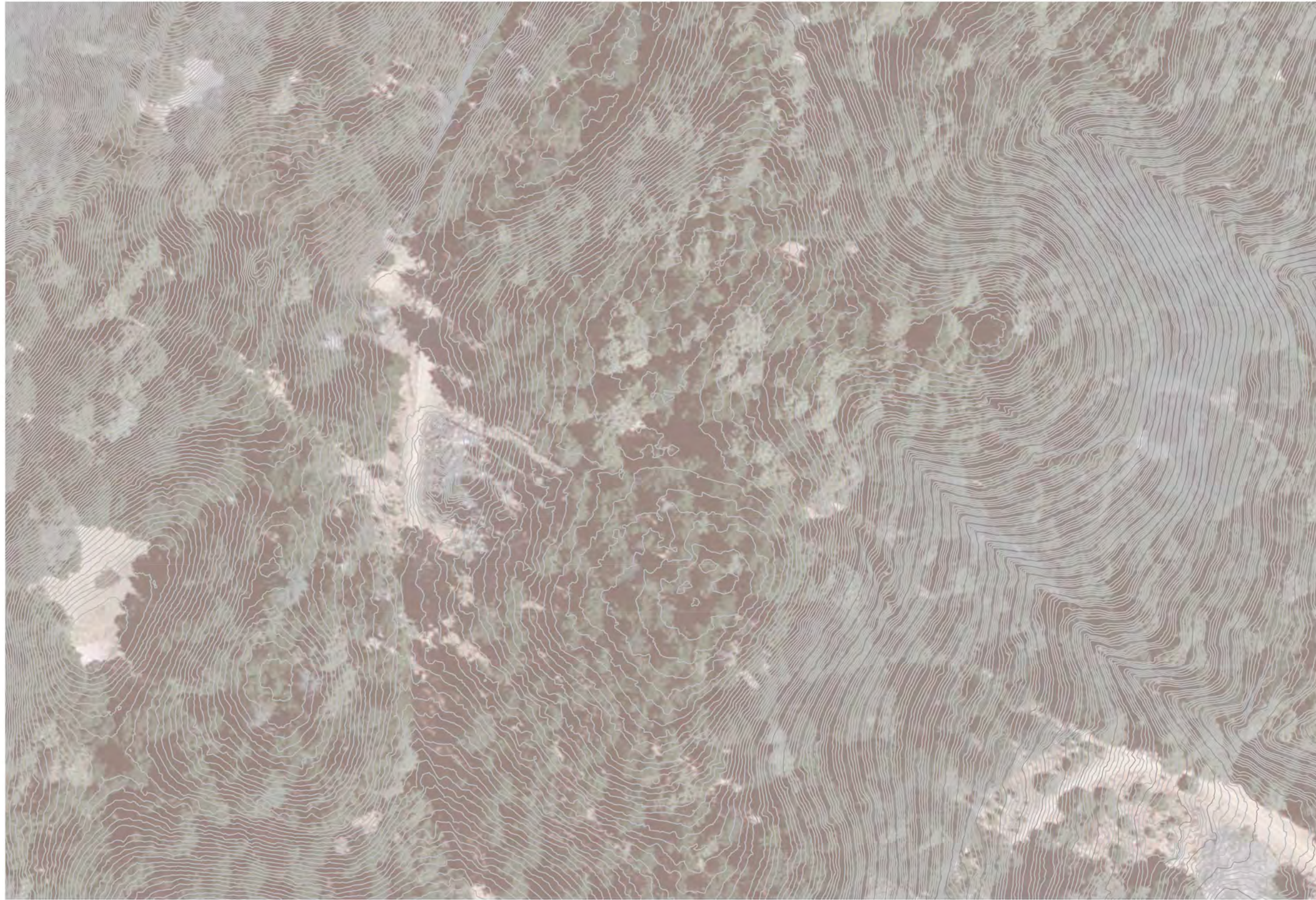
July 5, 2016



DESIGN GUIDING PRINCIPLES

- **Connection, Curiosity, Innovation**
- **Flexibility**
- **Viability**
- **Sustainability**
- **Technology**

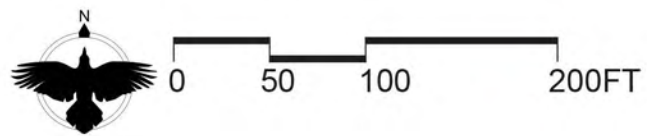


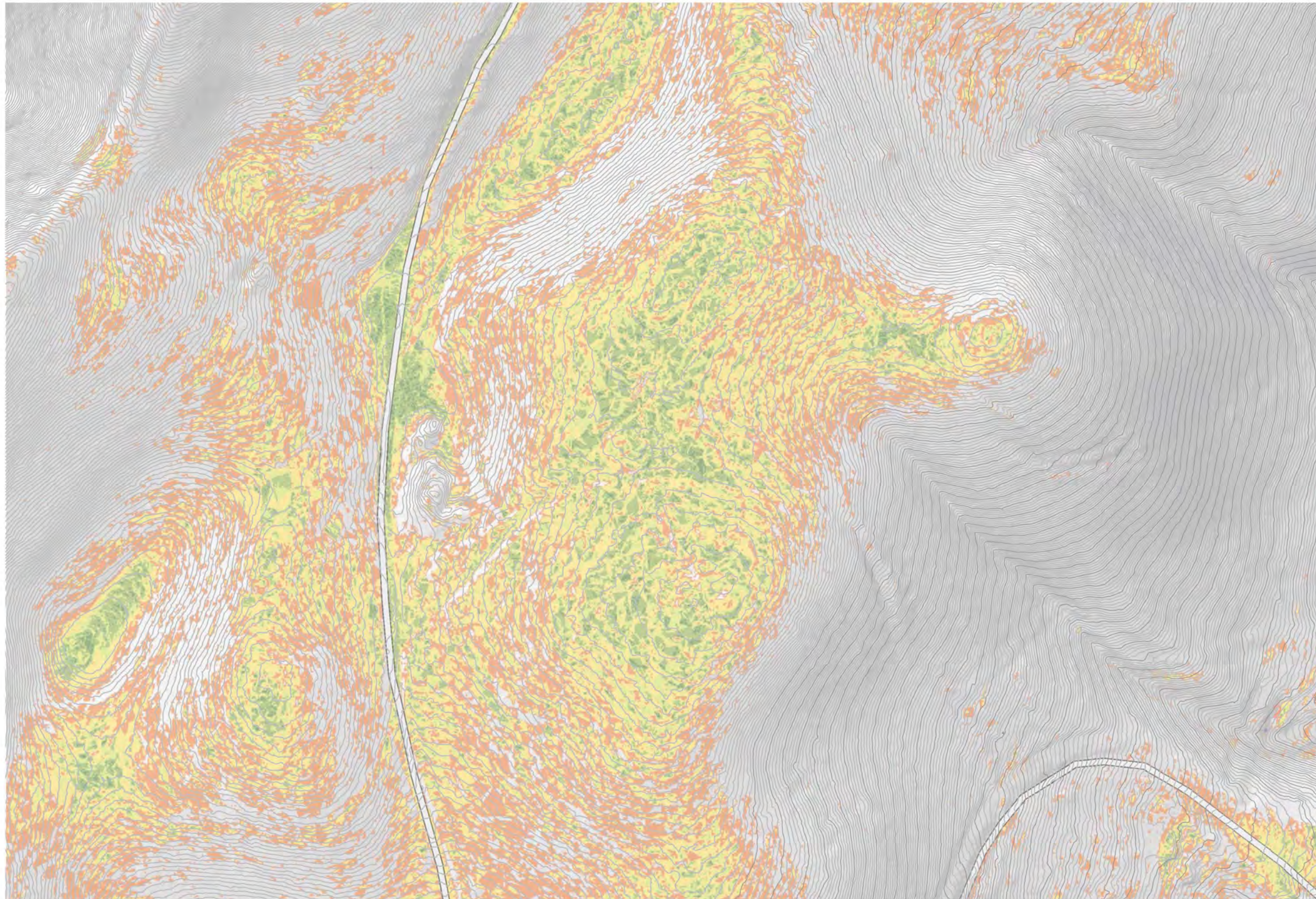


Site Aerial with Contours (1ft)

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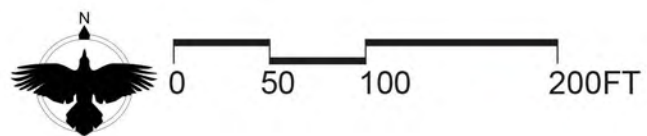
Slope Legend

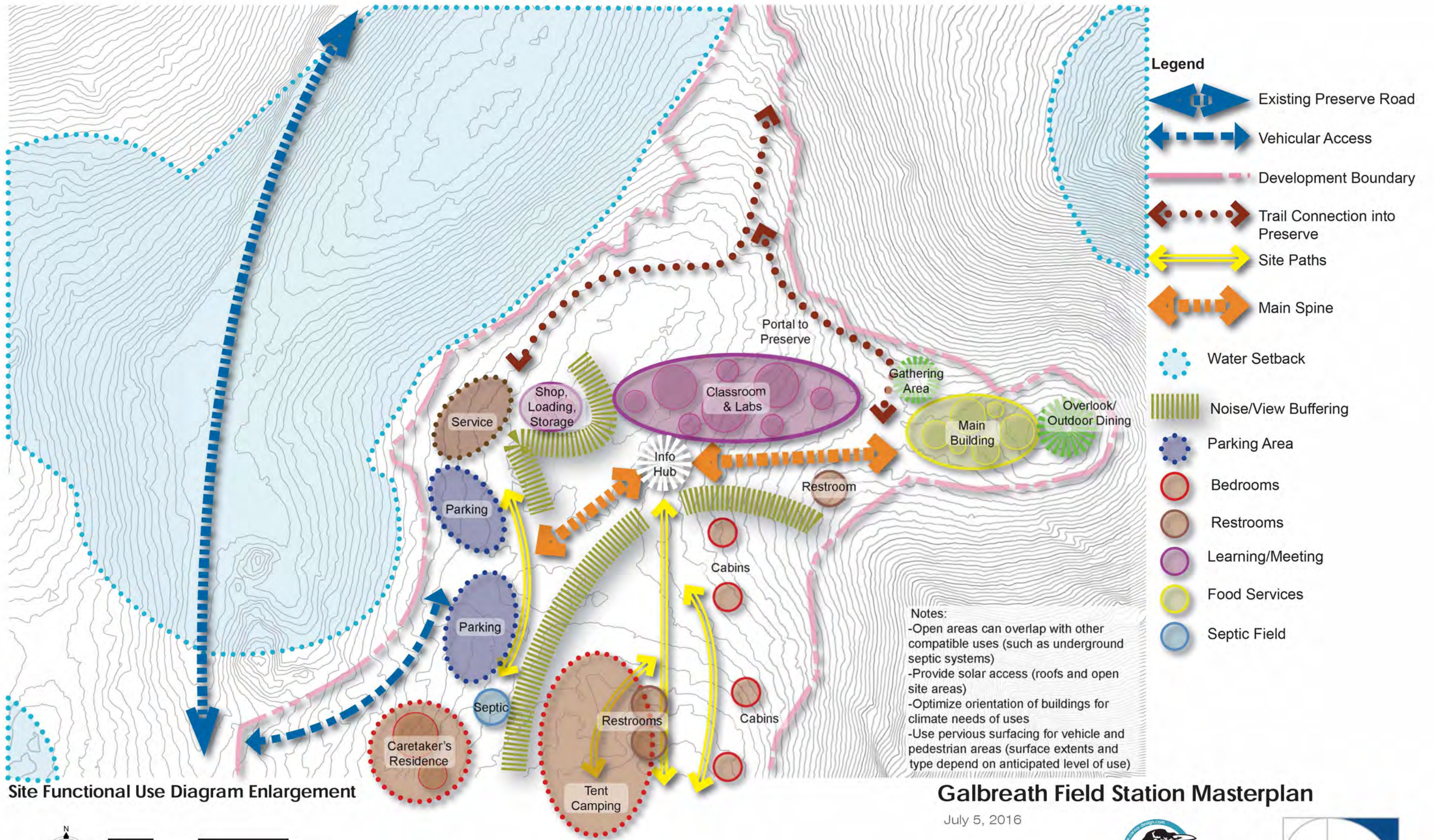
- 0 to 2%
- 2.1 to 5%
- 5.1 to 8%
- 8.1 to 12%
- 12.1 to 20%
- >20%

Site Contours with Slope Analysis.

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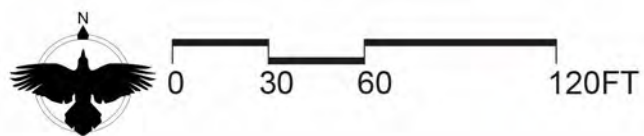


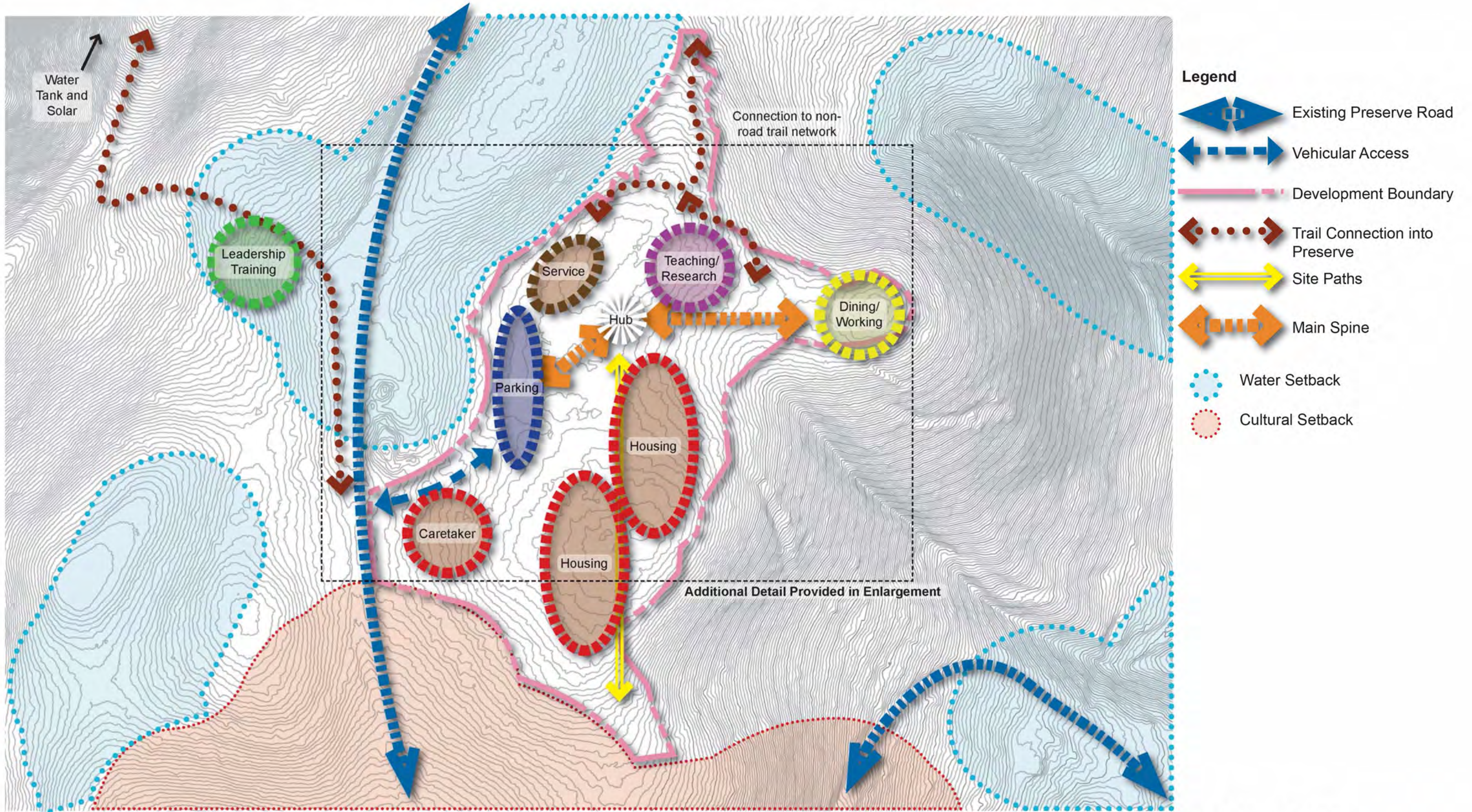


Site Functional Use Diagram Enlargement

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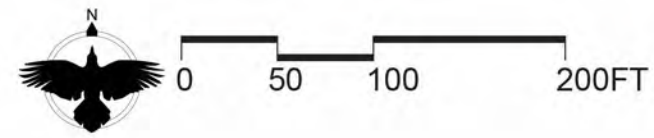


