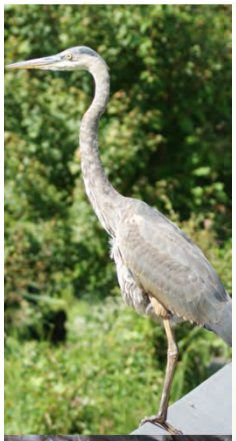
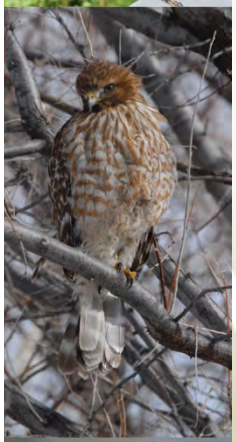
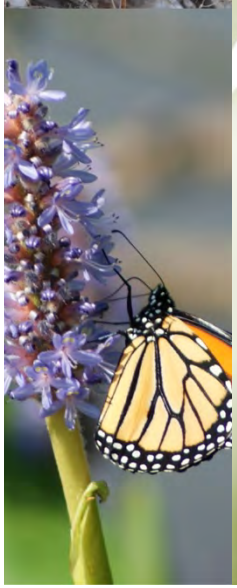


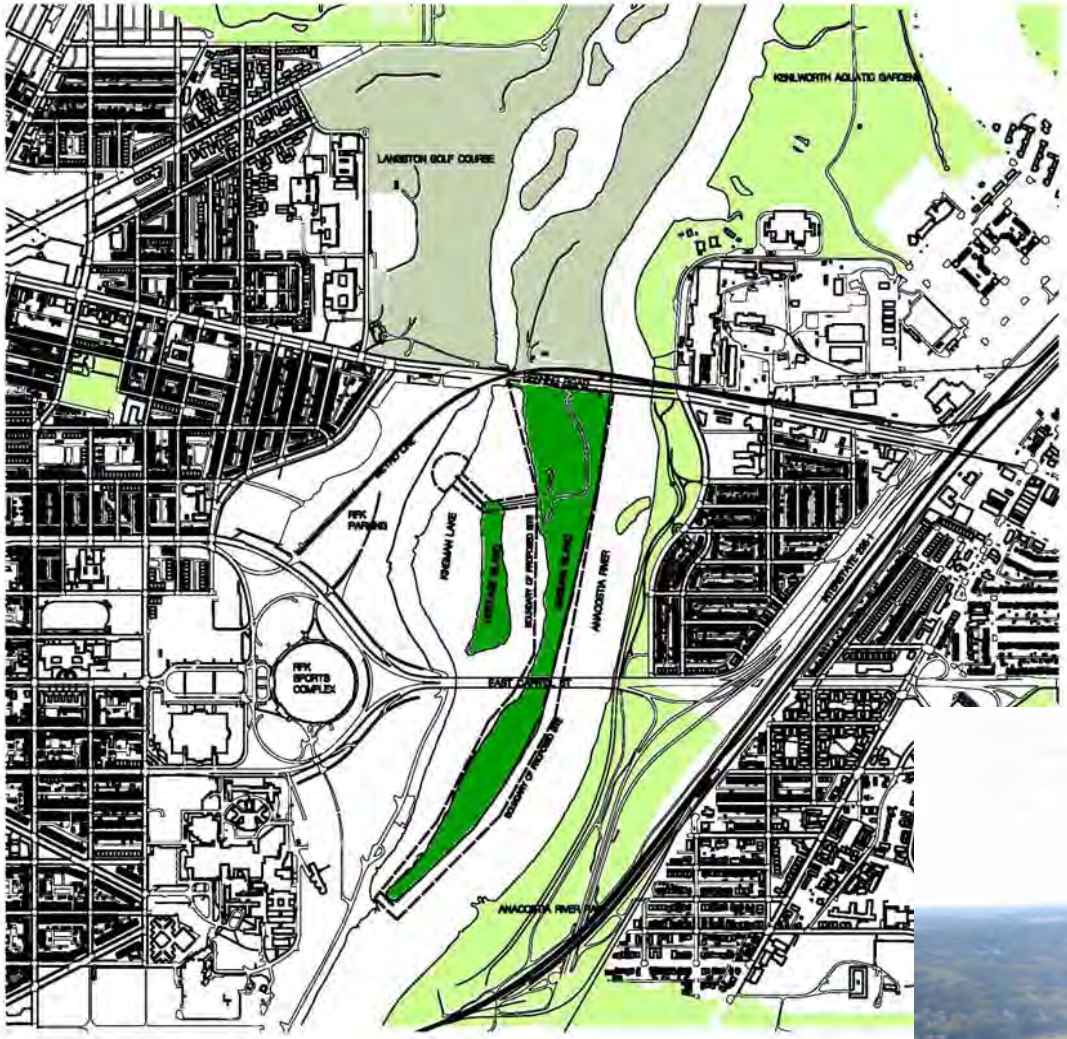




Kingman Island Restoration

July 10, 2015

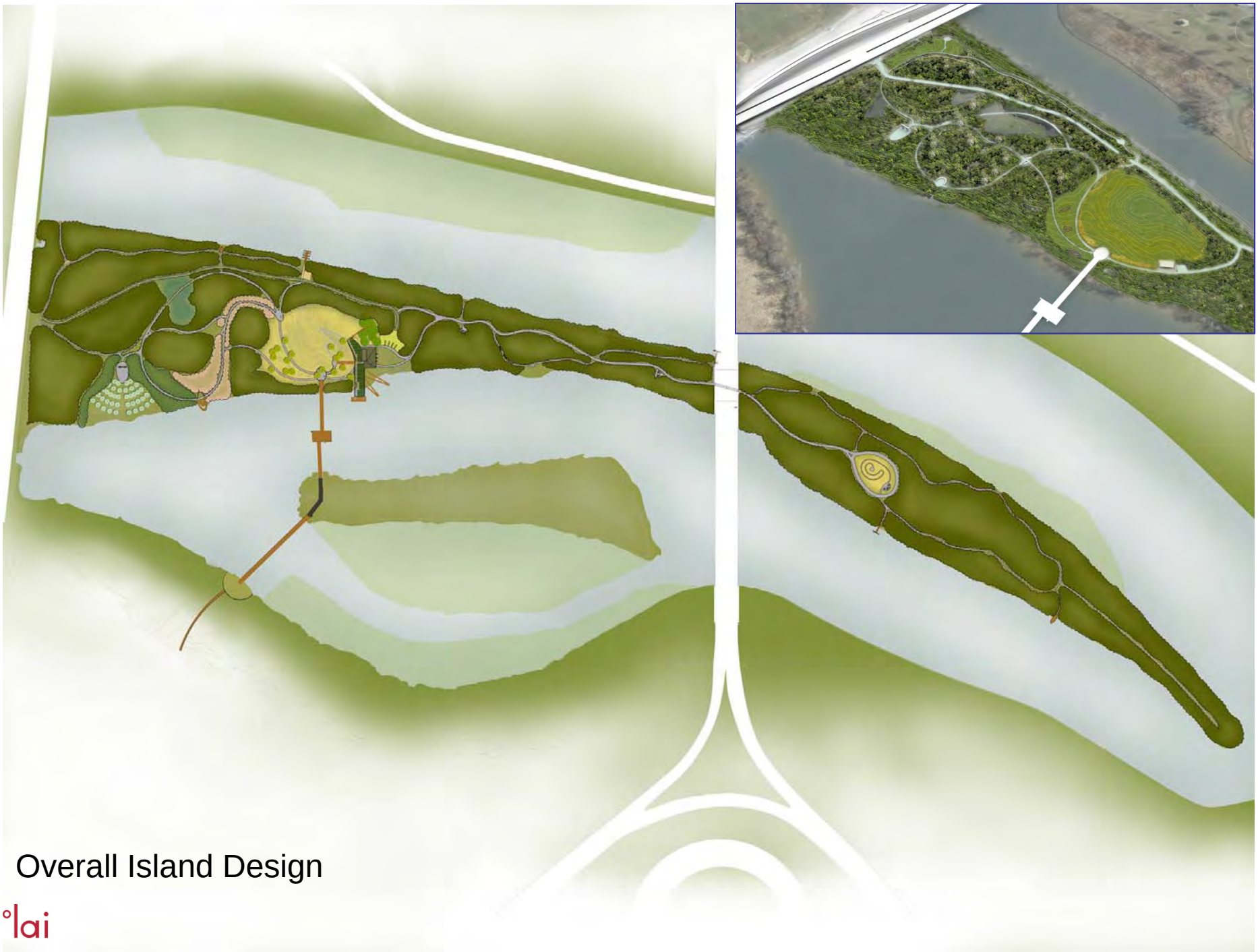
°lai °leeandassociates inc
landscape architecture • urban design • planning
green infrastructure • sustainable cities