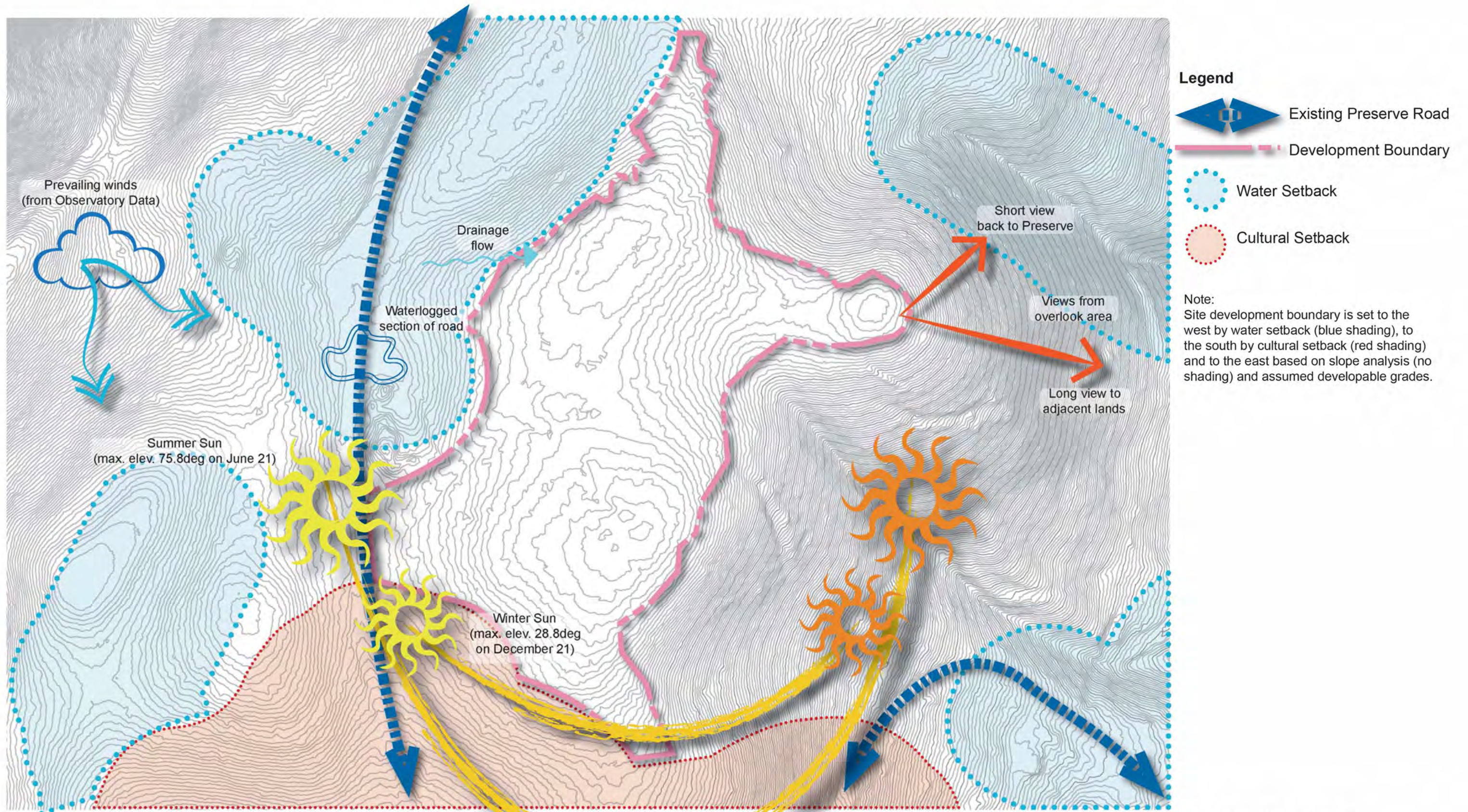


Site Functional Use Diagram





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Legend

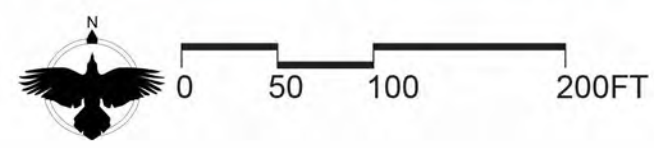
-  Existing Preserve Road
-  Development Boundary
-  Water Setback
-  Cultural Setback

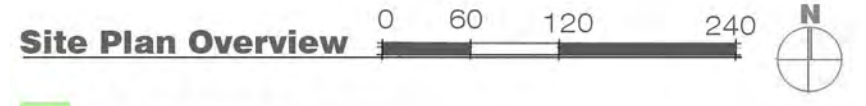
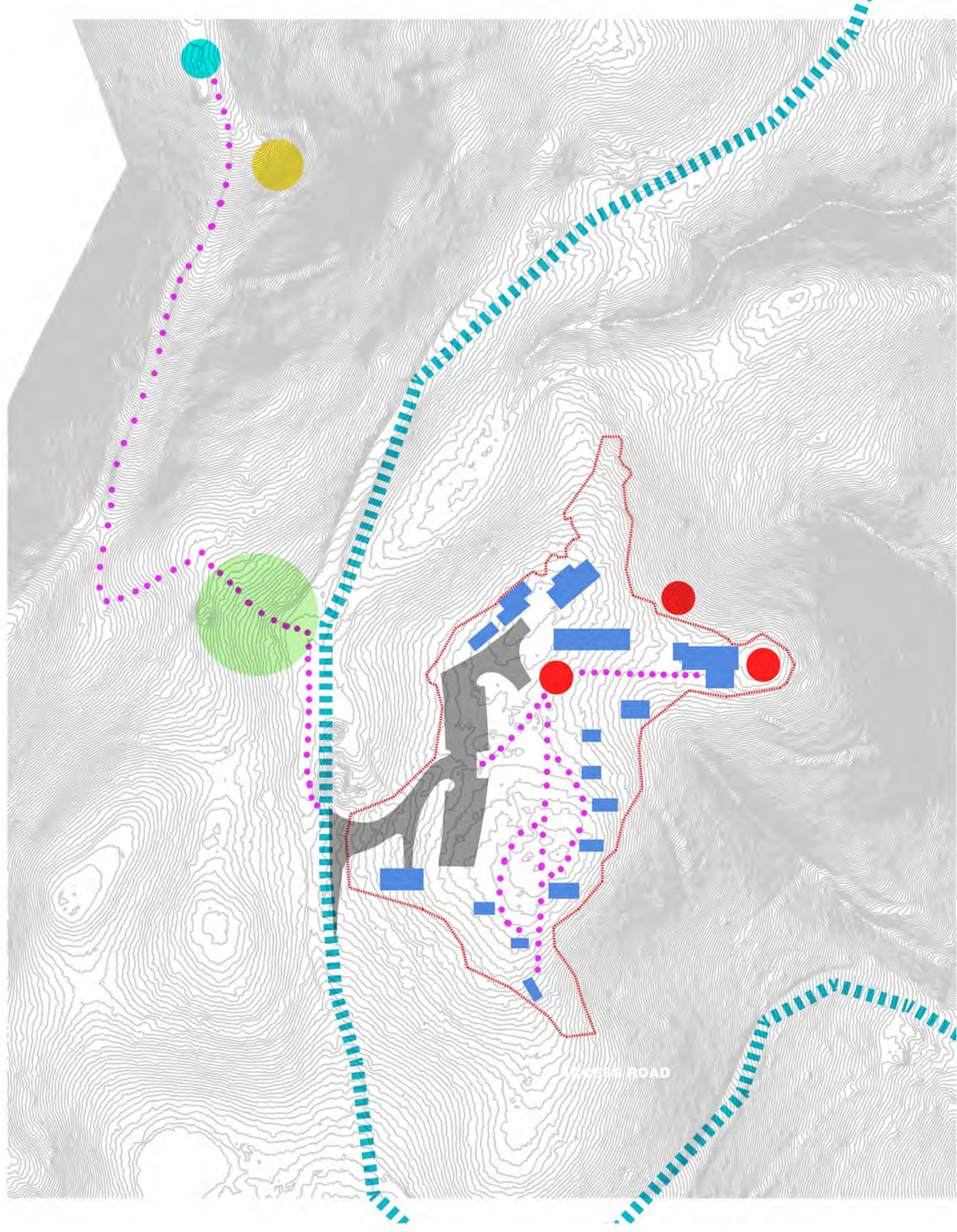
Note:
 Site development boundary is set to the west by water setback (blue shading), to the south by cultural setback (red shading) and to the east based on slope analysis (no shading) and assumed developable grades.

Site Analysis with Development Area Boundary

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- Leadership
- Buildings
- Gathering
- Water Storage
- PV Array
- Parking
- Access Road
- Site Constraints
- Trails



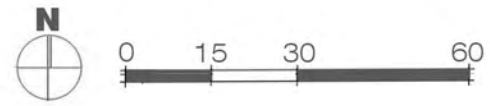
Phase 1 Site Plan

- 1** Tent Camping
- 2** Dining Camp
- 3** Restrooms/Showers/Laundry
- 4** Cabins: (1) 4 person, (1) 6 person
- 5** Utility Shed
- 6** Parking
- 7** Emergency Vehicle Turnaround
- 8** Construction Staging
- 9** Trail Head
- 10** Caretaker Trailer
- 11** Septic Tank
- 12** Leach Fields
- Pathways (Not Clearing) Gathering



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Phase 2 Site Plan

- 1** Tent Camping
 - 2** Dining Camp
 - 3** Restrooms/Showers/Laundry
 - 4** Cabins
 - 5** Utility Shed
 - 6** Parking
 - 7** Emergency Vehicle Turnaround
 - 8** Construction Staging
 - 9** Trail Head
 - 10** Caretaker Residence
 - 11** Septic Tank
 - 12** Leach Fields
 - 13** Lodge
 - 14** Shop
 - 15** Entry/Staff Office/IT/Porch
 - 16** Long Term Visitor Storage Containers
- Pathways (Not Clearing)
 Gathering



Phase 3 Site Plan

- Pathways (Not Clearing) Gathering
- 1 Tent Camping
- 2 Dining Camp
- 3 Restrooms/Showers/Laundry
- 4 Cabins
- 5 Utility Shed
- 6 Parking
- 7 Emergency Vehicle Turnaround
- 8 Amphitheatre
- 9 Trail Head
- 10 Caretaker Residence
- 11 Septic Tank
- 12 Leach Fields
- 13 Lodge
- 14 Shop
- 15 Entry/Staff Office/IT/Porch
- 16 Long Term Visitor Storage Containers
- 17 Education, Research Buildings



SUSTAINABLE FEATURES

OVERVIEW

- Net-zero energy
- Ultra-low water use
- Solar passive heating and cooling
- Efficient building envelopes
- Minimized building footprints using multipurpose spaces
- On-site, local, and healthy building materials
- Waste stream tracking
- Minimized impacts on local environments
- Sustainability behavioral change technology

CABINS

- Double-walled insulation
- Spaces convertible to studios, offices, bedrooms
- Display screens with real time electrical use

SHOP + UTILITY SHED

- Solar panels and batteries
- Fuel cell generator for backup power
- Non-chlorinated water filtration
- Permeable surfaces on parking areas
- Charging stations for solar ATV's
- Exploration stations on water and energy

EDUCATIONAL + RESEARCH FACILITIES

- Flexible classroom sizes with sound-proof partitions
- Low light pollution fixtures
- Modular flexible workbench arrangements
- Exploration stations on watershed connections

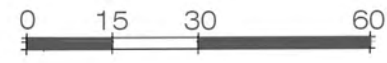
RESTROOMS/SHOWERS

- Solar water heater and drain heat exchangers
- Rainwater collection for toilets and washing machines
- Ultra-low flow and composting toilets
- Separate grey and black water treatment systems
- Display screens with real-time water use

DINING HALL AND LODGE

- Solar panels
- Ridge mount translucent skylights for natural lighting
- Locally harvested stone and wood
- High-efficiency wood stove with carbon tracking system
- Counter current heating and cooling systems
- Grey water system
- Animal-proof garbage systems
- Display screens with real-time waste tracking





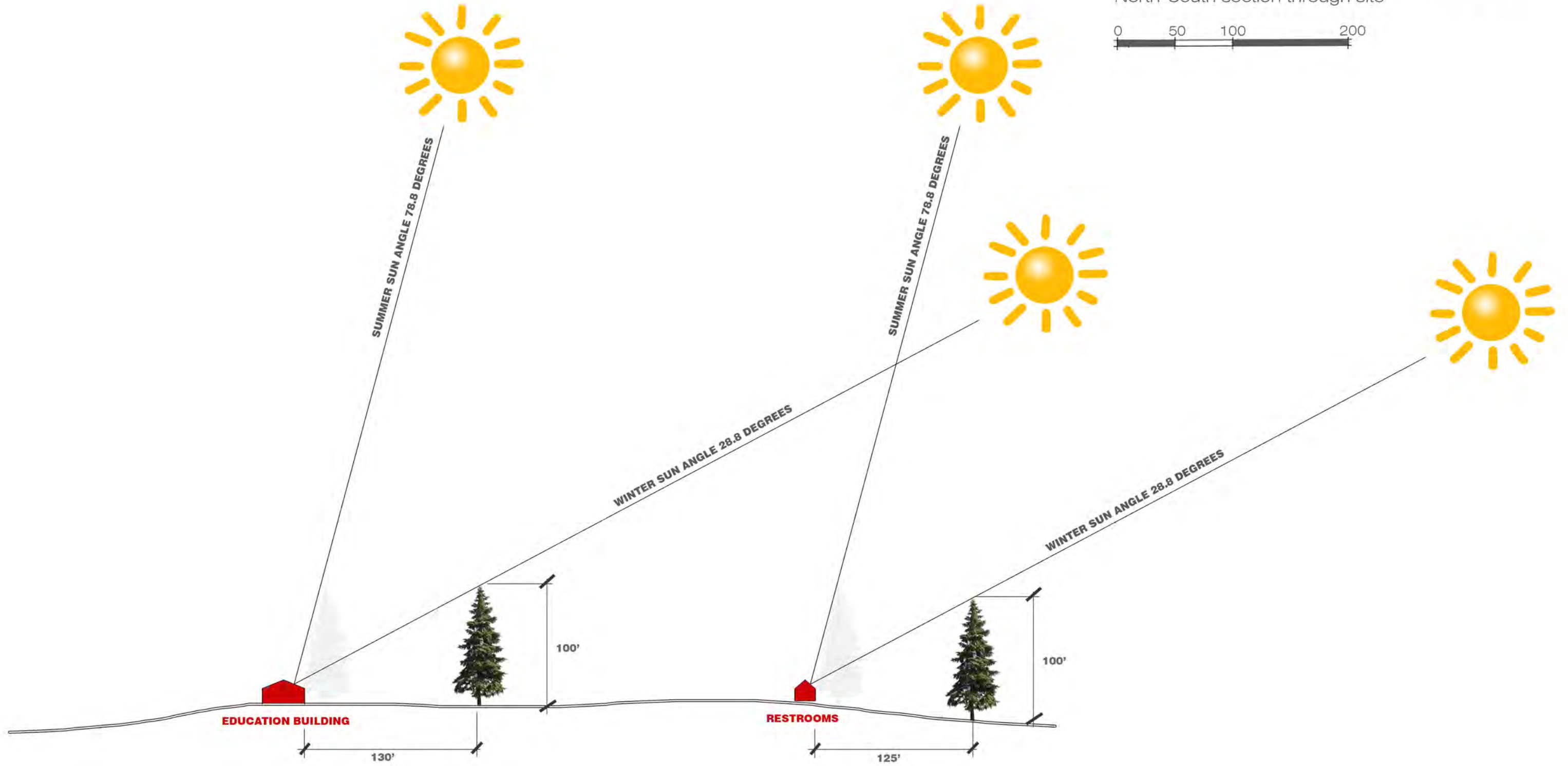
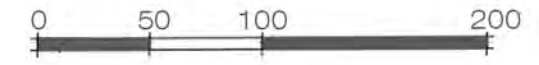
Tree Clearing Zones

-  30' Building Setback
-  100' Building Setback
-  130' Building Setback



Tree Clearing Zones: Solar Installation

North-South section through site





**CHARACTER
DEFINING
ELEMENTS**

Galbreath Field Station Masterplan
Design Precedence: July 5, 2016





indoor/
outdoor
space with
adequate
weather
protection



indoor/
outdoor
visual
connection



rough
stonework and
crafted doors-
harken
regional
history



extensive
use of
daylighting

reclaimed
timbers where
possible

dormers

CHARACTER
DEFINING
ELEMENTS



weathered
metal roofs
(regional
aesthetic)

simple roof
forms,
expressed
structure

weathered
siding





dormers/
skylights

regional
aesthetic



indoor/
outdoor
space



weathered
siding
(variation)

outdoor
gathering

CHARACTER
DEFINING
ELEMENTS



reclaimed
timbers



indoor/
outdoor
gathering





shipping containers



barn doors connecting indoor/outdoor spaces



indoor/outdoor gathering space



regional aesthetic

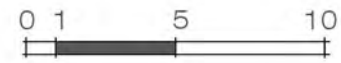
CHARACTER DEFINING ELEMENTS



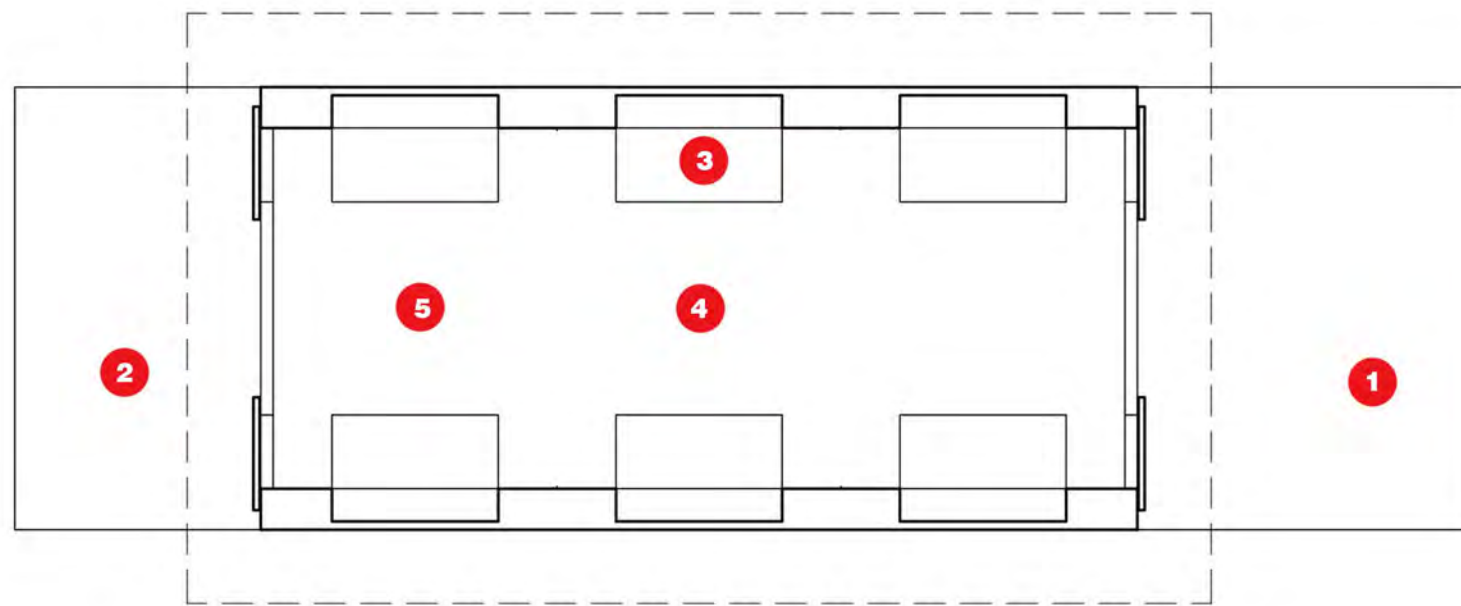
CABINS



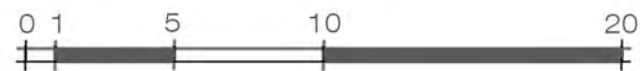
Front/Back Elevation



Side Elevation



Cabin Floor Plan



- 1** Deck
- 2** Mud Porch
- 3** Murphy Bunks
- 4** Cabin sizes vary:
 - 4 Person Cabin: 475 sf
 - 6 Person Cabin: 625 sf
 - 8 Person Cabin: 775 sf
 - 16 Person Cabin: 925 sf



Galbreath Field Station Masterplan

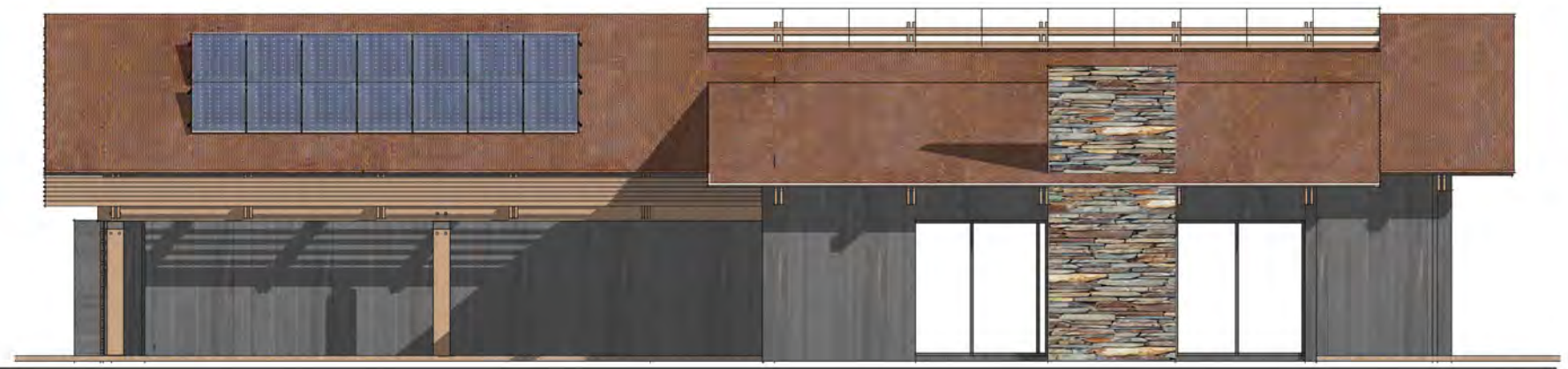
July 5, 2016



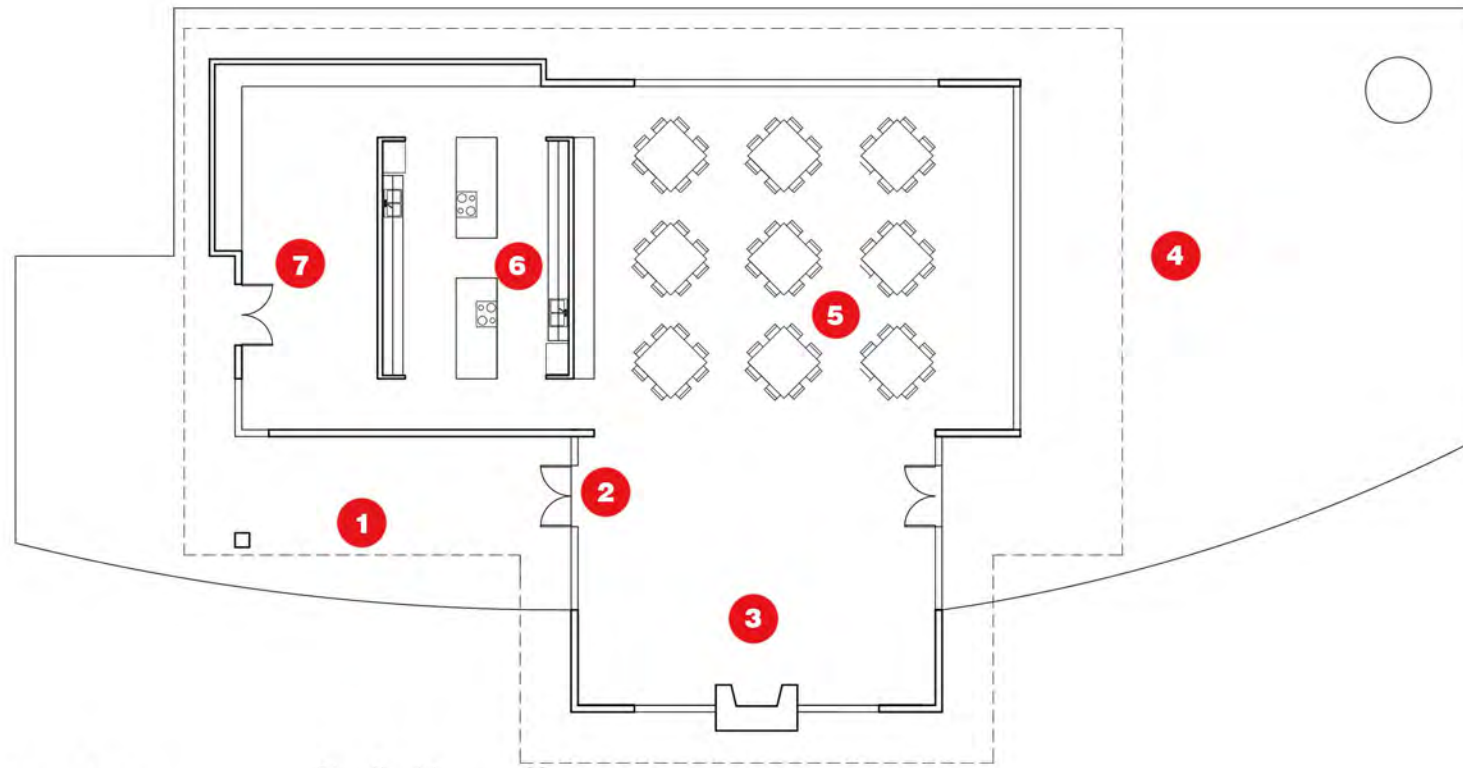
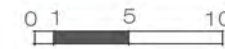
DINING HALL/ LODGE (3,200 sf)



West Elevation



South Elevation



Floor Plan



- 1 Mud Porch
- 2 Entry
- 3 Lodge
- 4 Deck
- 5 Dining
- 6 Kitchen
- 7 Storage



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July 5, 2016



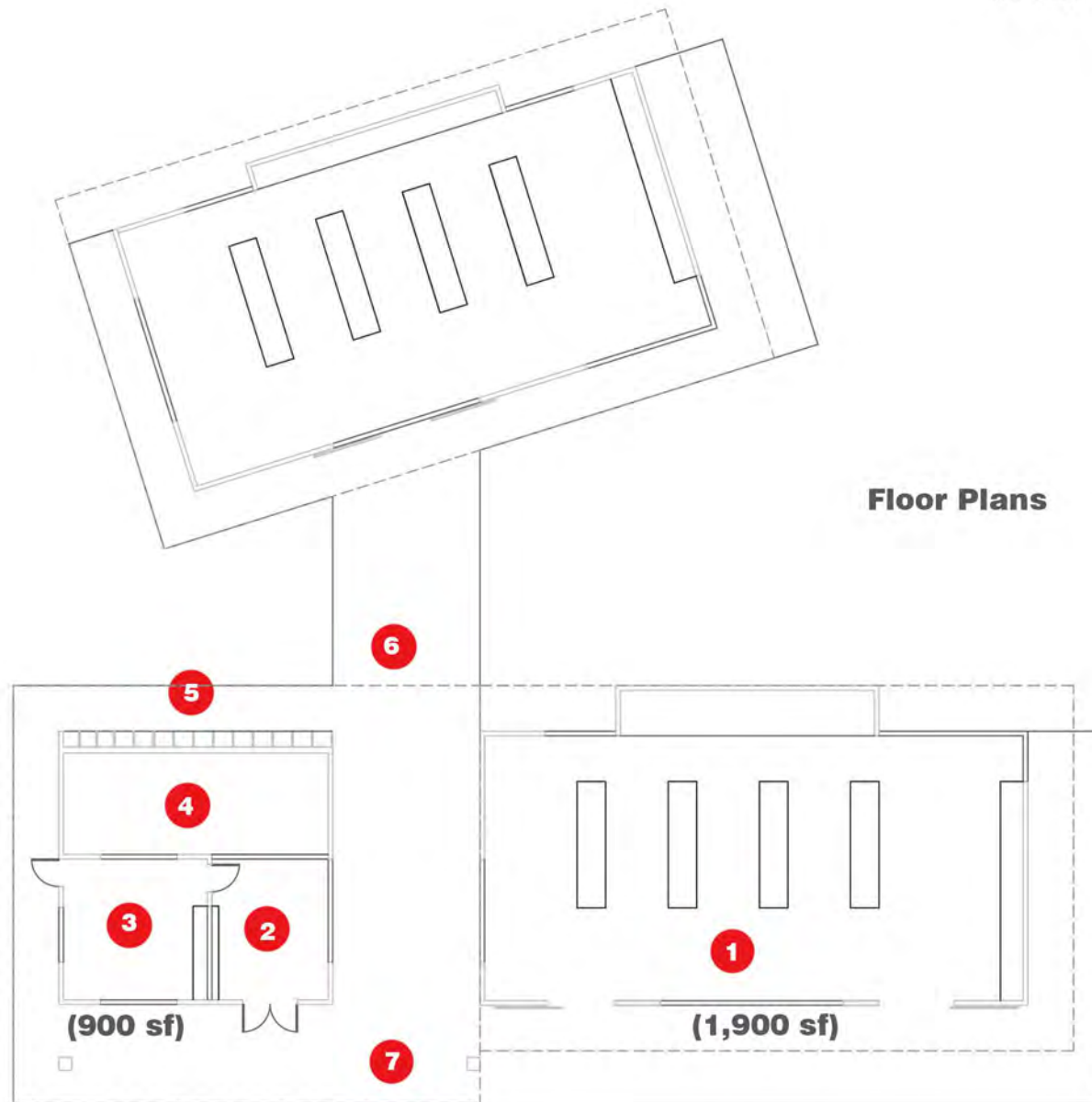
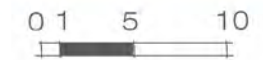
EDUCATION BUILDING / MAIN ENTRY FACILITY