Site Context

°lai

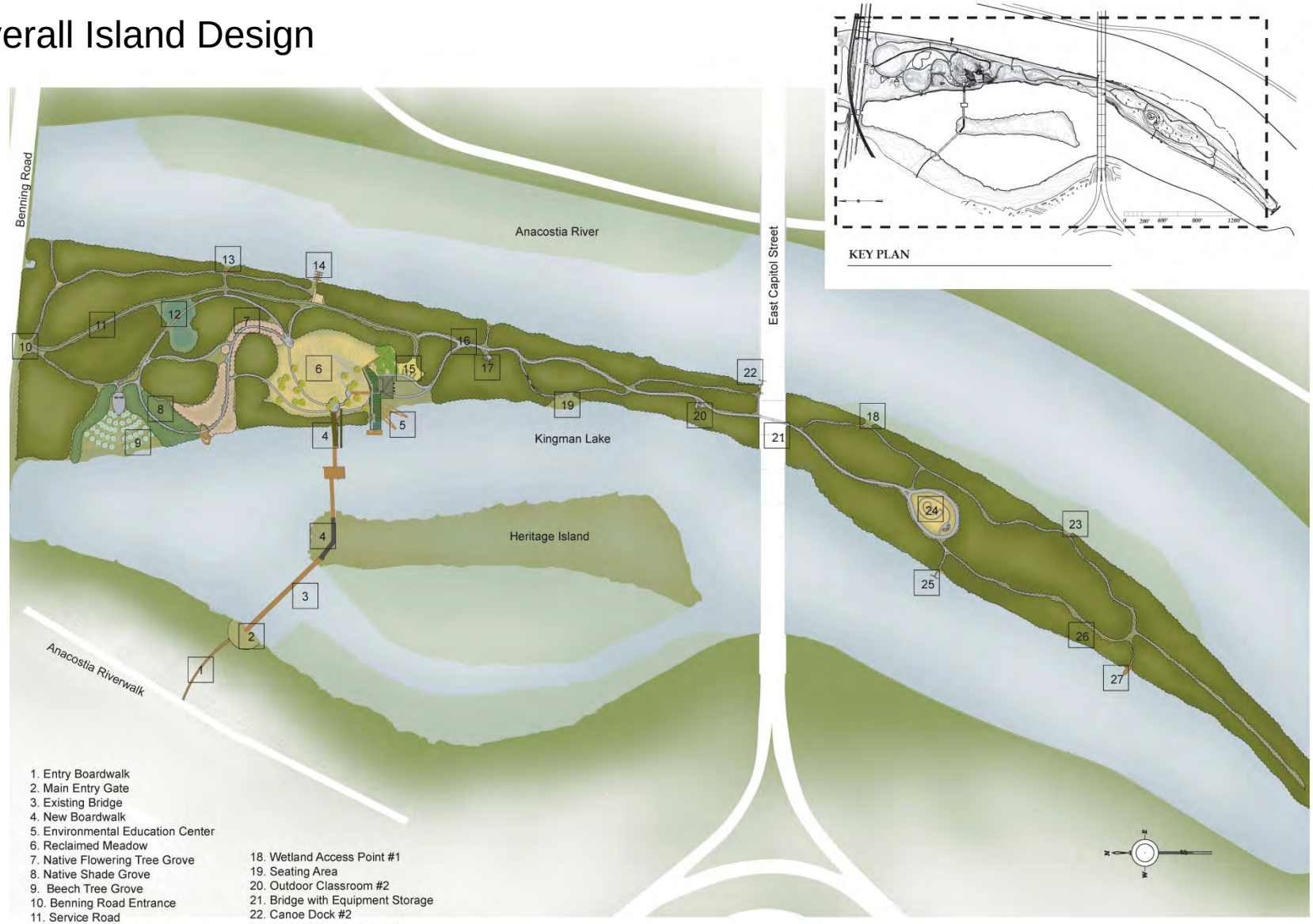
°lai Island Master Plan



Overall Island Design

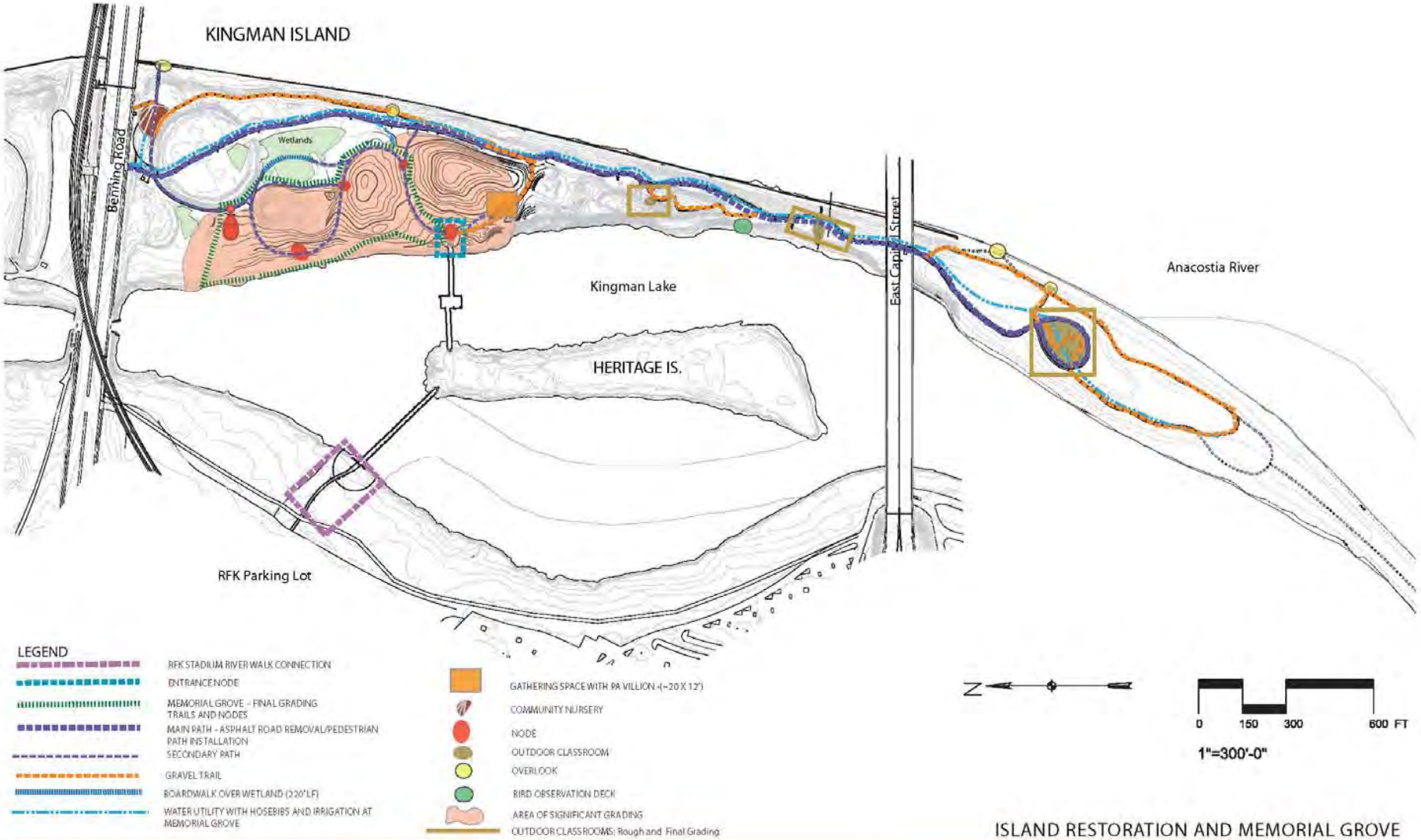
°lai

Overall Island Design



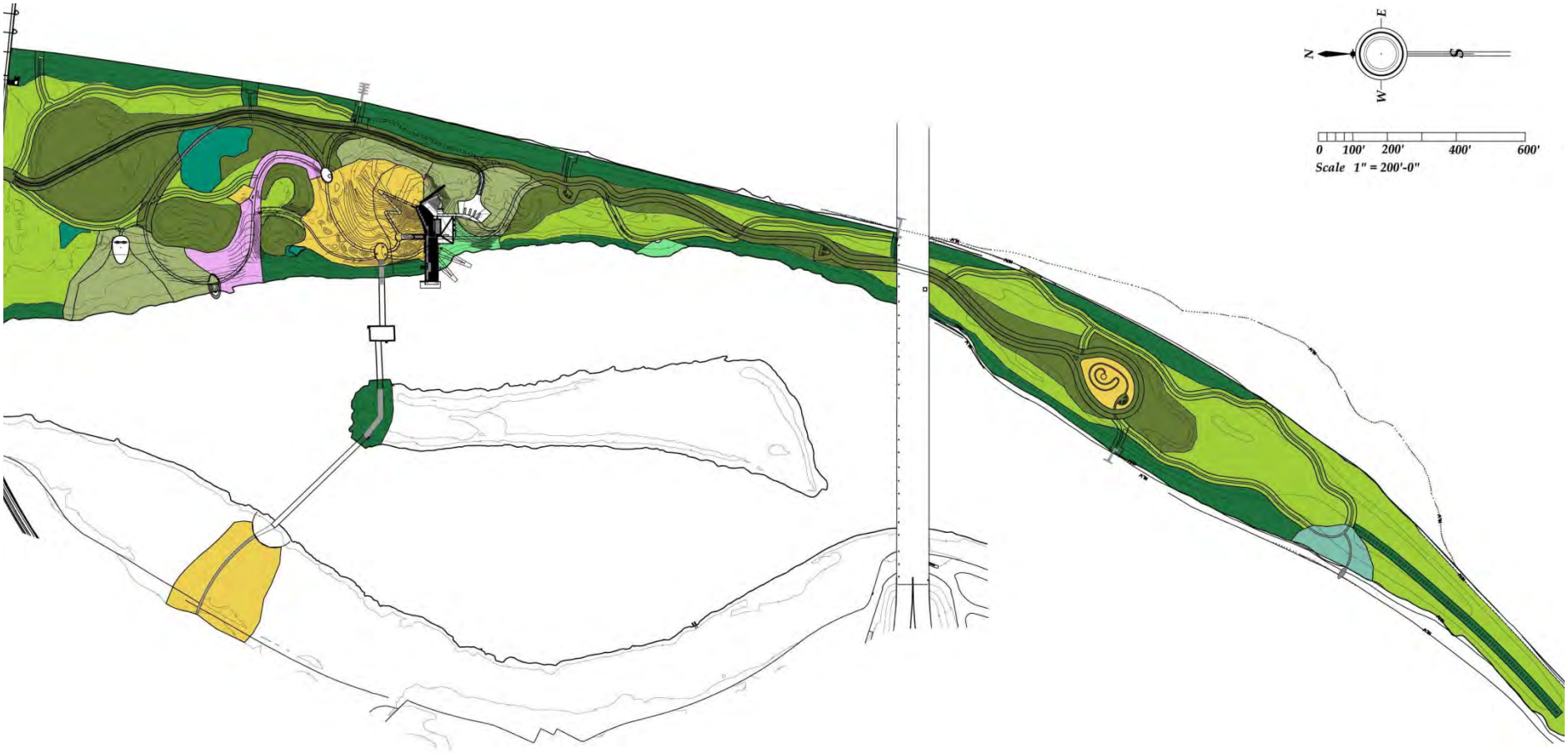
1. Entry Boardwalk
2. Main Entry Gate
3. Existing Bridge
4. New Boardwalk
5. Environmental Education Center
6. Reclaimed Meadow
7. Native Flowering Tree Grove
8. Native Shade Grove
9. Beech Tree Grove
10. Benning Road Entrance
11. Service Road
12. Wetland Boardwalk
13. Viewing Platform #1
14. Main Accessible Canoe Dock #1
15. Visitor Center Parking
16. Primary Path and Vehicle Access
17. Outdoor Classroom 1
18. Wetland Access Point #1
19. Seating Area
20. Outdoor Classroom #2
21. Bridge with Equipment Storage
22. Canoe Dock #2
23. Wetland Access Point #2
24. Meadow Maze with Outdoor Classroom #3
25. Canoe Dock #3
26. Bottomland Swamp Boardwalk
27. Bird Viewing Dock

°lai



Site Programming

°lai



NATIVE FLOWERING GROVE
REMOVE ALL EXISTING VEGETATION, SELECTIVELY THIN UNDERSTORY AND REPLANT WITH BALLED AND BURLAPPED TREES , SHRUBS, AND HERBACEOUS SEEDS

DECIDUOUS UPLAND WOODS WOODS ALONG SECONDARY PATHS
RETAIN EXISTING, HEALTHY, LARGE TREES (>6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEOUS SEEDS

MESIC RIPARIAN WOODS ALONG WATER ACCESS PATHS
RETAIN EXISTING, HEALTHY, LARGE TREES (>6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEOUS SEEDS

FORESTED WETLAND
RETAIN EXISTING, HEALTHY, LARGE TREES (>6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEOUS SEEDS

NATIVE MEADOW
REMOVE ALL EXISTING VEGETATION OR ASPHALT, AND RESEED WITH NATIVE MEADOW WILDFLOWER MIX

NATIVE SHADE GROVE AROUND NODE 3 AND BEHIND ENVIRONMENTAL CENTER
REMOVE ALL EXISTING VEGETATION, SELECTIVELY THIN UNDERSTORY AND REPLANT WITH BALLED AND BURLAPPED TREES , SHRUBS, AND HERBACEOUS SEEDS