South Elevation



West Elevation



Floor Plans



- 1** Education Building
- 2** Entry/Reception
- 3** Office
- 4** IT
- 5** Storage
- 6** Boardwalk Connection
- 7** Deck

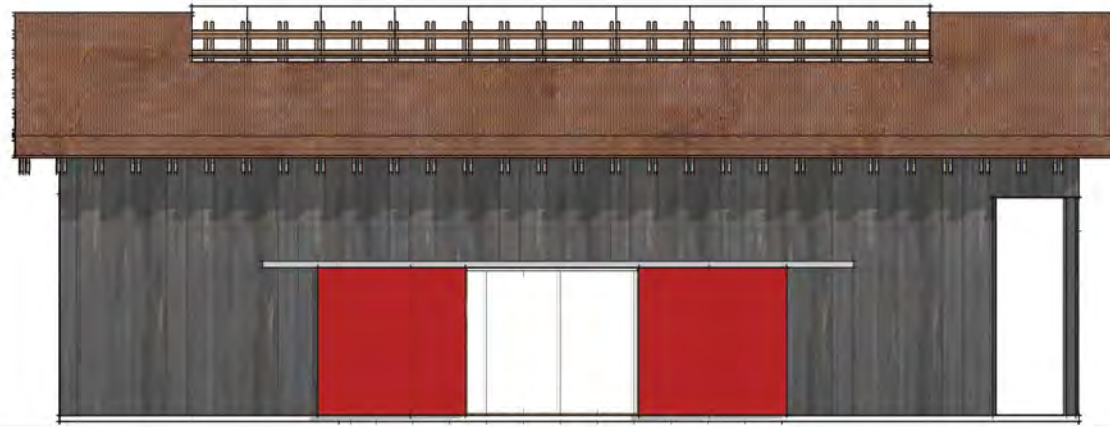


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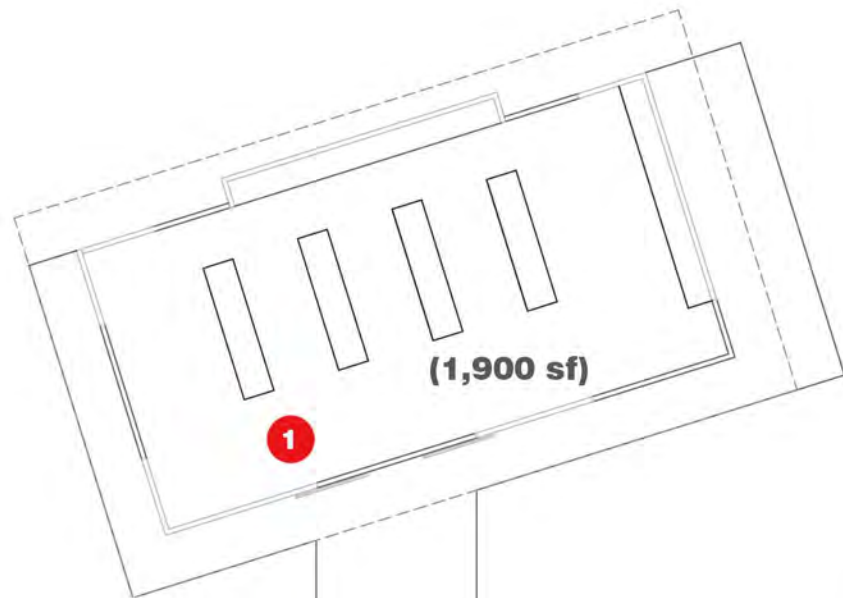
RESEARCH BUILDING



South Elevation



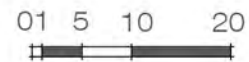
West Elevation



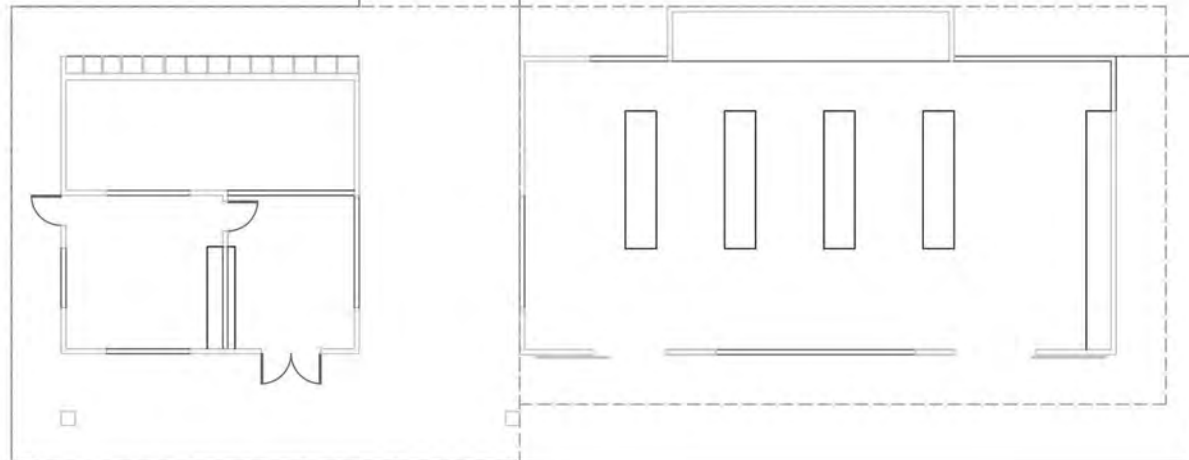
(1,900 sf)

1

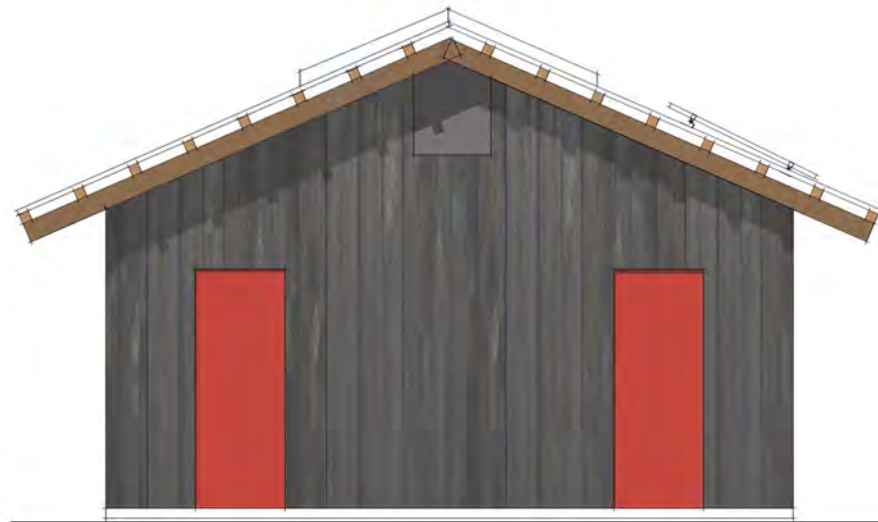
Floor Plans



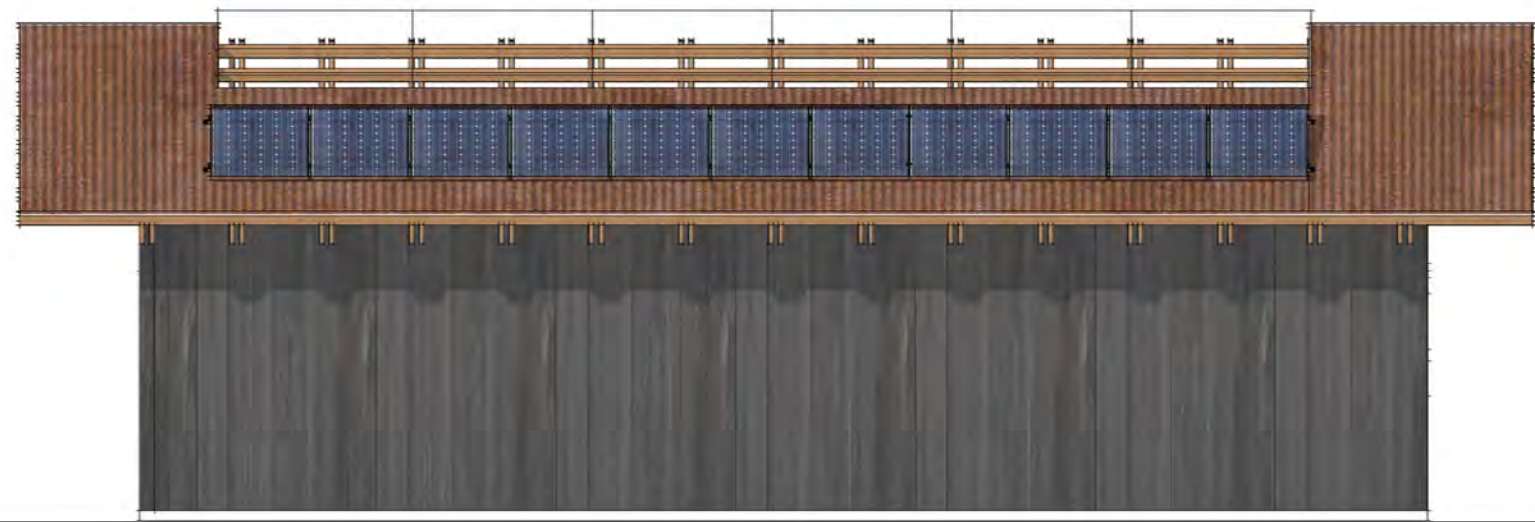
1 Research Building



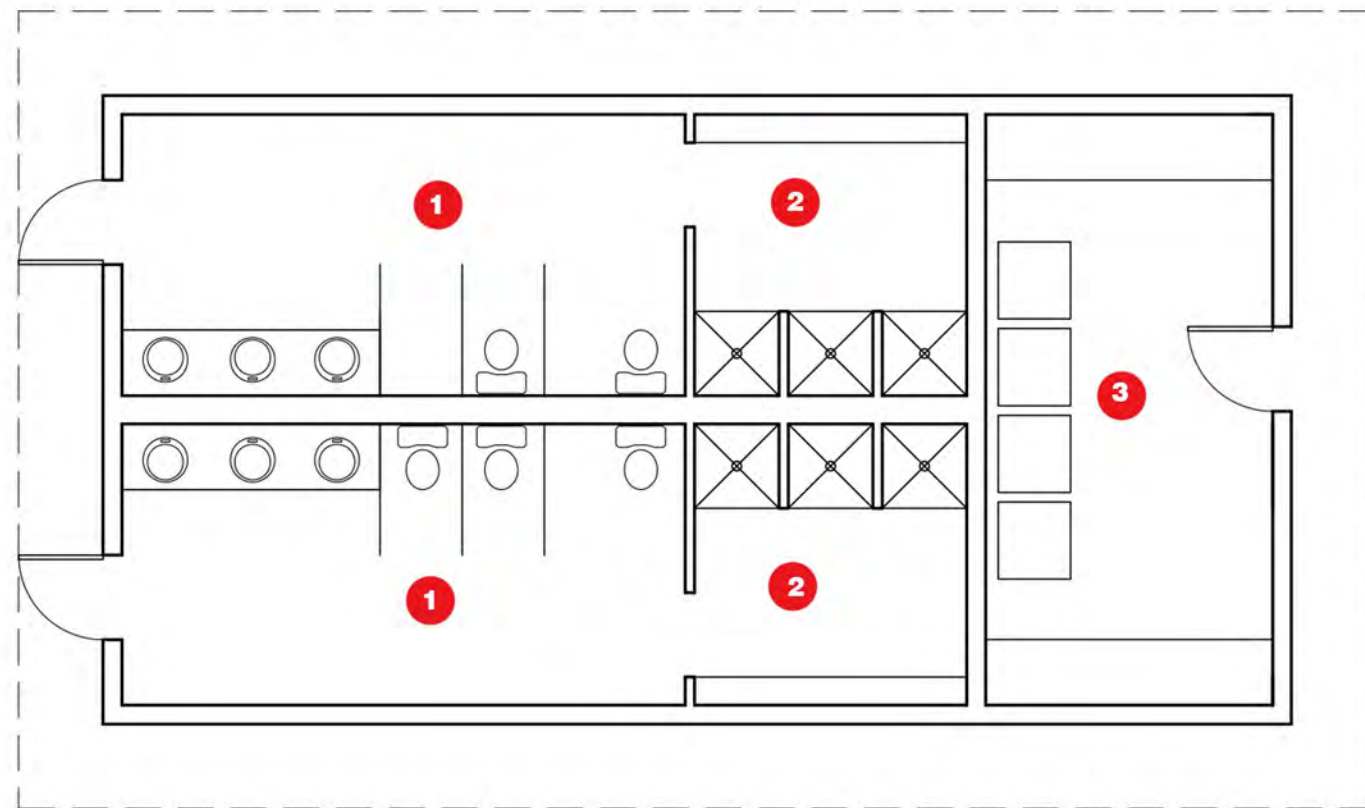
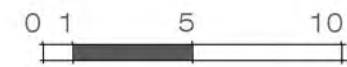
BATHROOMS (800 sf)



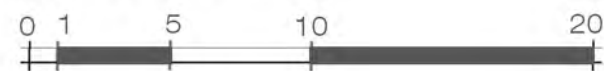
Front/Back Elevation



Side Elevation

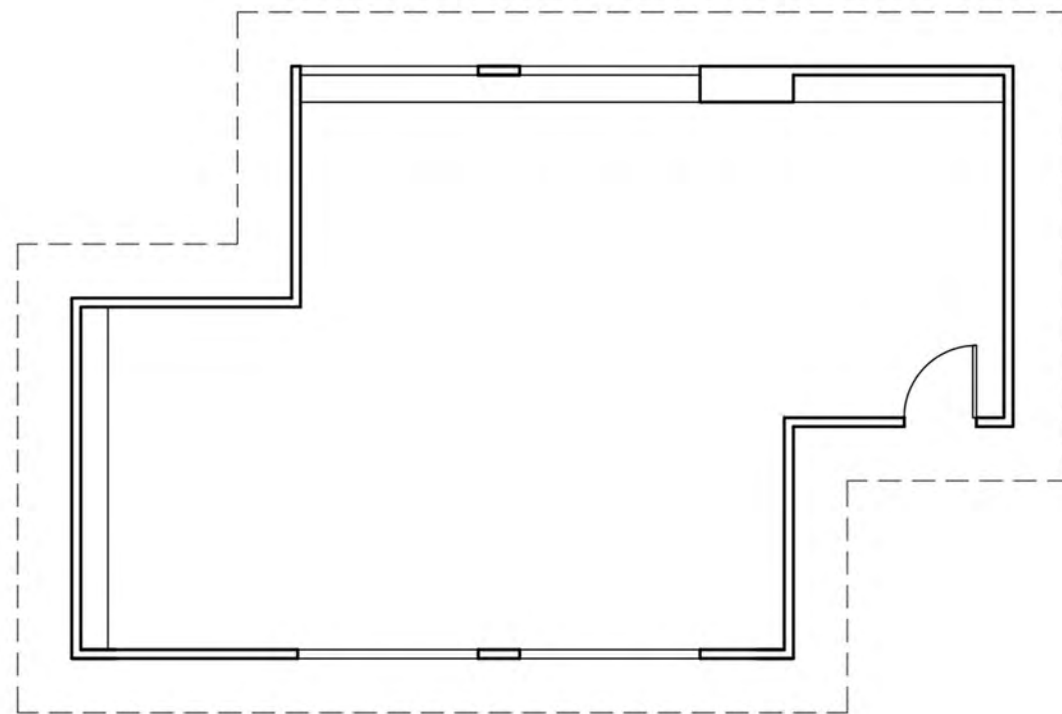
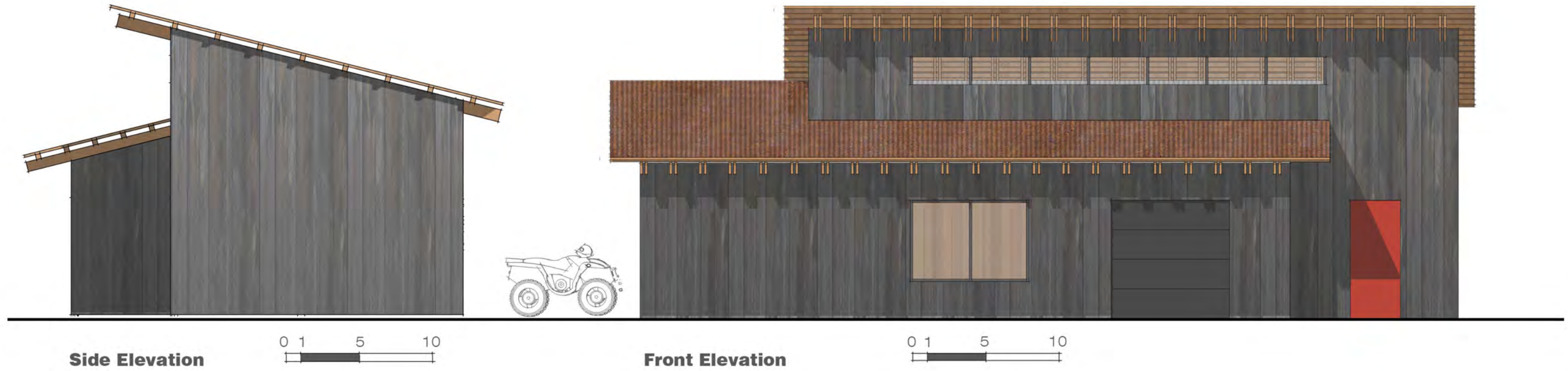


Bathroom/Showers/Laundry Floor Plan



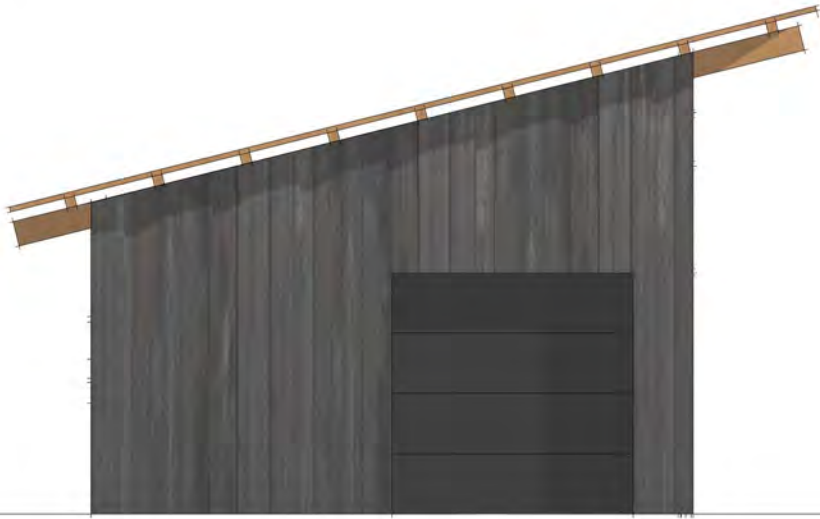
- 1** Bathroom
- 2** Showers
- 3** Laundry

SHOP AND GARAGE (1,400 sf)

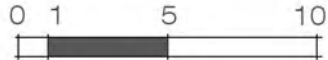


Floor Plan 0 1 5 10 20

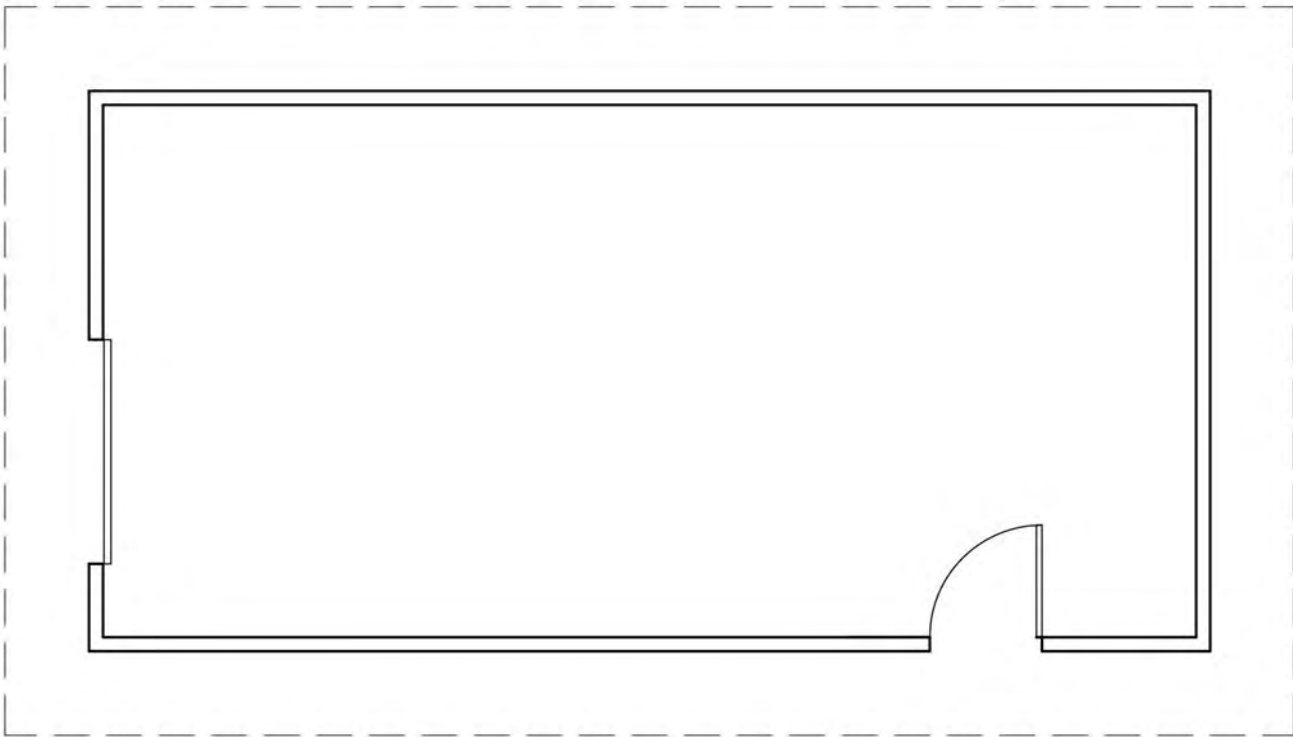
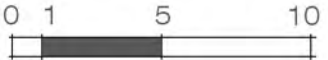
UTILITY SHED (800 sf)



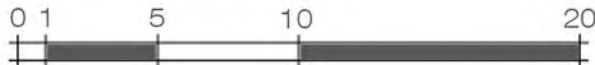
Side Elevation



Front Elevation



Shed Floor Plan

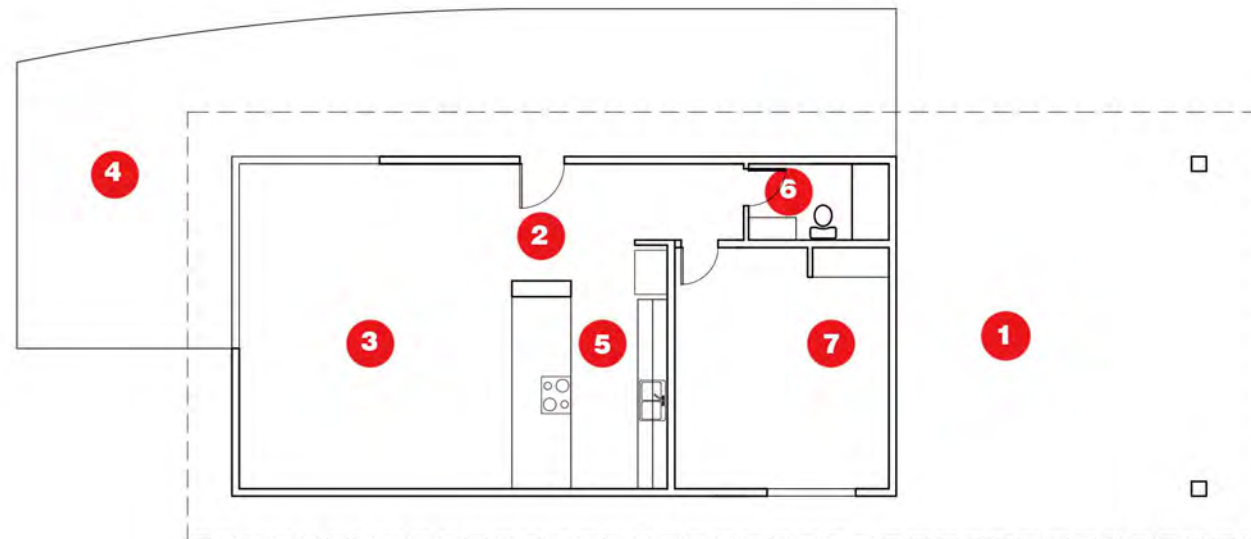
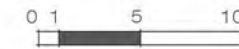




West Elevation



North Elevation



First Floor



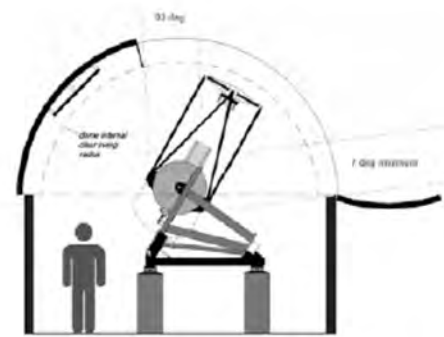
- 1 Carport
- 2 Entry
- 3 Living/Dining
- 4 Deck
- 5 Kitchen
- 6 Bathroom
- 7 Bedroom



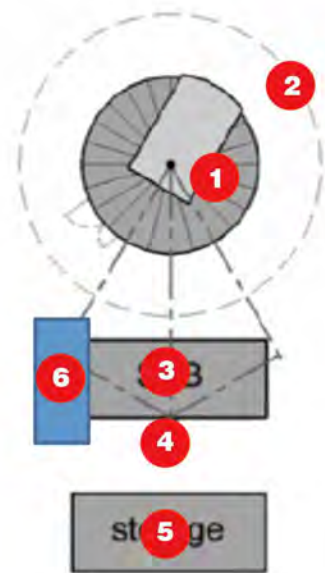
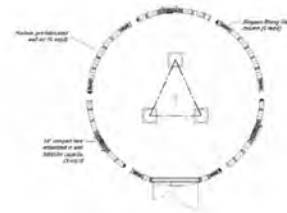
Elevation



Elevation



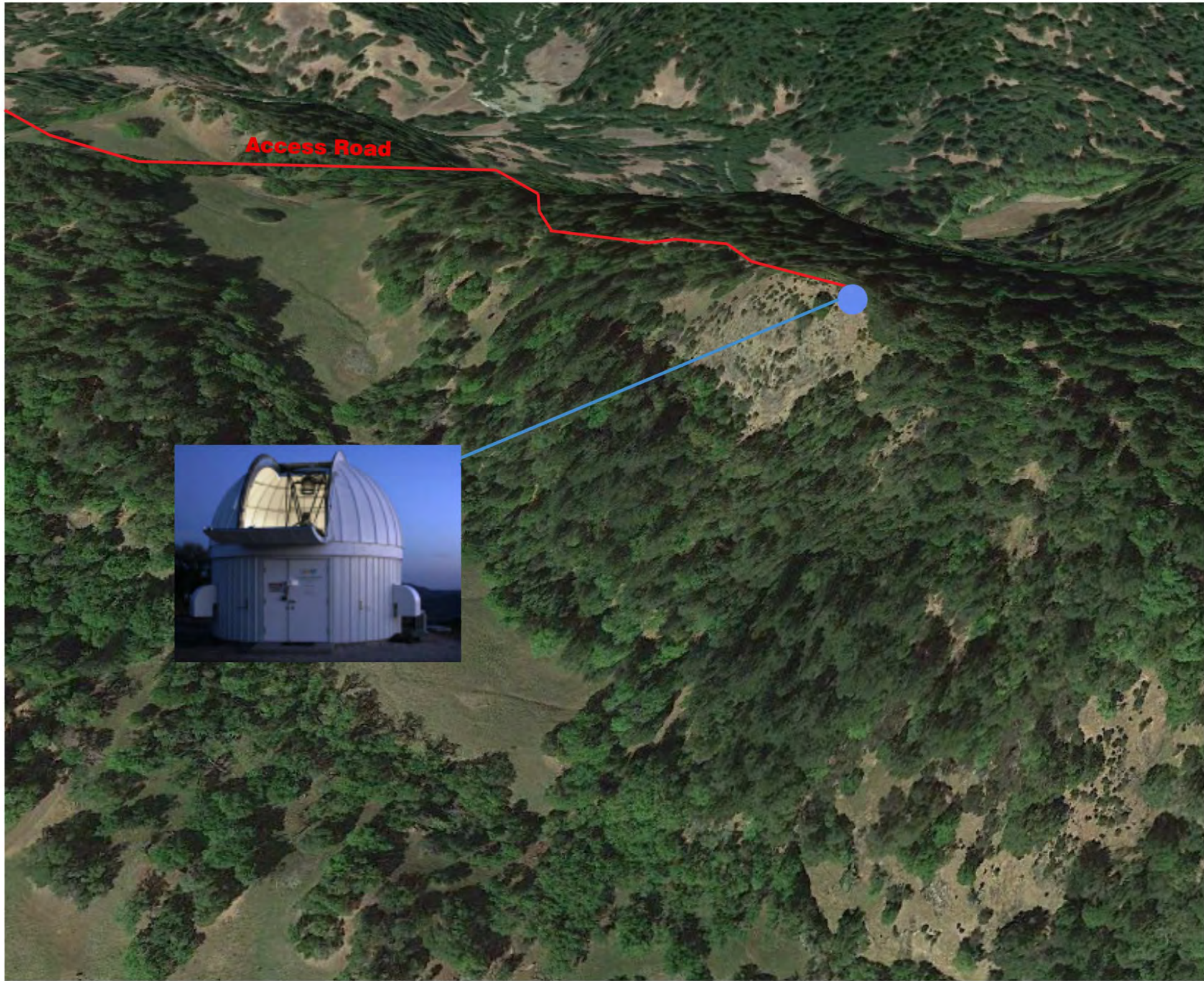
Side Elevation (put in scale bar showing that telescope enclosure is 20 ft in diameter)



Observatory Floor Plan



- 1** 1-m telescope enclosure
- 2** Open swing radius of shutter door
- 3** Site services building
- 4** Weather station
- 5** Storage
- 6** Solar and shade for site services building



Observatory Site Plan



LIST OF INCORPORATED DESIGN GUIDING PRINCIPLES

Sustainability

- Net-zero energy
 - Microbial fuel cells
 - Passive solar design
 - Counter current heating and cooling
 - Solar water heating
 - Natural lighting
- Ultra low water use
 - Rainwater collection and use
 - Ultra low-use fixtures
 - Real-time monitoring of amount used
- Low local impact
 - Minimized light pollution
 - Minimized supplemental wildlife food sources
 - Minimized tree cutting
 - Avoidance of cultural resources and waterways
 - Use of local and on site materials
 - Ultra high-resolution topography to minimize needed grading
 - Minimize ground disturbance with buildings on pillars and raised leach field for septic

Technology

- Real-time measurements of resource use
- Real-time feedback on personal energy and resource use
- Sensor-to-screen sensor networks created by students
- Building performance monitoring
- Smart building technology
- Integration of building, preserve, and global data networks
- Observatory linked to world-wide telescope network

Creativity, Curiosity, Innovation

- Connect people to each other with “productive collisions” and super desirable locations
- Connect visitors to place with seamless indoor-outdoor spaces, natural lighting, views, and local history
- Stimulate creativity with art, repurposed objects, golden mean proportioning systems
- Interactive exploratorium activities surrounding sustainability concepts
- The use of local materials, weathered wood, corrugated metal, glass windows and barn doors connecting inside to outside, and large decks connecting spaces.