MIXED SUCCESSIONAL WOODS ALONG PRIMARY PATHS AND ENTRY ROAD
RETAIN EXISTING, HEALTHY, LARGE TREES (>6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEOUS SEEDS

RIPARIAN SLOPE SHRUBLAND AT OVERLOOKS AND BUILDING
REMOVE ALL EXISTING VEGETATION AND REPLANT SHRUBS, AND HERBACEOUS SEEDS

BOTTOMLAND SWAMP WOODS
RETAIN EXISTING, HEALTHY, LARGE TREES (>6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEOUS SEEDS

KINGMAN ISLAND
SITE RESTORATION

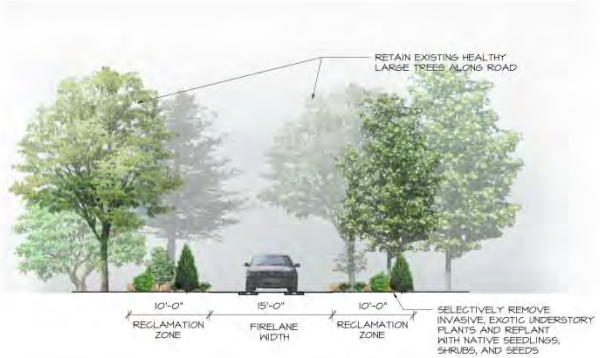
Office of the Deputy Mayor for Planning & Economic Development

Island Restoration – Remediation Planting Zones

°lai

MIXED SUCCESSIONAL WOODS ALONG ENTRANCE ROAD

RETAIN EXISTING, HEALTHY, LARGE TREES (6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEUOS SEEDS

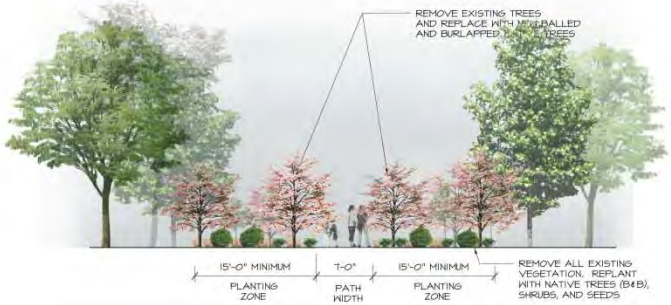


MIXED SUCCESSIONAL WOODS ALONG PRIMARY PATHS

RETAIN EXISTING, HEALTHY, LARGE TREES (6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEUOS SEEDS

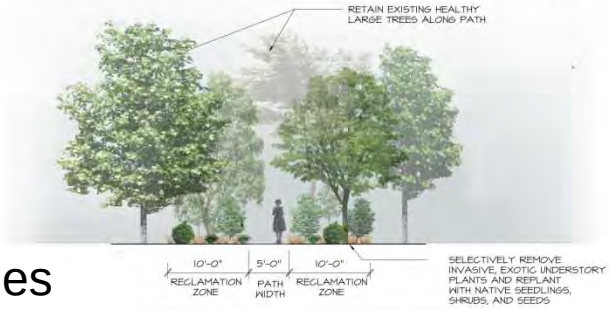
NATIVE FLOWERING GROVE AND NATIVE SHADE GROVE ALONG PRIMARY PATHS AND BEHIND ENVIR. CENTER

REMOVE ALL EXISTING VEGETATION, SELECTIVELY THIN UNDERSTORY AND REPLANT WITH BALLED AND BURLAPPED TREES , SHRUBS, AND HERBACEUOS SEEDS



DECIDUOUS UPLAND WOODS WOODS ALONG SECONDARY

RETAIN EXISTING, HEALTHY, LARGE TREES (6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEUOS SEEDS



Island Restoration – Remediation Planting Zones

°lai

Island Restoration – Remediation Planting Zones

MESIC RIPARIAN WOODS ALONG WATER ACCESS PATHS

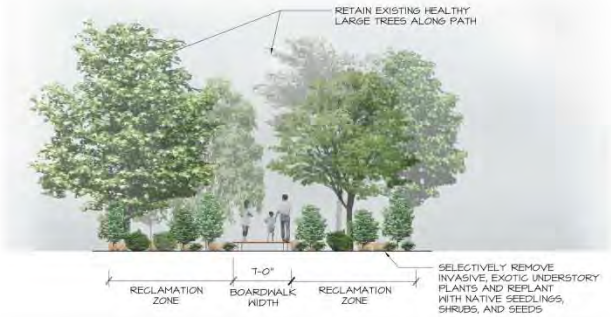
RETAIN EXISTING, HEALTHY, LARGE TREES (6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEUOS SEEDS

RIPARIAN SLOPE SHRUBLAND AT OVERLOOKS AND BUILDING

REMOVE ALL EXISTING VEGETATION AND REPLANT SHRUBS, AND HERBACEUOS SEEDS

FORESTED WETLAND

RETAIN EXISTING, HEALTHY, LARGE TREES (6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEUOS SEEDS



BOTTOMLAND SWAMP WOODS

RETAIN EXISTING, HEALTHY, LARGE TREES (6" CALIPER), SELECTIVELY THIN UNDERSTORY AND REPLANT WITH TREE SAPLINGS, SHRUBS, AND HERBACEUOS SEEDS

NATIVE MEADOW

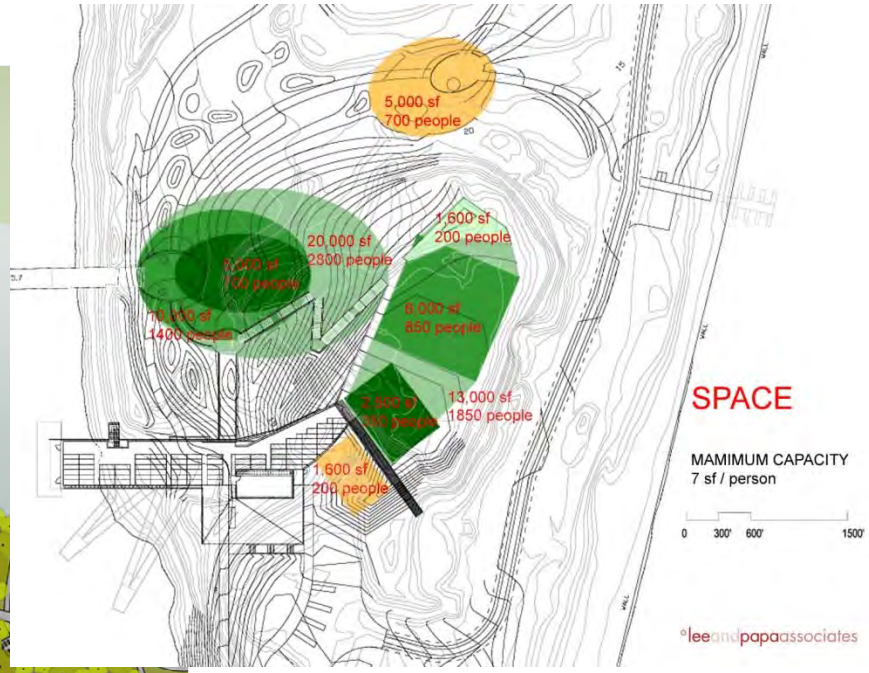
REMOVE ALL EXISTING VEGETATION OR ASPHALT, AND RESEED WITH NATIVE MEADOW WILDFLOWER MIX

°lai

9/11 Memorial Grove

°lai

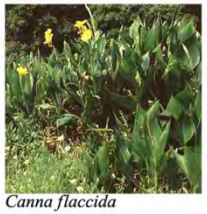
Environmental Center



lai

OUTDOOR CLASSROOM / STORMWATER DIAGRAM

VEGETATION:

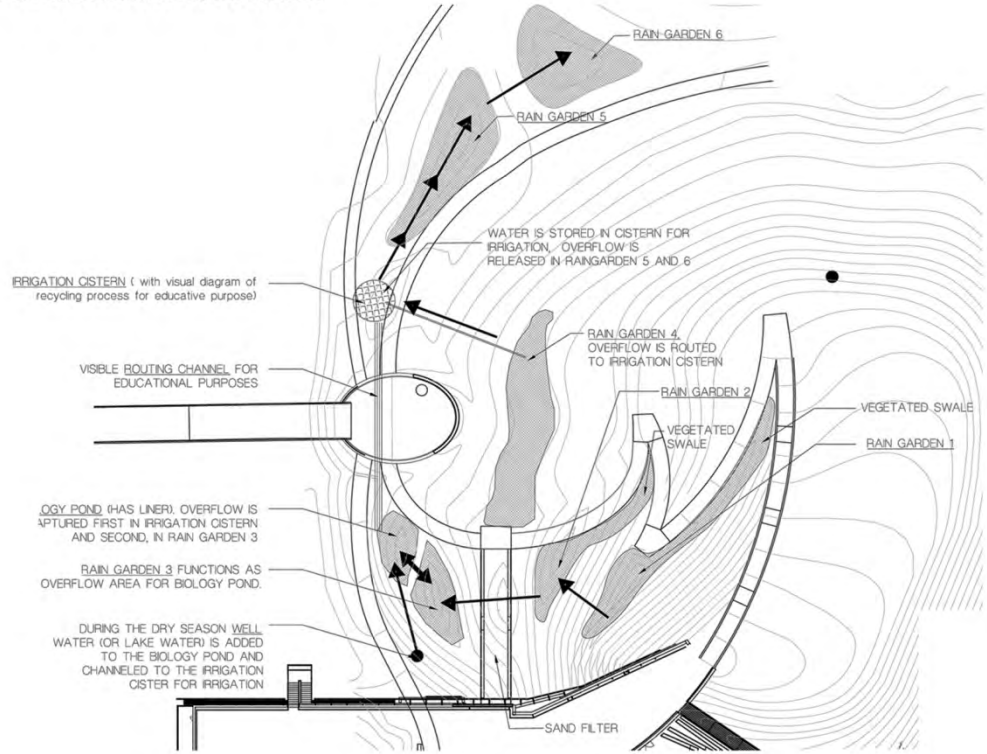


Canna flaccida

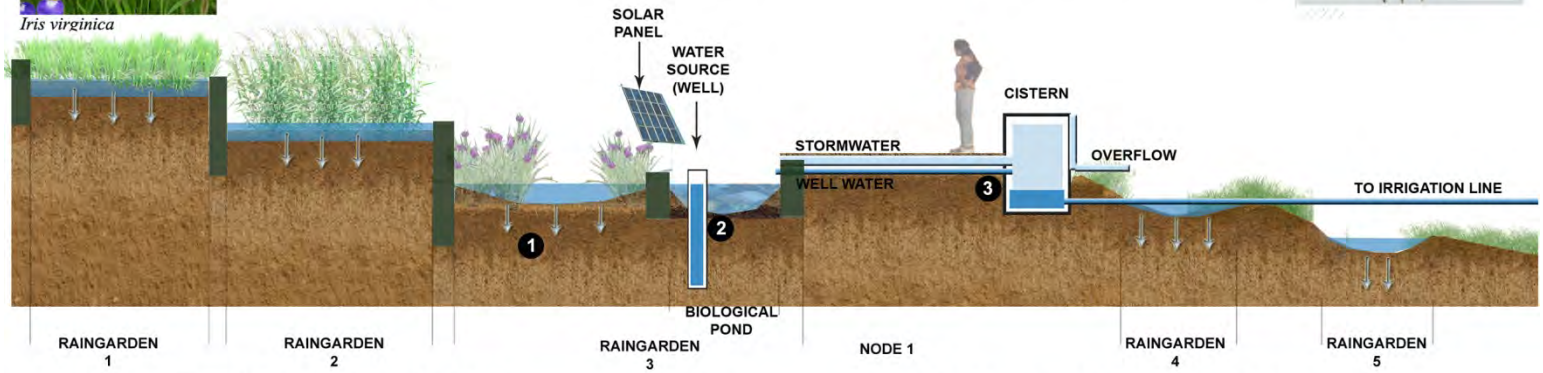
Juncus effusus

Polygonum amphybium

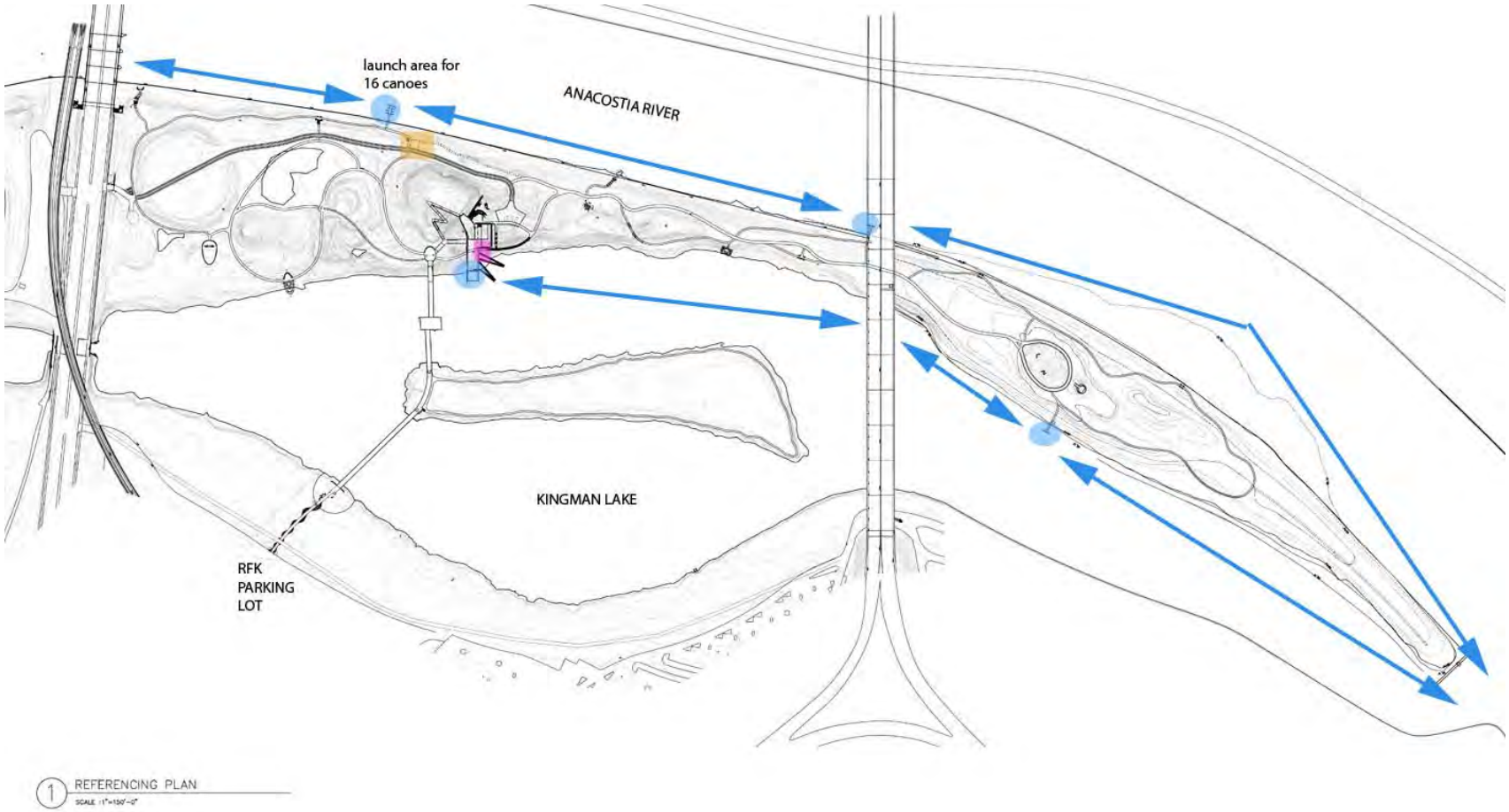
Iris virginica



PREDATORS:



1. DURING THE RAINY SEASON STORMWATER IS COLLECTED IN A SERIES OF RAIN GARDENS, AND A BIOLOGY POND. THE OVERFLOW IS DIRECTED TO THE CISTERN
2. DURING THE DRY SEASON THE SOLAR PANEL POWERED WELL PUMP SUPPLIES FRESH WATER TO THE BIOLOGY POND AND REPLENISHES THE CISTERN WITH WELL WATER FOR IRRIGATION.
3. THE CISTERN, BIOLOGY POND AND THE WATER CHANNELS ARE VISIBLE TO THE PUBLIC FOR EDUCATIONAL PURPOSES.



CANOE DOCK

VEHICULAR DROP OFF
AND CANOE STORAGE

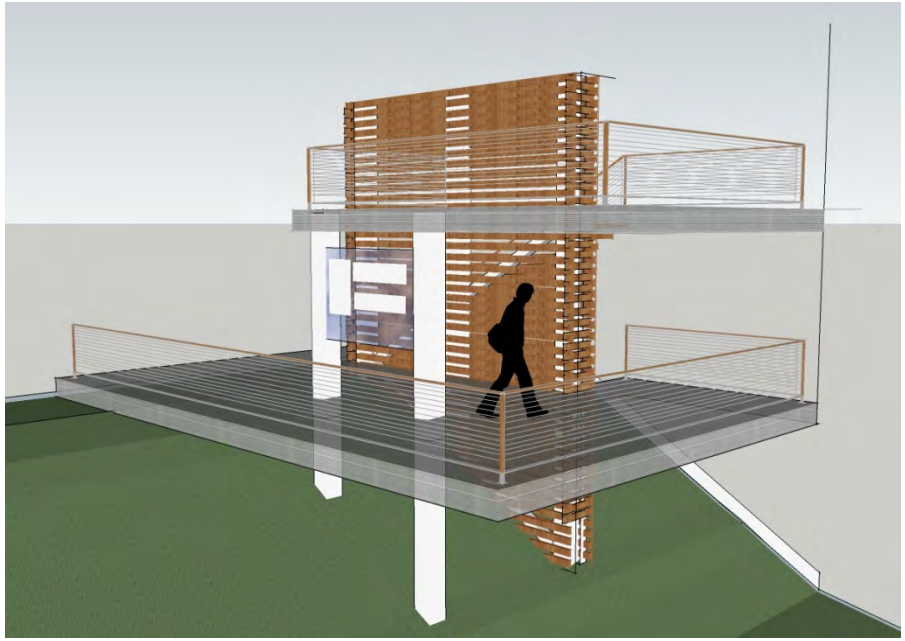
ENVIRONMENTAL CENTER
CANOE STORAGE

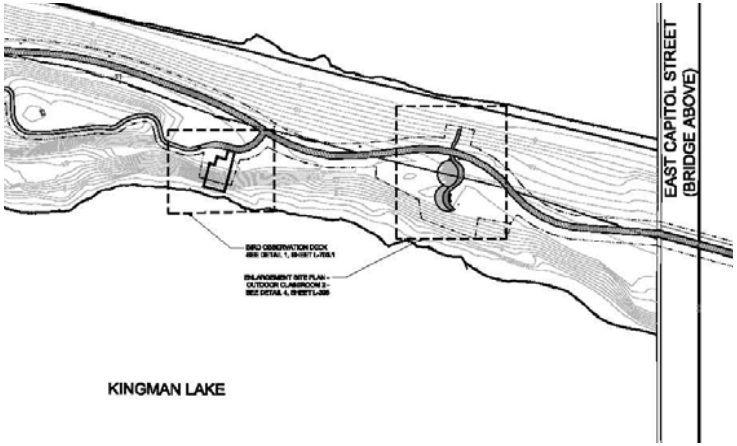
Canoe Dock Plan

°lai

Bird Observation Deck

°lai

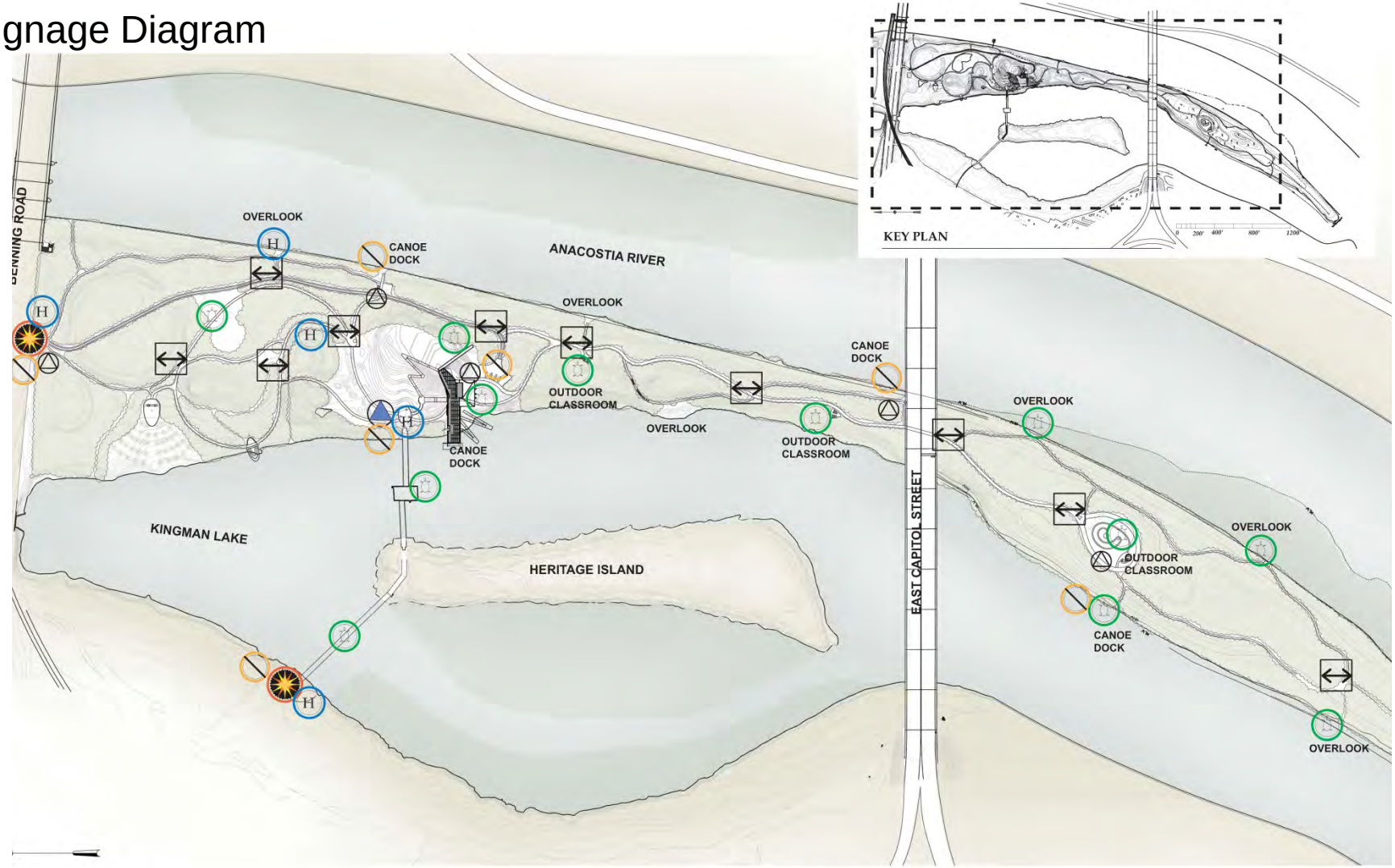




Bird Observation Deck

°lai

Signage Diagram



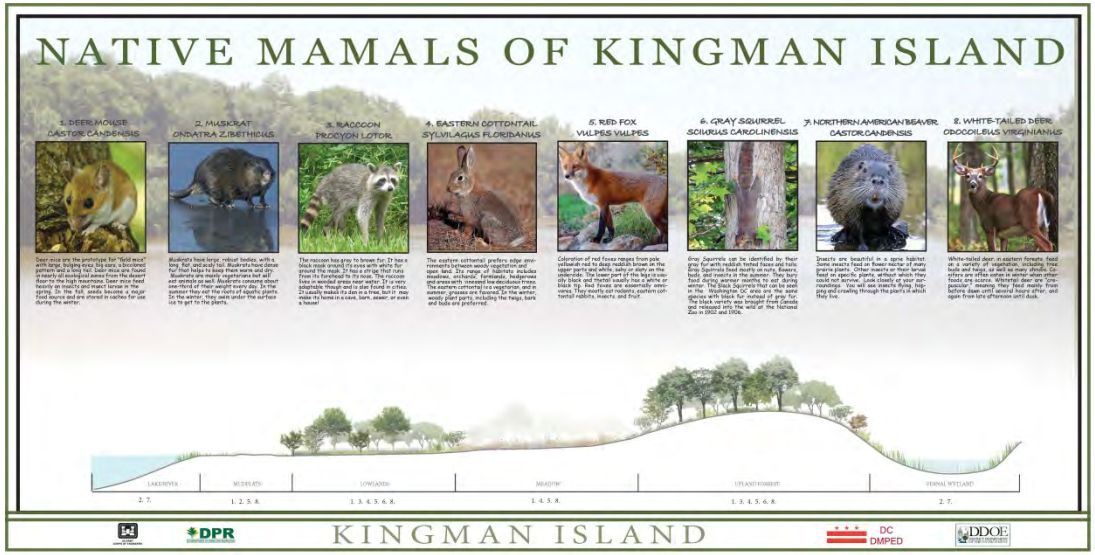
KINGMAN ISLAND

LEGEND

- Gateway Entry Signage - Reclaimed Granite
- Orientation Kiosk
- Orientation Sign w/ Map
- Directional Signage
- Interperative Signage Ecological
- Interperative Signage Historical
- Regulatory Signage

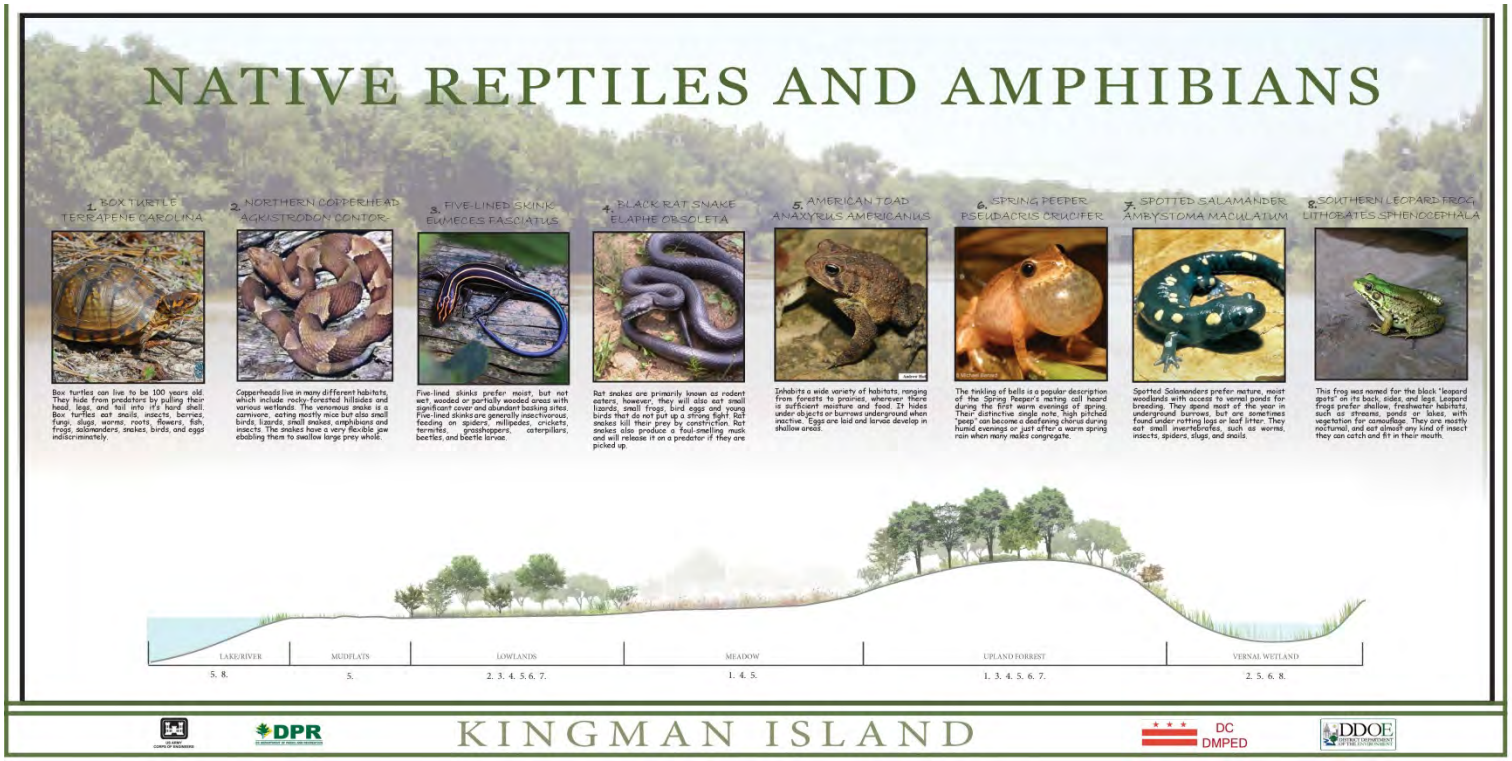
FIXTURES

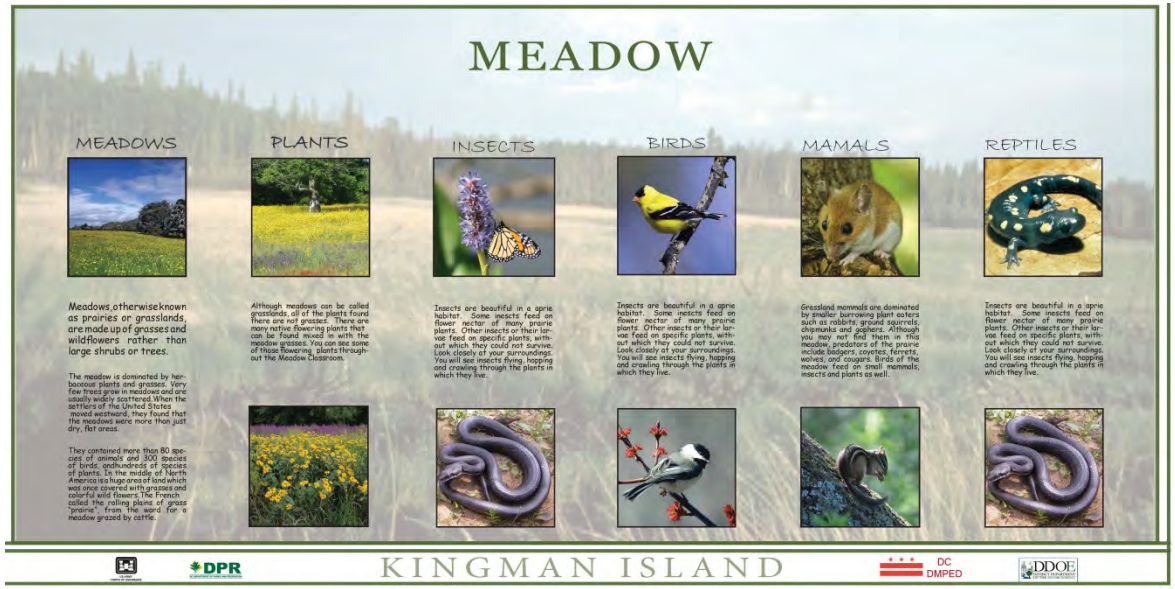
lai



Island Signage

°lai





Island Signage

°lai

April 1, 2016

Mr. Dev Murali, PG
Remedial Project Manager
Toxic Substances Division
Department of Energy and Environment
Government of the District of Columbia
1200 First Street, N.E. 5th Floor
Washington, DC 20002

Subject: Proposal – Asphalt Pad Removal
Kingman Island
Washington, DC

Dear Mr. Murali:

Tetra Tech, Inc. (Tetra Tech) is pleased to submit this proposal and cost estimate in response to the existing asphalt pad removal portion of the Scope of Work provided to Tetra Tech dated August 20, 2015 regarding a site investigation of soil piles at Kingman Island, NE, Washington DC (Site). This proposal addresses tasks including:

- Project planning and set up including preparation of a site specific Health and Safety Plan (HASP);
- Excavating the existing asphalt pad material;
- Transporting excavated asphalt pad material to a recycling facility;
- Finishing the excavated area with grass seed and straw; and
- Preparing a report that documents project activities.

BACKGROUND

The creation of Kingman Island reportedly began in 1916 by the U.S. Army Corps of Engineers as a result of Anacostia River dredging operations. The placement of dredged material at the site ceased prior to 1920. The original intent of the island was to provide outdoor recreational areas for surrounding city communities, but development was interrupted during World War II. During this time, the neighboring communities used the island for fishing and nature walks, and to create "victory gardens" during the war. Since then, the Site has generally been left unattended and undeveloped and has reportedly been used for unauthorized dumping of local refuse from the 1920s through present day.