Flexibility

- Every space has more than one purpose
- Open floor plans provide flexibility of use
- Moveable sound proof partitions easily change room sizes
- Sleeping cabins can be converted into workshops and meeting rooms

Viability

- Low maintenance materials
- Ease of access
- Fire safety
- ADA
- Low effort maintenance and repair designs



Cost Estimate



Galbreath Field Station
Master Plan
Estimate of Construction Cost - Summary
prepared 7/05/16

PHASE-1		Area (sf)	Bldg Capacity	\$/sf
General Site Requirements	\$	220,315		
Site Work	\$	220,500		
Utility Shed	\$	38,200	800	\$ 48
Camp Kitchen	\$	356,100	2,200	\$ 162
Restrooms / Showers	\$	158,050	800	\$ 198
(1) 4-Person Cabin	\$	94,575	475	\$ 199
(1) 6-Person Cabin	\$	113,325	625	\$ 181
Contingency	\$	-		
Sub Total Direct	\$	1,201,065		
Escalation Phase 2 - year 1 2018	\$	180,160	15%	
Building, Sitework & Escalation	\$	1,381,225		
Contractor General Conditions (12%)	\$	165,747		
Total Construction Subtotal	\$	1,546,972		
SSU Costs				
AE Services During PW	\$	73,945	4.78%	
AE Services During Construction	\$	22,431	1.45%	
Campus Contract Management Services	\$	108,133	6.99%	
Campus Project Contingency	\$	77,349	5.00%	
Required Add'l Services during PW phase	\$	108,288	7.00%	
Required Add'l Services during Construction	\$	26,299	1.70%	
Builders Risk Insurance Premium	\$	2,320	0.15%	
Owner Controlled Insurance Premium	\$	26,299	1.70%	
Soft Cost Subtotal	\$	445,064		
TOTAL PROJECT COST - Phase 1		\$	1,992,035	

PHASE-2		Area (sf)	Bldg Capacity	\$/sf
General Site Requirements	\$	111,605		
Site Work	\$	470,600		
(2) 4-Person Cabin	\$	189,150	950	\$ 199
(1) 6-Person Cabin	\$	113,325	625	\$ 181
Shop	\$	138,750	1,400	\$ 99
Lodge	\$	227,600	1,000	\$ 228
Main Building Expansion	\$	123,245	2,200	\$ 56
Entry / Staff / IT / Porch	\$	134,500	900	\$ 149
Caretaker Residence	\$	103,300	1,035	\$ 100
Contingency	\$	-		
	Sub Total Direct	\$ 1,612,075		
Escalation Phase 2 - year 2 2019	\$	354,657	22%	
Building, Sitework & Escalation	\$	1,966,732		
	Contractor General Conditions (12%)	\$ 236,008		
	Total Construction Subtotal	\$ 2,202,739		
SSU Costs				
AE Services During PW	\$	105,291	4.78%	
AE Services During Construction	\$	31,940	1.45%	
Campus Contract Management Services	\$	153,971	6.99%	
Campus Project Contingency	\$	110,137	5.00%	
Required Add'l Services during PW phase	\$	154,192	7.00%	
Required Add'l Services during Construction	\$	37,447	1.70%	
Builders Risk Insurance Premium	\$	3,304	0.15%	
Owner Controlled Insurance Premium	\$	37,447	1.70%	
	Soft Cost Subtotal	\$ 633,728		
TOTAL PROJECT COST - Phase 2		\$ 2,836,467		

PHASE-3		Area (sf)	Bldg Capacity	\$/sf
General Site Requirements	\$	76,000		
Site Work	\$	154,100		
(1) 8-Person Cabin	\$	124,575	775	\$ 161
(1) 16-Person Cabin	\$	156,725	925	\$ 169
Classroom	\$	354,750	1,900	\$ 187
Research Lab	\$	350,750	1,900	\$ 185
Restrooms / Showers	\$	160,050	900	\$ 178
Contingency	\$	-		
	Sub Total Direct	\$ 1,376,950		
Escalation Phase 2 - year 3 2020	\$	371,777	27%	
Building, Sitework & Escalation	\$	1,748,727		
	Contractor General Conditions (12%)	\$ 209,847		
	Total Construction Subtotal	\$ 1,958,574		
SSU Costs				
AE Services During PW	\$	93,620	4.78%	
AE Services During Construction	\$	28,399	1.45%	
Campus Contract Management Services	\$	136,904	6.99%	
Campus Project Contingency	\$	97,929	5.00%	
Required Add'l Services during PW phase	\$	137,100	7.00%	
Required Add'l Services during Construction	\$	33,296	1.70%	
Builders Risk Insurance Premium	\$	2,938	0.15%	
Owner Controlled Insurance Premium	\$	33,296	1.70%	
	Soft Cost Subtotal	\$ 563,482		
TOTAL PROJECT COST - Phase 3		\$ 2,522,055		
TOTAL PROJECT COST ALL PHASES		\$ 7,350,558		

**PV sizing is estimated on average for 1.2kW per building

** Estimate does not include costs for furniture or Equipment

Galbreath Master Plan - Estimation of Construction Cost - Phase 1

PHASE-1				Rate							
Description	Qty	Unit	(\$/Unit)	Amt	Description Details	Questions and Clarifications	RESPONSE				
SITE GENERAL REQUIREMENTS											
Site Preparation - Clear & Grub	50,000	sf	1	\$ 50,000	Misc removal of Trees; Brush; Rocks Stumps Etc.						
Off-Haul site debris	1	ls	2,500	\$ 2,500	Green Waste Debris						
Rough Grade Site	50,000	sf	1	\$ 50,000	Construction Areas Only						
Import rock/gravel site parking	333	cy	55	\$ 18,315	Utilize Permanent Parking Area; Assume 18,000-sf (Ph 1) @ 6" depth. Crushed rock is available within a 2-mile radius of installation location.	Rock/gravel unit (sf) needs to be changed to cf. Crushed rock will come from an on-site location within 2 mi of the field station site. What portion of the crushed rock estimate is labor and what portion materials? What assumptions have you made about the thickness of the rock to be applied? (Pacific Watershed Associates who just completed 8 miles of roadwork and rocking at the Preserve: "I would think that rocking 24,000 sqft of area would require between 300 and 440 cubic yards of rock depending on the thickness of rock applied (1/3 of a ft vs 1/2 ft depth).")	Changed Unit to cf. Assume 24k-sf @ 6" Depth 12kcf (444cy). Changed unit cost (reduced) to reflect close proximity to crushed rock. General comment (Typical) did not break down to Labor; Material; Other; Equipment (LMOE) level of detail. This is conceptual estimate based on conceptual design concepts. Providing LMOE cost detail is not appropriate				
Grade construction parking	18,000	sf	3	\$ 54,000	Sub grade grading prep.	Pacific Watershed Associates: If the scope of work is simply grading, sub-grade compaction, rock quarry and transport, rock surfacing (grading, watering, and compaction), and installation of minimal parking lot infrastructure, I'm inclined to think that the estimate that they've provided (\$312,000) may be as much as \$100k too high. If there are other elements to the scope of work that could increase the estimate, such as curbs or other wheel stops, sub-grade preparation, or LD drainage structures, these need to be identified	Reduced unit cost to \$3/sf.				
Chemical Toilets / Wash Stations	1	ls	7,500	\$ 7,500	Serviceable	Rental cost and for how many months?	This is a conceptual analysis. Adequate information to determine construction duration schedules is not available. \$7,500 for temp chemical toilets is a reasonable assumption for P1. Considering the remote location to service the units, 7-9 months could be used as a reasonable base assumption.				
Water Truck	1	ls	2,500	\$ 2,500	NonPotable for construction operations						
Fuel	1	ls	4,000	\$ 4,000	Construction Operations \$3/gal x 55gal x Qty (6) barrels = \$1,000 + \$3K to deliver, handle relocate etc throughout construction	I'm presuming that the cost is rental for a fuel truck to supply heavy equipment and the generator for duration of construction operations. If so, the cost seems quite high and could be reduced by dropping off some 55 gallon barrel drums from which fuel is hand or battery pumped into vehicles rather than the renting a fuel truck. What is this calculation based on? e.g., (\$x/day for y days)?	Reduced, basis \$3/gal x 55gal x Qty (6) barrels = \$1,000 + \$3K to deliver, handle relocate etc throughout construction. = \$4,000				
Concrete Mix Plant / Pump Rigs / Vehicles	1	ls	7,500	\$ 7,500	Assume adequate area required to raw material storage	What does this assumption mean?	There will be a need to store concrete material (Aggregate, sand, cement etc.) for batching operations. This is a reasonable assumption otherwise costs will increase substantially.				
Temp Shelters	1	ls	2,500	\$ 2,500	Tent Shelters (required by OSHA); Tables; Chairs; Desks	Are these for workers to stay overnight or just for day work?	Day work, no assumptions for overnight stays. OSHA requires a clean dedicated area for break areas; eating; clean-up stations etc., for labor.				
Hoisting / Crane / Gradall	6	mo	750	\$ 4,500	Material Off-Loading; Construction Operations	Hoisting/Crane/Gradall cost seems too low. What is this based on? How many days?	Assume 6-months @ \$750/Month to rent a hoist similar to Gradall / Forklift.				
20-Ft Storage Containers	2	ea	500	\$ 1,000	Secured / Weather Resident Containers	Are these shipping containers? Are they for tool and supply storage? This must be the cost for renting since they appear as a cost in each Phase of construction. By the end of phase III, we will have spent \$3K on two storage containers. Seems like we should just buy two and use them for storage.	The containers can be procured for \$500/Unit. Costs for this have been removed for Phases 2 & 3.				
SWPP & Tree Protection Measures	1	ls	2,500	\$ 2,500	Hay Waddles; Filter Fabric; Cisterns; Fencing Etc..						
Safety	1	ls	5,000	\$ 5,000	Barricades; Fencing; PPE; First Aid Supplies						
Portable Generator / Fuel / Temp Power Feeders & Panels	20	kw	175	\$ 3,500	Construction Operations	Looks like this is being rented for site preparation. If so, for that price, you could buy one and then that could be the backup generator for the Phase 1 facilities. Also, if you buy the generator, then you don't need a different one for the Site work and can use the same generator.	Agreed, removed costs for temp generator for phases 2 & 3 as well as additional generator for site work.				
Temp Lighting	0	ls	5,000	\$ -	No night work is assumed.	Are we planning on working at night? Why is lighting needed?	Removed				
Misc Consumables	1	ls	5,000	\$ 5,000	Tools; Misc Supplies Etc...						
			Sub-Total	\$ 220,315							

SITE WORK

Excavation for leach field / septic tank	1,300	cy	15	\$	19,500	Assume 7k-sf @ 5-Ft depth (35k-sf; approx. 1,300-cy)	This is an exceptionally high cost for a septic system (\$453,000). What are the assumptions used to calculate the size needed? Max occupancy rates will only sporadically be achieved on site. In addition there are separate grey and black water systems. See additional comments in "Comments on Charrette Report #2.docx" about utilities.	Changed unit to cy
Import gravel / base rock / Sandy Loam Soil for Leach Field	1,300	cy	10	\$	13,000	Assume 7k-sf @ 5-Ft depth (35k-sf; approx. 1,300-cy) - Assume rock available on site	Can we use the on-site crushed rock to reduce this cost? What does the "12" multiplier in this estimate refer to?	Changed Unit to cy; reduced unit cost to reflect local sourced crushed rock and back fill material.
Set Tank / Piping / Perf Piping - Leach Field	1	ls	25,000	\$	25,000		Change cost estimate to indicate an elevated leach field. Does the area requirement for the leach field (7,000 sf) match the locations identified in the site plans?	Reduced cost; system can be designed and furnished to reflect this budgeted cost for system.
Grade for pathways	1,000	lf	3	\$	3,000			
Provide well water pump	0	ls	7,500	\$	-	Removed not required	Not needed. This is already installed on site.	
Potable Water Filtration Skid	1	ls	10,000	\$	10,000		What kind of water filtration system is this cost based on? UV? Ozone?	Specific system not identified. This is a reasonable allowance for a filtration skid.
Sub grade & Furnish Decomposed granite for pathways	1,000	lf	5	\$	5,000	Assume material is local sourced, include sub grade.	\$17/linear foot is too great a cost for a pathway. Assume we are using local crushed rock	Reduced to \$8/lf
Prepare Site for water storage tank	1	ls	5,000	\$	5,000	Localized site prep to accommodate tank. Does not include vehicle access road.	Does this include the cost for the utility access road (dirt) to the site? Is this the cost of grading?	No, utility access road not included. If utility access road is to be provided for use by vehicles; add \$100/lf.
Deliver / Set Water Tank	5,000	gal	7	\$	35,000			
Utility Trenching Allowance	3,000	lf	25	\$	75,000	500-lf of utility trenching included; assumed Qty	See trenching estimate comments in "Comments on Charrette #2.docx"	Increased lf to 500-lf
Prepare Site for PV Array	1	ls	2,500	\$	2,500			
PV Structure	1	ls	7,500	\$	7,500	Steel frame structure required to mount PV panels.	What does structure mean? The racks for the pv array? Place for the battery bank?	Steel structure / frame will be required to mount panels.
Set PV Panels	4,000	W	5	\$	20,000	Qty (4) Buildings @ approx. 1.2kw each.	What does "set PV array mean?" Is this the installation? I don't see any expense for a battery bank for the PV array unless the cost includes that component.	PV includes battery, inverter etc. Does not include support structure
					Sub-Total	\$ 220,500		

UTILITY SHED

800 SF									
Concrete Pad for Gen-Set	0	sf	75	\$	-	Assume located inside utility shed.	If it's possible with respect to safety codes, put generator in the utility shed	Yes, assume location in utility shed on floor pad.	
Provide electric generator / enclosure	0	kw	175	\$	-	Utilize Generator procured for construction operations	Why do we need separate 20 kw and 5 kw generators for Site General Requirements and Site Work?		
Utility Shed Concrete Pad	200	sf	20	\$	4,000				
Utility Shed Framing	800	sf	25	\$	20,000		Reduced unit cost for simplified framing		
Metal Roof	200	sf	25	\$	5,000				
Entry Doors	2	lvs	850	\$	1,700	Painted HM			
Roll-Up Door	0	ea	1,700	\$	-	Not required	Is this for the utility shed? I don't think an 10 x 20 ft building will need a utility door and double doors. Double doors will do.	Removed	
Rough Electrical	1	ls	6,000	\$	6,000				
Interior / Exterior Lighting	6	fix	250	\$	1,500				
					Sub-Total	\$ 38,200			

CAMP KITCHEN	2,200				change name to CAMP KITCHEN
Excavation for foundation	9,600	cf	3	\$	28,800
Reinforced Matt Slab w/Grade Beams	2,200	sf	20	\$	44,000
Rough Plumbing	1	ls	5,000	\$	5,000
Perimeter and Interior Shear Walls	200	sf	35	\$	7,000 Timber Construction
Exposed Heavy Timber Roof Framing	2,400	sf	55	\$	132,000
Exposed Heavy Timber Roof Posts	3	ea	1,500	\$	4,500
Roof Deck	0	sf	35	\$	- Not provided
Roof Deck - Glass Railing	0	lf	75	\$	- Not provided
Metal Roofing	2,400	sf	25	\$	60,000
Decking	1,000	sf	35	\$	35,000
Concrete Sealer	2,200	sf	3	\$	6,600
Kitchen Equipment	1	ls	5,000	\$	5,000
Trenching for Electrical & Plumbing	0	lf	30	\$	- Included in Site Work
Grey Water Catchment System	1	ls	10,000	\$	10,000
Rough Electrical	1	ls	5,000	\$	5,000
Interior Lighting	20	fix	250	\$	5,000
Exterior Lighting	4	fix	175	\$	700
Skylights	2	ea	2,500	\$	5,000
Insect Netting @ Exterior Walls	1	ls	2,500	\$	2,500
			Sub-Total	\$	356,100

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair and obvious when something goes wrong. Rough plumbing is allowance

What is a glass railing?