The central portion of Kingman Island was developed with an asphalt pad in recent past. The existing asphalt pad, which is approximately 200 feet by 125 feet, was apparently deposited in

Tetra Tech, Inc.
45610 Woodland Road, Suite 400, Sterling, VA 20132
Tel 703.444.7000 Fax 703.444.1685 www.tetratech.com

several iterations, as the pad thickness and continuity are highly variable. Tetra Tech measured the asphalt pad thickness in multiple locations to be an average three inches thick. The pad also appears to have several small localized layers that were not deposited in a continuous effort. Based on the unknown source of the asphalt and the highly variable thickness, it is not recommended that the pad be used for a foundation or substrate for further development.

Tetra Tech reviewed the Kingman and Heritage Islands Preferred Master Plan Concept which details the planned future uses of Kingman Island as a public resource, which includes a nature center, a sculpture garden, an open meadow, playgrounds, nature trails, and canoe tie ups. The existing asphalt pad is located in an area of Kingman Island that may be developed based on the Preferred Master Plan Concept. Based on the proposed potential development of this area, the asphalt pad should be removed.

SCOPE OF WORK

TASK 1 - PROJECT PLANNING AND SETUP

This task includes the coordination of subcontractors and Site access issues. Tetra Tech will submit a Miss Utility DC One Call ticket for the work, a minimum of 72-hours in advance of any excavation activities. Our efforts will include appropriate utility survey review and updates, should they be required.

A Site HASP will be prepared in advance of asphalt removal activities. The HASP will be prepared in accordance with Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120.

TASK 2 – ASPHALT EXCAVATION AND REMOVAL

Tetra Tech will provide oversight for the excavating and removal of the existing asphalt pad. Tetra Tech has selected Miller Environmental Group (Miller) to perform the asphalt excavation and transfer operations. Prior to excavation activities, Tetra Tech and Miller will erect a temporary barrier to provide the community a safe pedestrian trail from the walking bridge that provides access to the island. The temporary barrier will delineate an effective exclusion zone around the excavation area and will stay in place until the excavation activities are complete and the excavated area has been reseeded.

Based on a measurements of the extent and thickness of the asphalt pad, Tera Tech estimates the mass of asphalt to be approximately 300 tons. Tetra Tech will oversee the use of an excavator and a skid-steer (Bobcat) to excavate the asphalt material and load it into dump trucks. Once loaded, the dump trucks will transfer the material to the asphalt recycling facility. Based on the volume estimates, it is assumed the material can be removed in 15 truckloads.

Once the asphalt material has been removed, the excavated area will be regraded to allow for surface water drainage and the underlying bare soils will be seeded with grass seed and covered with straw for stabilization.

TASK 3 - REPORT PREPARATION

The site activities will be summarized in a report following the completion of the aforementioned services. The report will include the following:

- Summary of project objectives, scope of work, and field procedures;
- Presentation of generated waste manifests or recycling receipts, as applicable; and
- Photographs of the asphalt pad, excavation activities, and finished excavation area;

An electronic copy of the report will be provided to the DOEE within two weeks of the completion of field activities. In addition, during each task, Tetra Tech will provide verbal briefings on a regular basis to a designated client representative.

ASSUMPTIONS

- Existing asphalt pad dimensions are approximately 200 feet by 125 feet with an average thickness of three inches;
- The total mass of the existing asphalt material does not exceed 300 tons;
- Only the asphalt material will be excavated and removed removal of significant gravel or asphalt sub-base is not included in this proposal. If encountered, Tetra Tech will contact DOEE for approval prior to removal;
- Tasks can be performed during normal business hours;
- No permits will be required to complete the scope-of-work as stated;
- Work areas will be accessible and will not require relocation of equipment or materials by Tetra Tech;
- Accessibility for personnel and equipment on-site will not be hampered by site-, earthquake-, or weather-related conditions;
- Local/state utility company “hotline” services will be contacted to identify buried utilities located in easements. Tetra Tech will perform a visual survey of each work area for evidence of potential buried utilities prior to commencement of excavation activities;
- Tetra Tech will make every reasonable effort to identify and avoid subsurface utilities, but will not be responsible for damage to or repair of unmarked utilities;
- Tetra Tech will make every reasonable effort to avoid damage to mature trees, but will not be responsible for damage to or repair/replacement of damaged vegetation;
- Field work can be completed in three business days;
- Existing asphalt pad will be removable by an excavator; and
- The units included in the attached cost estimate (Table 1) will not be exceeded without prior approval from DOEE.

Tetra Tech is pleased to provide this proposal and cost estimate for your review and consideration. Please contact Mr. Murley at (571) 228-5553 if you have any comments or questions.

Sincerely,

TETRA TECH, INC.

Ryan Murley, P.G.

Geologist/Project Manager

Mr. Jimmy Kehs

Technical Reviewer

Jeremy B. Travis, CHMM

Program Manager

Attachments:

Table 1 – Cost Estimate

TABLE 1

COST ESTIMATE

Asphalt Removal Cost Estimate
Kingman Island
Washington, DC

	Quantity	Unit	Rate	Subtotal	Markup	Actual Cost
Task 1 - Project Planning, Management, Coordination and Set-up						
TT Costs						
Principal II	3	hr	$ 185.23	$ 555.69		$ 555.69
Scientist III (Coe)	4	hr	$ 95.41	$ 381.64		$ 381.64
Scientist IV (Murley)	2	hr	$ 108.97	$ 217.94		$ 217.94
H&S Manager (Scientist IV) (Draper)	1	hr	$ 108.97	$ 108.97		$ 108.97
Administrative Assistant II	1	hr	$ 66.95	$ 66.95		$ 66.95
					TASK 1 Total Costs	**$ 1,331.19**
Task 2 - Asphalt Removal and Recycling						
TT Costs						
Scientist III (Coe)	30	hr	$ 95.41	$ 2,862.30		$ 2,862.30
Scientist IV (Murley)	8	hr	$ 108.97	$ 871.76		$ 871.76
					Subtotal	**$ 3,734.06**
Equipment/Subs						
Miller Environmental	1	unit	$ 25,875.00	$ 25,875.00		$ 25,875.00
Field Supplies	3	ea	$ 50.00	$ 150.00		$ 150.00
Mileage	1	ea	$ 60.00	$ 60.00		$ 60.00
Field Vehicles/Fuel	3	day	$ 150.00	$ 450.00		$ 450.00
					Subtotal	**$ 26,535.00**
					TASK 2 Total Costs	**$ 30,269.06**
Task 3 - Reporting						
TT Costs						
Principal II Final Review	2	hr	$ 185.23	$ 370.46		$ 370.46
Scientist III (Coe)	8	hr	$ 95.41	$ 763.28		$ 763.28
Scientist IV (Murley)	4	hr	$ 108.97	$ 435.88		$ 435.88
GIS Analyst (Peters)	1	hr	$ 127.62	$ 127.62		$ 127.62
Administrative Assistant II	1	hr	$ 66.95	$ 66.95		$ 66.95
					Subtotal	**$ 1,764.19**
					TASK 3 Total Costs	**$ 1,764.19**
Other Direct Costs (ODCs)						
TT Costs						
Computer Charge (Based on total labor hours)	65	hr	$ 3.14	$ 204.10		$ 204.10
					Subtotal	**$ 204.10**
					ODC Costs	**$ 204.10**
Total Costs						**$ 33,568.54**

Tetra Tech
45610 Woodland Road
Suite 400
Sterling, VA 20166

April 4, 2016

Mr. Dev Murali, PG
Remedial Project Manager
Toxic Substances Division
Department of Energy and Environment
Government of the District of Columbia
1200 First Street, N.E. 5th Floor
Washington, DC 20002

Subject: **Soil Pile Site Investigation Recommendations**
Kingman Island
Washington, DC

Dear Mr. Murali:

Tetra Tech, Inc. (Tetra Tech) is pleased to provide the District of Columbia Department of Energy & Environment (DOEE) with recommendations regarding the results of the Soil Pile Site Investigation (SI) conducted at Kingman Island, located in Washington, DC (Site). A site location map is presented in Figure 1. The findings of the SI are presented in the complete Soil Pile Site Investigation Report dated March 29, 2016. This letter presents three primary recommendation options. The recommendations discussed herein are presented with approximate costs for comparison purposes which include Tetra Tech costs as well as subcontractor costs. Please note that the approximate costs provided in this recommendations letter are estimates based on discussions with potential subcontractors and disposal facilities and should not be considered detailed cost estimates.

SITE INVESTIGATION SUMMARY

Tetra Tech performed a SI of Kingman Island in Washington, DC in an effort to evaluate the presence or absence of hazardous materials in the subsurface in the vicinity of the soil piles. In addition, the soil pile material was assessed in order to characterize the material for potential disposal methods.

SI activities included conducting a subsurface assessment around the perimeter of each of the three existing soil piles to evaluate potential impacts to subsurface media from the soil piles. Six soil borings were advanced in the vicinity of each of the soil piles for a total of 18 soil borings. Groundwater was collected from three of the six borings that were advanced in the vicinity of each soil pile for a total of nine groundwater samples. In addition, the SI included the completion of twelve test pits and the collection of composite soil samples from each soil pile for characterization of the material to assist in determining potential disposal options. The location of the soil borings are presented in Figure 2 and the location of the test pits are presented in Figure 3.

Tetra Tech reviewed the Kingman and Heritage Islands Preferred Master Plan Concept, which details the planned future used of Kingman Island as a public resource. The master plan concept includes a nature center, a sculpture garden, an open meadow, nature trails, and canoe tie ups. Tetra Tech sampled for known constituents of concern (COCs), based on previous investigations, along with several other

parameters in order to assist in verifying the suitability of Kingman Island as public green spaces detailed in the Preferred Master Plan Concept.

SITE INVESTIGATION CONCLUSIONS

SUBSURFACE INVESTIGATION

As detailed in the Soil Pile Site Investigation Report dated March 29, 2016, the soil sample analytical results indicated detectable concentrations of numerous Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), and metals above the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) and DOEE Risk-Based Screening Levels (RBSLs) in the soil samples collected at the Site. Results of the laboratory analysis of the groundwater samples also indicate detectable concentrations of numerous PAHs, TPH, and metals above the EPA Biological Technical Assistance Group (BTAG) freshwater screening values and DOEE RBSLs. Three of the 10 groundwater samples collected also exceeded the EPA BTAG freshwater screening values for polychlorinated biphenyl (PCB) PCB-1260. EPA BTAG screening criteria were used because the primary human and ecological exposure pathway to contaminated groundwater is exposure to surface water that has been impacted by groundwater seepage.

The soil and groundwater data were generally consistent throughout the Site. Overall the COCs based on this investigation appear to be PAHs, TPH-Diesel Range Organics (DRO), arsenic, barium, iron, lead, manganese, vanadium, zinc, and PCBs.

TEST PITS

The analytical results of the test pit composite soil samples indicate a source of PAHs, TPH, and metals within the soil pile waste material. The laboratory results of the composite soil samples, when compared to the laboratory results of the soil and groundwater samples collected around the soil piles, indicate that the waste material in the soil piles is, in part, a source of the contamination seen in the subsurface of the Site. Specifically a correlation can be seen in the compounds that exceed the regulatory standards in all media including TPH-DRO, arsenic, lead, and PCB-1260.

Based on the results of the laboratory analysis of the soil pile material, the material is not ignitable, corrosive, or reactive. Based on the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the soil pile material did leach the metals arsenic, barium, cadmium, chromium, lead and selenium; however, the leaching was not above the EPA Maximum Concentration of Contaminants for the Toxicity Characteristic. Therefore, the material is not considered toxic. The soil pile material can be considered non-hazardous solid waste.

Based on the variation of material in the soil piles identified during completion of the test pits, it is possible that portions of the soil pile material may be suitable for reuse on the site. Material that exceeds the EPA RSLs or the DOEE RBSLs for PAHs, TPH, metals, or PCBs should not be used for soil cover or surficial soil material that has the potential to come in contact with community members utilizing the island.

RESULTS SUMMARY

Elevated levels of COCs were detected in soil and groundwater samples collected throughout the site. Zones or areas of more highly-impacted soil and groundwater were not noted. Results indicate that the subsurface has likely been impacted by the soil pile material; however, based on the widespread occurrence of COCs throughout the site, it appears that a significant source of contaminants is the subsurface of the island itself, which was built up from dredge spoils from the Anacostia River. The test pits were conducted in the soil pile material and outside of the identified soil piles in the island subsurface. Anthropogenic debris was noted outside of the identified soil piles, with debris noted at depths that intersect the water table, as was the case in Test Pit 4. Based on the material noted in the test pits as compared to the material noted in the island subsurface, it appears that the soil pile material can be considered a source of COCs. However, due to the occurrence of anthropogenic debris in the subsurface of the island itself, along with the widespread occurrence of COCs in subsurface media, it appears that the material utilized in the creation of Kingman Island is also a contributing source of contaminants.

RECOMMENDATIONS

SOIL PILES 1 AND 2

Due to the potential for the soil piles to further negatively impact the subsurface of the Site, Tetra Tech recommends that the Soil Piles 1 and 2 be removed. Tetra Tech understands that Soil Piles 1 and 2 are located in the area that will feature future site redevelopment.

To manage the material in Soil Piles 1 and 2, Tetra Tech recommends consideration of three options for addressing the contamination in the soil piles and subsurface:

- Option 1: Removal and off-site disposal of the material in Soil Piles 1 and 2 and subsurface soils that exceed EPA RSLs and or DOEE RBSLs for PAHs, metals, and/or TPH. Soils should be removed to three feet below the proposed finished grade;
- Option 2: Excavate, sort, and remove the material in Soil Piles 1 and 2, and subsurface soils that exceed EPA RSLs and or DOEE RBSLs for PAHs, metals, and/or TPH to three feet below the proposed finished grade; or
- Option 3: Excavate and sort material in Soil Piles 1 and 2, and subsurface soils to a pre-defined depth (greater than 3-feet) below the proposed finished grade and conduct a partial removal along with onsite solidification and stabilization (S/S).

Option 1 would involve excavating and removing the material to a depth of three feet below the proposed grade and transferring the material to an offsite disposal facility with little to no material sorting. Option 2 would consist of the initial excavation and onsite sorting of waste material, followed by confirmatory soil sampling to establish areas of material that may be suitable for reuse onsite. Option 3 would consist of the initial excavation, onsite sorting of waste material, and a partial removal of waste material; followed by the onsite S/S of material to be left onsite, in order to reduce contaminant migration.

Soil Piles 1 and 2 Volume Estimates

Estimates of the volume of the soil piles were conducted by MACTEC in their 2007 investigation of the soil piles[1]. The MACTEC report estimated the volume of Soil Pile 1 to be approximate 12,000 cubic yards and Soil Pile 2 to be approximately 7,000 cubic yards, however Tetra Tech believes that these are underestimates of the total volume for the purposes of evaluating the remedial options. When estimating the volume of material Tetra Tech considered the excavation of the soils pile to a depth of approximately three feet below grade to allow for the placement of a clean fill cover in the areas excavated. Tetra Tech calculated volume estimates based on field measurements of the extent of the soil piles and the soil pile survey data presented in the Geosyntec 2007 Stockpile Investigation Report[2]. The volume estimates of Soil Piles 1 and 2 calculated by Tetra Tech are shown below:

Soil Pile Volume Estimates

Identification	Dimensions in feet (L x W x H)	Volume (Cubic Yards)
Soil Pile 1	230 x 180 x 10	15,300
Soil Pile 2	300 x 200 x 15	33,300

Based on the above estimates, Soil Piles 1 and 2 contain approximately **48,600** cubic yards of material. If the entire volume were to be removed, this would equate to approximately 70,000 tons. Assuming an average truck capacity of 25 tons, it would require an average of 40 trips per day for 60 days to removal the material in its entirety.

Soil Pile Material Management

Under Option 1, the soil pile material, along with the surface soils will be completely removed to approximately three feet below the proposed finished grade. Only large pieces of metal and construction debris (concrete) would be sorted out of the excavated material to be recycled. Any sorting of material will be conducted with the excavator and loaded into trucks for offsite disposal. This option would minimize the amount of time spent managing the material itself; however, it would limit the ability to identify potential recycling and reuse opportunities.

Under both Option 2 and 3, the soil pile material will require an initial excavation and sorting phase due to the large percentage of debris. The sorting phase would be required to separate the common anthropogenic debris encountered during advancement of the test pits. Construction debris, including concrete and asphalt, should be identified during the initial excavation of the soil piles and ultimately sent to a recycling facility that will use concrete for aggregate and asphalt for new asphalt projects. Metal would then be sorted out on the excavated material with large magnets or other screening tools, and sent to metal recycling facility. Finally, the excavated material will be sent through a series of

---

[1] *MACTEC 2007. Fill Mound Environmental Assessment Report, Kingman Island, prepared for the Anacostia Waterfront Corporation by MACTEC Engineering and Consulting, Inc. (MACTEC). March 7.*

[2] *Geosyntec Consultants. 2007. Results of Stockpile Investigation, Kingman Island Washington, D.C. December 12.*

screens to allow the separation of common trash that would be sent to a landfill. Any additional recyclable material would be separated out where possible and sent offsite for recycling.

Depending on which option is chosen, the soil material may potentially be used onsite. Once sorted, the resulting impacted soil would be stockpiled into manageable piles of similar material based on field screening, and a composite sample should be collected to aid in determining the final disposal facility or potential for reuse onsite. The potentially impacted soil not exceeding the DOEE RBSLs or the EPA RSLs resulting from this separation process can be either used onsite or sent to an offsite disposal facility.

Future development plans and the associated grading and geotechnical requirements will need to be considered during the evaluation of these options. The final grade of the island would be significantly higher elevation if all the material were to be sorted, spread out evenly, and left in place. In addition, the geotechnical characteristics of the sorted material may not be suitable for the foundation of a structure or other development.

Option 1- Soil excavation, removal, and off-site disposal

Option 1 consists of the excavation and offsite disposal of Soil Piles 1 and 2 and subsurface soils to three feet below the proposed finished grade. The material would be excavated, and transferred to trucks and transported off site with minimal material handling or sorting. The material will be sent to local landfills and/or disposal facilities. Minimal sorting would be conducted during excavation to remove large pieces of construction debris and other large items. It is recommended that if Option 1 is chosen for the material in Soil Piles 1 and 2, the entire footprint of both soil piles be excavated down to three feet below the proposed finished grade. The excavation would then be backfilled with either certified clean soils or documented clean soils from the Site based on laboratory analysis and compacted.

Assuming this option is chosen, an erosion and sediment control plan highlighting engineering details with total excavation quantities, site erosion and sediment control measures, site restoration, seeding and vegetation, and defined truck routes for off-site transportation of soils would be prepared for DOEE approval. Tetra Tech understands that the DOEE will arrange for public meetings to ensure that the community is aware of these plans and will coordinate with the DOEE on the schedule, timeline, and duration of this project. These assumptions will apply to all the options below.

The approximate cost for option 1 for excavation, removal and disposal of 70,000 tons of soil is $3,450,000. This approximate cost assumes 14 weeks of on-site work and includes a 15% contingency.

Option 2- Soil excavation, removal, on-site sorting, and off-site disposal

Option 2 consists of excavation, thorough sorting of material, and offsite disposal and recycling of the material in Soil Piles 1 and 2. The material would be excavated, completely sorted, and transferred to a combination of recycling centers, landfills, and disposal facilities. It is recommended that if Option 2 is chosen for the material in Soil Piles 1 and 2, the entire footprint of both soil piles be excavated down to three feet below the proposed finished grade. The excavation would then be backfilled with either certified clean soils or documented clean soils from the Site based on laboratory analysis and compacted.

The estimated cost for option 2 for excavation, sorting, removal and disposal of 70,000 tons of soil is $4,200,000. This approximate cost assumes 18 weeks of on-site work and includes a 15% contingency.

Option 3- Soil removal, on-site sorting and treatment with limited off-site disposal

Option 3 consists of a partial removal of unsuitable material and impacted material for disposal offsite along with an onsite S/S technology. S/S technologies are primarily used to reduce the mobility of contaminants. Solidification is a technology that uses treatment processes to change the physical characteristics of the waste to form a solidified matrix of material that binds contaminants in place and improves material handling. Stabilization, sometimes referred to as fixation, is a process that hinders the contaminant's mobility through chemical or thermal interactions.

The general approach of the S/S process involves the mixing or injection of treatment agents into the waste material. Treatment agents may include cement, lime, fly ash, aggregate, or other suitable materials resulting in the waste contaminants being encompassed in an outer matrix. S/S can be implemented in situ using large injection machines or ex situ by excavating impacted waste materials, mixing with S/S amendments and then backfilling and compacting the S/S on site[3]. Depending on the resulting risk associated with the S/S material, a soil cover may be constructed of S/S fill materials[4].

Due to the high percentage of debris encountered during advancement of the test pits, the in situ option, while reducing the mobility of contaminants, would likely leave the subsurface material unsuitable for construction. Therefore, the ex situ option would be appropriate for Kingman Island as it would more readily allow for future development.

The general steps of the ex situ S/S process include the following:

- Treatability testing in order to assess which S/S amendments would be most suitable to stabilize the material. The criterion used to assess which amendments are preferred would include the workability and compaction of the soil piles using heavy equipment as well as reduction of leaching potential for soil pile contaminants;
- Excavation of the soil piles using standard heavy equipment to a pre-defined depth (greater than 3-feet) below the anticipated finished grade, but not below groundwater. The depth of excavation would be determined during the treatability testing phase. Excavated soil pile materials would be sorted to remove any unsuitable material or debris;
- Addition of the preferred amendment identified through treatability testing to the excavated soil pile material on the ground surface in areas to be capped using heavy equipment; and
- Backfill and compaction of stabilized materials in areas where the soil piles are currently located. The above ground areas would be covered by three feet of certified clean soils and compacted to minimize surface water infiltration and minimize direct contact with the stabilized material.

Treatment of the entire volume of material in the soil piles may create additional material management issues as leaving all the sorted soil material onsite would likely not result in the desired finished grade.