Phase 1 spends 15k on kitchen equipment, Phase 2 calls for 5K. This seems reverse since the camp kitchen will be sparse and the full kitchen will be double appliances (2 stoves, 2 refrigerators, 2 sinks, etc.) Reduced Amt in Phase 1; increased amount in P|phase-2. see utility trench comments in docx file

the design if for a ridge skylight. This estimate looks low for that Increased unit cost.

RESTROOMS / SHOWERS	800 SF				
Excavation for foundation	1,600	cf	3	\$	4,800
Reinforced Matt Slab w/Grade Beams	800	sf	20	\$	16,000
Rough Plumbing	1	ls	5,000	\$	5,000
Grey Water Catchment System	1	ls	10,000	\$	10,000 Allowance for a Grey Water system
Perimeter and Interior Shear Walls	3,200	sf	12	\$	38,400
Exposed Heavy Timber Roof Framing	900	sf	35	\$	31,500
Allowance to seal / waterproof exposed wood framing	1	ls	5,000	\$	5,000 Allowance to seal exposed wood
Metal Roofing	900	sf	25	\$	22,500
PV Array	0	kw	2	\$	- PV included in site work
Interior Finish Siding	500	sf	25	\$	12,500
Concrete Sealer	900	sf	2	\$	1,800
Trenching for Electrical & Plumbing	0	lf	30	\$	- Included in Site Work
Rough Plumbing & Connections to Water Source & Septic	0	lf	25	\$	- Included in Site Work
Plumbing connections for laundry	0	ls	1,500	\$	- Removed
Water Closets	6	ea	250	\$	1,500
Showers /Enclosures	6	ea	175	\$	1,050
Sinks	6	ea	150	\$	900
Vanity Tops	2	ea	500	\$	1,000
Toilet Partitions	1	ls	1,000	\$	1,000
Rough Electrical	1	ls	2,500	\$	2,500
Interior Lighting	6	fix	250	\$	1,500
Exterior Lighting	2	fix	175	\$	350
Entry Exit Doors	1	ea	750	\$	750
			Sub-Total	\$	158,050

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair and obvious when something goes wrong. Rough plumbing is allowance

What is this? Is it a combination of rainwater collection and grey water processing? If not, where is the rainwater collection system? How large is this system? I assume there is no cistern since none is detailed, but it is not clear to me what that is for. Also, it is an allowance (placeholder) for a system that has been designed and/or no matter the size of the structure, each system always costs \$10k. Don't quite understand this. Is it an off the shelf system that is independent of projected grey water production? specified yet.

For the restroom/shower/laundry, any heavy timbers will need to be sealed for water proofing but I don't see any expense for that. Is it included in the cost estimate for the Added line item. timbers?

What size solar capacity is required during phase I? The only electrical that will be needed during phase I is the pump, cell phone booster, lights and intermittent use of a refrigerator Removed included in Site Work category.

Ultra low flow

Qty (1) 4-PERSON CABIN

	475 SF				No Plumbing in Cabin
Drilled Concrete Piers	8	ea	250	\$ 2,000	
Wood Frame Floor	675	sf	35	\$ 23,625	Including decks
Perimeter Walls / Siding	1,300	sf	15	\$ 19,500	
Exposed Heavy Timber Roof Framing	675	sf	35	\$ 23,625	
Metal Roof	675	sf	25	\$ 16,875	
Glazed Entry	80	sf	35	\$ 2,800	
Wood Entry Door	1	ea	750	\$ 750	
Windows	6	ea	400	\$ 2,400	DbI Pane
Entry Steps	1	ls	500	\$ 500	
Lights / Receptacles	1	ls	2,500	\$ 2,500	
Utility Feeds	0	lf	25	\$ -	Included in Site Work
			Sub-Total	\$ 94,575	

Not true. There is no plumbing, but there is electricity in all cabins

Added Lights / Elec Trim

Added line item.

Are the prices listed for windows double-paned? I think it was indicated they would be and the prices listed for them seems on the low side to me.

Yes; Increased unit to \$400/Unit

Qty (1) 6-PERSON CABIN

	625 SF				No Plumbing in Cabin
Drilled Concrete Piers	12	ea	250	\$ 3,000	
Wood Frame Floor	825	sf	35	\$ 28,875	Including decks
Perimeter Walls / Siding	1,500	sf	15	\$ 22,500	
Exposed Heavy Timber Roof Framing	825	sf	35	\$ 28,875	
Metal Roof	825	sf	25	\$ 20,625	
Glazed Entry	80	sf	35	\$ 2,800	
Wood Entry Door	1	ea	750	\$ 750	
Windows	6	ea	400	\$ 2,400	DbI Pane
Entry Steps	1	ls	500	\$ 500	
Lights / Receptacles	1	ls	3,000	\$ 3,000	
Utility Feeds	0	lf	25	\$ -	Included in Site Work
			Sub-Total	\$ 113,325	

Are the prices listed for windows double-paned? I think it was indicated they would be and the prices listed for them seems on the low side to me.

Yes; Increased unit to \$400/Unit

Added line item.

Direct Cost Total \$ 1,201,065

Contractor Contingency (0%) \$ -

Sub-Total Phase-1 \$ 1,201,065

Galbreath Master Plan - Estimation of Construction Cost Phase -2

PHASE-2							
Description	Qty	Unit	Rate	Amt	Assumption	Question / Clarification	Response
SITE GENERAL REQUIREMENTS							
Site Preparation - Clear & Grub	17,000	sf	1	\$ 17,000	Misc removal of Trees; Brush; Rocks Stumps Etc.	Typo here. It should be 17,000. Why is the rate for Site Preparation - Clear & Grub is twice as high as in Phase 1?	Corrected Typo & rate
Off-Haul site debris	1	ls	7,500	\$ 7,500		Why are Off-Haul site debris costs three times as high as in Phase 1 but for an area half the size?	Anticipate more material to off-haul
Rough Grade Site	17,000	sf	1	\$ 17,000	Construction Areas Only	Why is the rate for rough grading twice the rate of that in Phase 1?	Corrected rate to correspond to phase 1
Import rock/gravel site parking	111	cy	55	\$ 6,105	Utilize Permanent Parking Area; Assume 6,000-sf (Ph 2) @ 6: depth. Crushed rock is available within a 2-mile radius of installation location.	Rock/gravel unit (sf) needs to be changed to cf. Crushed rock will come from an on-site location within 2 mi of the field station site. What portion of the crushed rock estimate is labor and what portion materials? What assumptions have you made about the thickness of the rock to be applied? (Pacific Watershed Associates who just completed 8 miles of roadwork and rocking at the Preserve: "I would think that rocking 24,000 sqft of area would require between 300 and 440 cubic yards of rock depending on the thickness of rock applied (1/3 of a ft vs 1/2 ft depth).")	Changed Unit to cf. Assume 24k-sf @ 6" Depth 12kcf (444cy). Changed unit cost (reduced) to reflect close proximity to crushed rock. General comment (Typical) did not break down to Labor; Material; Other; Equipment (LMOE) level of detail. This is conceptual estimate based on conceptual design concepts. Providing LMOE cost detail is not appropriate
Grade construction parking	6,000	sf	3	\$ 18,000	Sub grade grading prep.	Pacific Watershed Associates: If the scope of work is simply grading, sub-grade compaction, rock quarry and transport, rock surfacing (grading, watering, and compaction), and installation of minimal parking lot infrastructure, I'm inclined to think that the estimate that they've provided (\$312,000) may be as much as \$100k too high. If there are other elements to the scope of work that could increase the estimate, such as curbs or other wheel stops, sub-grade preparation, or LID drainage structures, these need to be identified.	Reduced unit cost to \$3/sf.
Chemical Toilets / Wash Stations	1	ls	7,500	\$ 7,500	Serviceable		
Water Truck	1	ls	5,000	\$ 5,000	NonPotable for construction operations		
Fuel	1	ls	4,000	\$ 4,000	Construction Operations \$3/gal x 55gal x Qty (6) barrels = \$1,000 + \$3K to deliver, handle relocate etc throughout construction		
Concrete Mix Plant / Pump Rigs / Vehicles	1	ls	10,000	\$ 10,000	Assume adequate area required to raw material storage		
Temp Shelters	1	ls	2,500	\$ 2,500	Tent Shelters; Tables; Chairs; Desks		
Hoisting / Crane / Gradall	6	mo	750	\$ 4,500	Material Off-Loading; Construction Operations	same questions as Phase I	
20-Ft Storage Containers	0	ea	500	\$	- Procured in Phase -1		
SWPP & Tree Protection Measures	1	ls	2,500	\$ 2,500	Hay Waddles; Filter Fabric; Cisterns; Fencing Etc..		
Safety	1	ls	5,000	\$ 5,000	Barricades; Fencing; PPE; First Aid Supplies		
Portable Generator / Fuel / Temp Power Feeders & Panels	0	kw	175	\$	- Procured in Phase -1		
Temp Lighting	0	ls	2,500	\$	- No night work is assumed		
Misc Consumables	1	ls	5,000	\$ 5,000	Tools; Misc Supplies Etc...		
				Sub-Total	\$ 111,605		
SITE WORK							
Prep & Pave (Asphalt Concrete) Access Road	3,960	lf	85	\$ 336,600			
Sub grade & Furnish Decomposed granite for pathways	500	lf	8	\$ 4,000	Assume material is local sourced, include sub grade.	In Phase I, the cost was 8000 ft @ \$3/ft for grading + 8000 ft @ \$17/ft for dg. In Phase II and III, there is no cost for grading and the cost for dg is \$3/ft	Corrected for all phases
Fire Pit Area Upgrades	1	ls	7,500	\$ 7,500	Allowance	what is proposed here?	This is an allowance (placeholder) for something that has yet to be designed.
General Site Work Allowance	1	ls	50,000	\$ 50,000	Allowance for site work	What is this? There is a \$100K general site work allowance in Phase II and Phase III but not in Phase I. My understanding of a site cost allowance is that it covers basic excavation, earthworks, landscaping, site utilities, walkways, etc. These costs seem to be identified separately in the site general requirements	This is an allowance (placeholder) for something that has yet to be designed.

Utility Trenching Allowance	500	If	25	\$	12,500	500-If of utility trenching included; assumed Qty
Prepare Site for PV Array	1	Is	2,500	\$	2,500	500-If of utility trenching included; assumed Qty
PV Structure	1	Is	7,500	\$	7,500	
Set PV Array	10,000	W	5	\$	50,000	Qty (7) Buildings @ approx. 1.2kw each
Sub-Total					\$ 470,600	

Is this a pv array on a building or up on the ridge?

Why does the PV structure cost the same for a 5kw expansion as for a 2.4 kw system in Phase 1? Corrected for all phases

Qty (2) 4-PERSON CABINS

475 SF		No Plumbing in Cabin				
Drilled Concrete Piers	8	ea	250	\$	2,000	
Wood Frame Floor	675	sf	35	\$	23,625	Includes decking
Perimeter Walls / Siding	1,300	sf	15	\$	19,500	
Exposed Heavy Timber Roof Framing	675	sf	35	\$	23,625	
Metal Roof	675	sf	25	\$	16,875	
Glazed Entry	80	sf	35	\$	2,800	
Wood Entry Door	1	ea	750	\$	750	
Windows	6	ea	400	\$	2,400	Dbl Pane
Entry Steps	1	Is	500	\$	500	
Lights / Receptacles	1	Is	2,500	\$	2,500	
Utility Feeds	0	If	25	\$	-	Included in Site Work
Sub-Total					\$ 189,150	

Added line item.

Qty (1) 6-PERSON CABIN

625 SF		No Plumbing in Cabin				
Drilled Concrete Piers	12	ea	250	\$	3,000	
Wood Frame Floor	825	sf	35	\$	28,875	Includes decking
Perimeter Walls / Siding	1,500	sf	15	\$	22,500	
Exposed Heavy Timber Roof Framing	825	sf	35	\$	28,875	
Metal Roof	825	sf	25	\$	20,625	
Glazed Entry	80	sf	35	\$	2,800	
Wood Entry Door	1	ea	750	\$	750	
Windows	6	ea	400	\$	2,400	Dbl Pane
Entry Steps	1	Is	500	\$	500	
Lights / Receptacles	1	Is	3,000	\$	3,000	
Utility Feeds	0	If	25	\$	-	Included in Site Work
Sub-Total					\$ 113,325	

Added line item.

Shop & Garage

1400 SF						
Excavation for foundation	2,800	cf	3	\$	8,400	
Reinforced Matt Slab w/Grade Beams	1,400	sf	20	\$	28,000	
Rough Plumbing & Electrical	1	Is	5,000	\$	5,000	
Grey Water Catchment System	1	Is	10,000	\$	10,000	
Wall & Roof Framing	1,400	sf	35	\$	49,000	
Metal Roof	1,400	sf	25	\$	35,000	
Windows	4	ea	250	\$	1,000	
Door	1	ea	850	\$	850	
Entry	1	Is	1,500	\$	1,500	
Utility Feeds	0	If	30	\$	-	Included in Site Work
Sub-Total					\$ 138,750	

This should be shop and garage

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair and obvious when something goes wrong.

LODGE

1000 SF						
Excavation for foundation	1,600	cf	3	\$	4,800	
Reinforced Matt Slab w/Grade Beams	1,000	sf	20	\$	20,000	
Under Slab Plumbing & Electrical	0	Is	5,000	\$	-	Not Required
Perimeter and Interior Shear Walls	500	sf	25	\$	12,500	Timber Construction
Exposed Heavy Timber Roof Framing	1,000	sf	55	\$	55,000	
Exposed Heavy Timber Roof Posts	3	ea	1,500	\$	4,500	
Metal Roofing	800	sf	25	\$	20,000	
Stone Feature Wall / Chimney	96	sf	75	\$	7,200	
Interior Finish Siding	1,500	sf	35	\$	52,500	Re-Claimed Lumber Siding
Decking	1,000	sf	25	\$	25,000	
Concrete Sealer	800	sf	3	\$	2,400	

Break out the costs for dining vs lodge so that we have option to build at different times

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair Removed and obvious when something goes wrong.

Kitchen Equipment	1	ls	15,000	\$	15,000
Trenching for Electrical & Plumbing	0	lf	18	\$	- Included in Phase 1
Rough Plumbing & Connections to Water Source & Septic	0	ls	7,500	\$	- Not required
Rough Electrical	1	ls	5,000	\$	5,000
Interior Lighting	10	fix	250	\$	2,500
Exterior Lighting	4	fix	175	\$	700
Skylights	1	ea	500	\$	500
Sub-Total				\$	227,600

This cost was already covered as part of the Camp Kitchen. Previously, this estimate was 500 lf for \$45/ft

Increased Amount in Phase-2
Removed

BUILDING EXPANSION

West Elevation						Dining
Dbl Entry Glass Doors	1	ea	750	\$		750
Glazed Wood Storefront	170	sf	65	\$		11,050
Stone Feature Wall	105	sf	75	\$		7,875
Wood Feature Wall	80	sf	55	\$		4,400
Siding	240	sf	35	\$		8,400
South Elevation						
Glazed Wood Storefront	98	sf	65	\$		6,370
Siding	600	sf	35	\$		21,000
PV Array	0	kw	175	\$		- PV included in Site Work
East Elevation						
Dbl Entry Glass Doors	1	ea	750	\$		750
Glazed Wood Storefront	70	sf	65	\$		4,550
Siding	230	sf	35	\$		8,050
North Elevation						
Glazed Wood Storefront	140	sf	65	\$		9,100
Stone Feature Wall	280	sf	75	\$		21,000
Siding	570	sf	35	\$		19,950
			Sub-Total	\$		123,245

ENTRY / STAFF OFFICE / IT / PORCH

	900 SF					
Prep Site	2,000	sf	3	\$		6,000
Excavate for Foundation	1	ls	3,500	\$		3,500
Rough Electrical	1	ls	2,500	\$		2,500
Grey Water Catchment System	1	ls	10,000	\$		10,000
Reinforced SOG	550	sf	20	\$		11,000
Wall Framing	1,000	sf	35	\$		35,000
Exposed Heavy Timber Roof Framing	800	sf	35	\$		28,000
Roof	800	sf	25	\$		20,000
Windows	1	ls	1,000	\$		1,000
Doors	1	ea	750	\$		750
Light Fixtures	4	fix	750	\$		3,000
General Site Work	1	ls	2,500	\$		2,500
Decking	250	sf	45	\$		11,250
Utility Connections	0	lf	30	\$		- Included in Site Work
			Sub-Total	\$		134,500

Is this 25kw in addition to the 7.5 kw? The PV array cost for the lodge/dining makes no sense. It calls for a 25kw system at \$175/kw when the rate is \$5000/kw in the previous estimates. And if you are going to have a PV array that big, think about how large the battery bank is going to be. It would be huge. I would like to see how they calculated the sizes of any of these PV arrays. Did they take into account the energy saving features of the buildings (e.g., LED lights, no heating or cooling) and that the PV Panels are included in Site Work Category. like to see how they calculated the sizes of any of these PV arrays. Did they take into account the energy saving features of the buildings (e.g., LED lights, no heating or cooling) and that the stoves will be propane?

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair Rough electrical is allowance and obvious when something goes wrong.

CARETAKER RESIDENCE

	1035 SF				
Prep Site	850	sf	3	\$	2,550
Excavate for Foundation	1	ls	2,500	\$	2,500
Rough Plumbing & Electrical	1	ls	5,000	\$	5,000
Reinforced SOG	850	sf	20	\$	17,000
Grey Water Catchment System	1	ls	10,000	\$	10,000
Appliance Allowance	1	ls	2,500	\$	2,500
Exposed Heavy Timber Roof Framing	850	sf	35	\$	29,750
Roof	850	sf	25	\$	21,250
Windows	1	ls	2,500	\$	2,500
Doors	1	ea	750	\$	750
Light Fixtures	3	fix	250	\$	750
General Site Work	0	ls	500	\$	- Included in Site Work
Decking	250	sf	35	\$	8,750
Utility Feed	0	lf	30	\$	- Included in Site Work
			Sub-Total	\$	103,300
			Direct Cost Total	\$	1,612,075
			Contractor Contingency (0%)	\$	-
			Sub-Total Phase-2	\$	1,612,075

Design calls for 1400 sf

Corrected

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair Rough plumbing and electrical is allowance and obvious when something goes wrong.

Galbreath Master Plan - Estimation of Construction Cost Phase -3

PHASE-3						
Description	Qty	Unit	Rate	Amt	Description Details	Questions and Clarifications
SITE GENERAL REQUIREMENTS						
Site Preparation - Clear & Grub	15,000	sf	1	\$ 15,000	Misc removal of Trees; Brush; Rocks Stumps Etc.	
Off-Haul site debris	1	ls	7,500	\$ 7,500	Green Waste Debris	
Rough Grade Site	15,000	sf	1	\$ 15,000	Construction Areas Only	
Chemical Toilets / Wash Stations	1	ls	7,500	\$ 7,500		
Water Truck	1	ls	5,000	\$ 5,000	NonPotable for construction operations	
Fuel	1	ls	4,000	\$ 4,000	Construction Operations \$3/gal x 55gal x Qty (6) barrels = \$1,000 + \$3K to deliver, handle relocate etc throughout construction	
Concrete Mix Plant / Pump Rigs / Vehicles	1	ls	2,500	\$ 2,500	Assume adequate area required to raw material storage	
Temp Shelters	1	ls	2,500	\$ 2,500	Tent Shelters; Tables; Chairs; Desks	
Hoisting / Crane / Gradall	6	mo	750	\$ 4,500	Material Off-Loading; Construction Operations	
20-Ft Storage Containers	0	ea	500	\$ -	- Procured in Phase 1	
SWPP & Tree Protection Measures	1	ls	2,500	\$ 2,500	Hay Waddles; Filter Fabric; Cisterns; Fencing Etc..	
Safety	1	ls	5,000	\$ 5,000	Barricades; Fencing; PPE; First Aid Supplies	
Portable Generator / Fuel / Temp Power Feeders & Panels	0	kw	175	\$ -	- Procured in Phase -1	
Temp Lighting	0	ls	2,500	\$ -	- No night work is assumed	
Misc Consumables	1	ls	5,000	\$ 5,000	Tools; Misc Supplies Etc...	
			Sub-Total	\$ 76,000		
SITE WORK						
Sub grade & Furnish Decomposed granite for pathways	200	lf	8	\$ 1,600	Assume material is local sourced, include sub grade.	
General Site Work Allowance	1	ls	100,000	\$ 100,000		
Prepare Site for PV Array	1	ls	2,500	\$ 2,500		
Utility Trenching Allowance	500	lf	25	\$ 12,500	500-lf of utility trenching included; assumed Qty	
PV Structure	1	ls	7,500	\$ 7,500		
Set PV Array	6,000	W	5	\$ 30,000	Qty (5) Buildings @ approx 1.2kw each	
			Sub-Total	\$ 154,100		
Qty (1) 8-PERSON CABIN						
	775 sf				No Plumbing in Cabin	
Drilled Concrete Piers	8	ea	250	\$ 2,000		
Wood Frame Floor	975	sf	35	\$ 34,125	Includes decking	
Perimeter Walls / Siding	1,400	sf	15	\$ 21,000		
Exposed Heavy Timber Roof Framing	975	sf	35	\$ 34,125		
Metal Roof	975	sf	25	\$ 24,375		
Glazed Entry	80	sf	35	\$ 2,800		
Wood Entry Door	1	ea	750	\$ 750		
Windows	6	ea	400	\$ 2,400	Dbl Pane	
Entry Steps	1	ls	500	\$ 500		
Lights / Receptacles	1	ls	2,500	\$ 2,500		
Utility Feeds	0	lf	25	\$ -	- Included in Site Work	
			Sub-Total	\$ 124,575		
Qty (1) 16-PERSON CABIN						
	925sf				No Plumbing in Cabin	
Drilled Concrete Piers	18	ea	250	\$ 4,500		
Wood Frame Floor	1,125	sf	35	\$ 39,375	Includes decking	
Perimeter Walls / Siding	2,200	sf	15	\$ 33,000		
Exposed Heavy Timber Roof Framing	1,125	sf	35	\$ 39,375		
Metal Roof	1,125	sf	25	\$ 28,125		
Glazed Entry	80	sf	35	\$ 2,800		
Wood Entry Door	1	ea	750	\$ 750		
Windows	12	ea	400	\$ 4,800	Dbl Pane	
Entry Steps	1	ls	500	\$ 500		
Lights / Receptacles	1	ls	3,500	\$ 3,500		
Utility Feeds	0	lf	25	\$ -	- Included in Site Work	
			Sub-Total	\$ 156,725		

CLASSROOM		1900 SF			
Excavation for foundation	9,000	cf	3	\$	27,000
Reinforced Matt Slab w/Grade Beams	1,900	sf	20	\$	38,000
Rough Electrical	1	ls	2,500	\$	2,500 All surface mount
Grey Water Catchment System	1	ls	10,000	\$	10,000
Perimeter and Interior Shear Walls	1,500	sf	35	\$	52,500 Timber Construction
Exposed Heavy Timber Roof Framing	2,100	sf	35	\$	73,500
Exposed Heavy Timber Roof Posts	6	ea	500	\$	3,000
Metal Roofing	2,100	sf	25	\$	52,500
Interior Finish Siding	3,500	sf	15	\$	52,500 Re-Claimed Lumber Siding
Moveable Partition & Track - Room Divider	1	ls	7,500	\$	7,500
Interior Doors	4	lvs	750	\$	3,000
Decking	500	sf	25	\$	12,500
Concrete Sealer	1,900	sf	2	\$	3,800
Trenching for Electrical & Plumbing Feeds	0	lf	50	\$	- Included in Site work
Rough Plumbing & Connections to Water Source & Septic	0	ls	5,000	\$	- Removed
Interior Lighting	15	fix	250	\$	3,750
Exterior Lighting	4	fix	175	\$	700
Skylights	2	ea	2,500	\$	5,000
Framed Shear Walls / Perimeter	0	ls	5,000	\$	- Removed Included in wall construction above
Windows / Glazing	12	ea	250	\$	3,000
Doors	2	ea	750	\$	1,500
General Site / Utilities	1	ls	2,500	\$	2,500
			Sub-Total	\$	354,750

Break out costs into office, classroom, and research lab buildings

We want plumbing and electrical to be surface mount. The advantage of surface mount is that it is easy to access and repair and obvious when something goes wrong.

RESEARCH LAB		1900 SF			
Excavation for foundation	9,000	cf	3	\$	27,000
Reinforced Matt Slab w/Grade Beams	1,900	sf	20	\$	38,000
Rough Plumbing & Electrical	1	ls	5,000	\$	5,000 All surface mount
Grey Water Catchment System	1	ls	10,000	\$	10,000
Perimeter and Interior Shear Walls	1,500	sf	35	\$	52,500 Timber Construction
Exposed Heavy Timber Roof Framing	2,100	sf	35	\$	73,500
Exposed Heavy Timber Roof Posts	6	ea	500	\$	3,000
Metal Roofing	2,100	sf	25	\$	52,500
Interior Finish Siding	2,500	sf	15	\$	37,500 Re-Claimed Lumber Siding
Interior Partitions	750	sf	17	\$	12,750
Interior Doors	4	lvs	750	\$	3,000
Decking	500	sf	25	\$	12,500 Removed
Concrete Sealer	1,900	sf	2	\$	3,800
Trenching for Electrical & Plumbing Feeds	0	lf	30	\$	- Included with Classroom building
Rough Plumbing & Electrical	1	ls	5,000	\$	5,000
Interior Lighting	10	fix	250	\$	2,500
Exterior Lighting	4	fix	175	\$	700
Skylights	2	ea	2,500	\$	5,000
Framed Shear Walls / Perimeter	0	ls	1,250	\$	- Removed Included in wall construction above
Windows / Glazing	10	ea	250	\$	2,500
Doors	2	ea	750	\$	1,500
General Site / Utilities	1	ls	2,500	\$	2,500
			Sub-Total	\$	350,750

RESTROOMS / SHOWERS		800 SF			
Excavation for foundation	1,600	cf	3	\$	4,800
Reinforced Matt Slab w/Grade Beams	900	sf	20	\$	18,000
Rough Plumbing	1	ls	5,000	\$	5,000 Not required
Grey Water Catchment System	1	ls	10,000	\$	10,000 Allowance for a Grey Water system
Perimeter and Interior Shear Walls	3,200	sf	12	\$	38,400
Exposed Heavy Timber Roof Framing	900	sf	35	\$	31,500
Allowance to seal / waterproof exposed wood framing	1	ls	5,000	\$	5,000 Allowance to seal exposed wood
Metal Roofing	900	sf	25	\$	22,500
PV Array	0	kw	2	\$	- PV included in site work
Interior Finish Siding	500	sf	25	\$	12,500
Concrete Sealer	900	sf	2	\$	1,800
Trenching for Electrical & Plumbing	0	lf	30	\$	- Included in Site Work
Rough Plumbing & Connections to Water Source & Septic	0	lf	25	\$	- Included in Site Work
Plumbing connections for laundry	0	ls	1,500	\$	- Removed
Water Closets	6	ea	250	\$	1,500
Showers /Enclosures	6	ea	175	\$	1,050
Sinks	6	ea	150	\$	900
Vanity Tops	2	ea	500	\$	1,000
Toilet Partitions	1	ls	1,000	\$	1,000
Rough Electrical	1	ls	2,500	\$	2,500
Interior Lighting	6	fix	250	\$	1,500
Exterior Lighting	2	fix	175	\$	350
Entry Exit Doors	1	ea	750	\$	750
			Sub-Total	\$	160,050
			Sub-Total Direct	\$	1,376,950
Contractor Contingency (0%)			\$		-
			Sub-Total Phase-3	\$	1,376,950

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Galbreath Charette #2

Construction Restrictions Caused by Access Limitations

- Tree protection measures shall be employed.
- Strict limitations with regard to laydown and material storage areas. These areas will need to be secured by a fenced / secure boundary such that the surrounding areas remain undisturbed.
- Foot traffic to be kept / limited to certain areas, similar to material storage areas above.
- SWPP (Storm Water Pollution Prevention) measures must be designed, planned and approved in advance of construction mobilization. Measures shall be taken to ensure that any potential contamination to surrounding watersheds be prevented. Examples include proper storage and containment of any chemical, coating material, material of construction such as sand, aggregate material, cement etc. Proper and resilient containment facilities shall be in place prior to execute of any activity that has the potential to contaminate surrounding areas.
- Use of gasoline / Diesel machinery / equipment be kept to a minimum. Air quality standards could warrant restrictions of certain vehicles and equipment. Must demonstrate that equipment meet certain air quality standards for emissions.
- Contractor shall repair any areas damaged by construction operations.
- Contractor shall limit amount of vehicle parking. Suggest shuttle at the access road to the job site for all workers.
- There may be limitations placed on when certain activities can be performed due to the existing habitat, i.e., during nesting season for certain bird species, all construction activities that generate noise shall cease.

Project Cost Savings Elements:

- * **Simplified Roof Framing**
est savings \$10/sf
- * **Utilize Containers for Structures:**
 - Utility Shed**
 - Shop**
 - est savings \$15k Shed
 - est savings \$40k Shop
- * **Reduce size of Cabins (bunkbeds)**
est savings \$265/sf
- * **Reduce size of Classroom/ Lab Buildings**
est savings \$300/sf
- * **Eliminate Lodge in Phase 2**
est savings \$356k

** **Note: Cost Savings above include markups for escalation and SSU Softcosts**