---

[3] *GWRTAC. 1997. Ground-Water Remediation Technology Center (GWRTAC). Remediation of Metals-Contaminated Soil and Groundwater, Carnegie Mellon University, Department of Civil and Environmental Engineering, Pittsburgh, PA. October.*

[4] *EPA. 1997. Recent Developments for In Situ Treatment of Metal Contaminated Sites. Office of Solid Waste and Emergency Response, Technology Innovation Office. March 5, 1997.*

For example if the desired finished grade of the area in the vicinity of Soil Piles 1 and 2 is approximately the elevation of the access road to the south and west and the cleared area to the east of the soil piles (15 feet above sea level), a portion of the entire volume of material would need to be relocated or disposed of offsite, as this material is currently located above grade.

The estimated cost for option 3 for excavation, removal, on-site treatment and limited disposal of 55,000 tons of soil is $5,750,000. This approximate cost assumes 22 weeks of on-site work and includes a 15% contingency.

SOIL PILE 3

Laboratory results of the samples collected in the area of Soil Pile 3 were similar to the results from samples collected throughout the Site. Detections of PAHs, TPH-DRO, metals, and PCBs indicate approximately the same COCs on the southern portion of the island as compared to the central portion of the island, in frequency of occurrence and magnitude. However the current use of the southern portion of the island more closely matches the Kingman and Heritage Islands Preferred Master Plan Concept. In particular, the southern portion of Kingman Island in the vicinity of Soil Pile 3 is developed with a cleared meadow, walking path, and public greenspace. Due to the lack of a defined boundary of the soil pile and the current use of this area in a way that is compatible with the proposed future development of the island, Tetra Tech recommends that Soil Pile 3 be left in place as it was observed during the SI field work. Placement of a clean fill cap should be considered prior to any further development in this area to minimize risk to human or ecological health from contact to impacted surface soils at the surface. The cap should be made up certified clean soils with a minimum thickness of three feet, placed in high use areas.

CONCLUSION

Based on the estimated costs presented above, Tetra Tech recommends that the District consider Option 1, however, Option 2 may be considered based on sustainability and public perception concerns. Each recommended option entails the excavation, removal, and off-site disposal of Soil Piles 1 and 2, and no further action on Soil Pile 3 (unless additional development activities are planned). The cost estimates presented in this recommendation letter should be considered rough approximations. In the event the DOEE wishes to proceed, Tetra Tech would be happy to work with our team of subcontractors to provide a detailed estimate of time and cost.

Tetra Tech is pleased to provide this recommendations letter for your review and consideration. Please contact Mr. Murley at (703) 885-5513 or ryan.murley@tetratech.com if you have any comments or questions.

Sincerely,

Mr. Ryan Murley, P.G.
Project Manager

Mr. Jimmy Kehs
Technical Reviewer

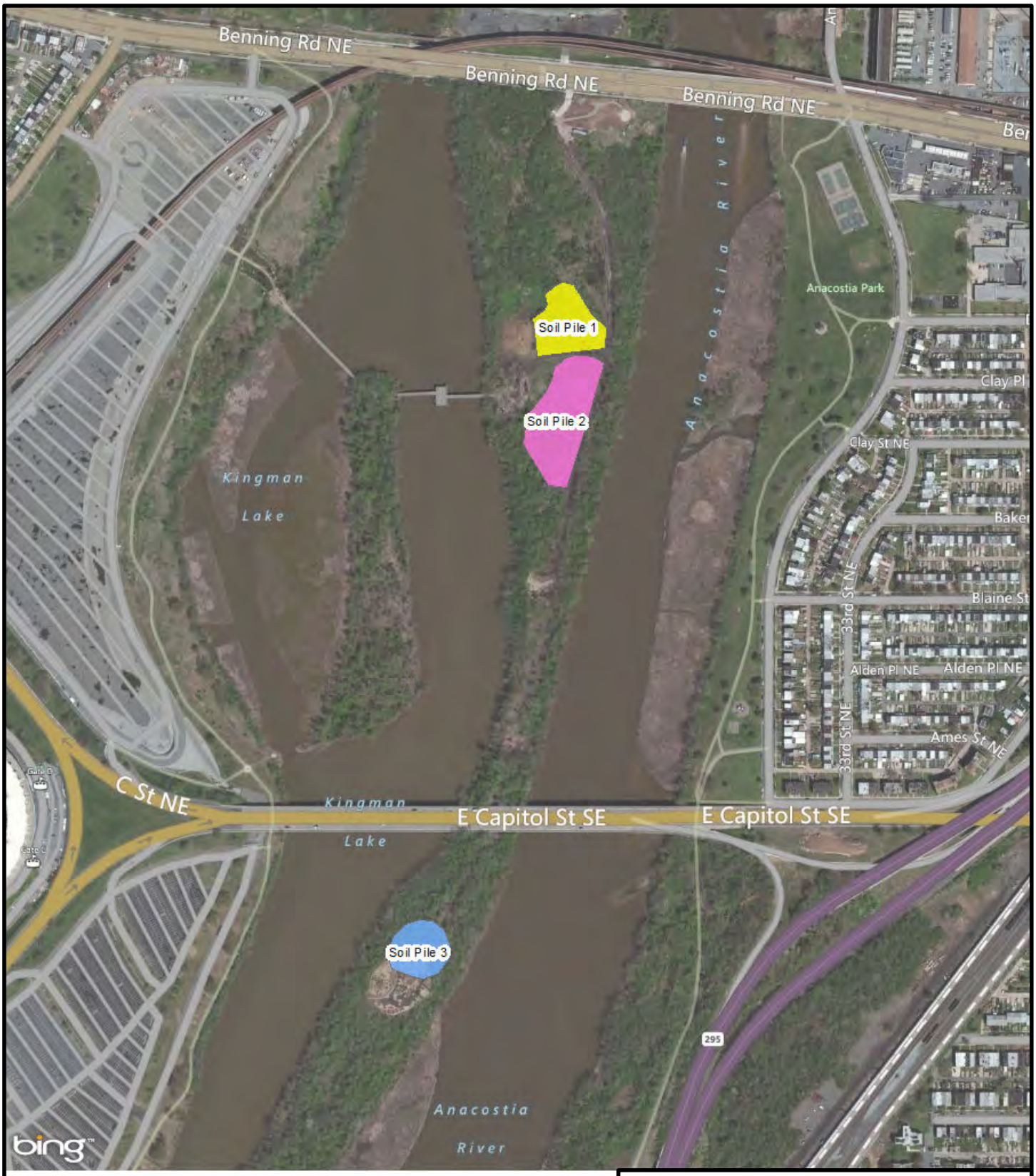
Mr. Jeremy B. Travis, CHMM
Program Manager

Attachments:

Figure 1 – Site Location Map

Figure 2 – Soil Boring Location Map

Figure 3 – Test Pit Locations



Legend

- Soil Pile 1
- Soil Pile 2
- Soil Pile 3

N
W E
S

0 250 500
Feet

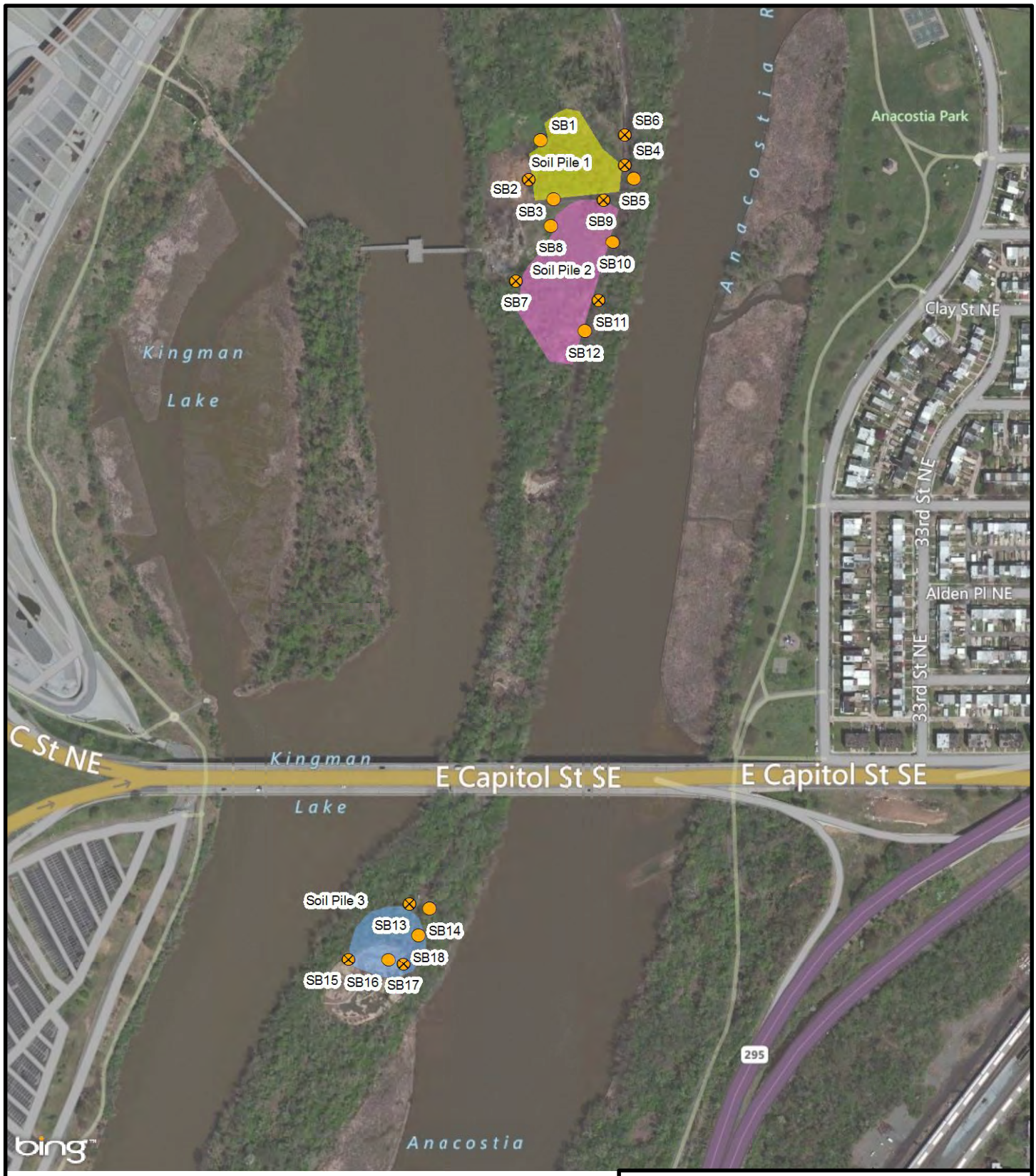
SOURCE: MODIFIED FROM BING MAPS HYBRID IMAGERY, 2011.

KINGMAN ISLAND
SOIL PILE INVESTIGATION
WASHINGTON, DC

FIGURE 1
SITE LOCATION MAP

TETRA TECH

Date Saved: 2/10/2016 2:24:51 PM User: joel.peters Path: S:\CADD\S\3636\014\mxd\DDOE_KingmanLake_1.mxd



Legend

- Soil Boring Location
- Soil Boring/Groundwater Sample Location
- Soil Pile 1
- Soil Pile 2
- Soil Pile 3

SOURCE: MODIFIED FROM BING MAPS HYBRID IMAGERY, 2011.

N W E S

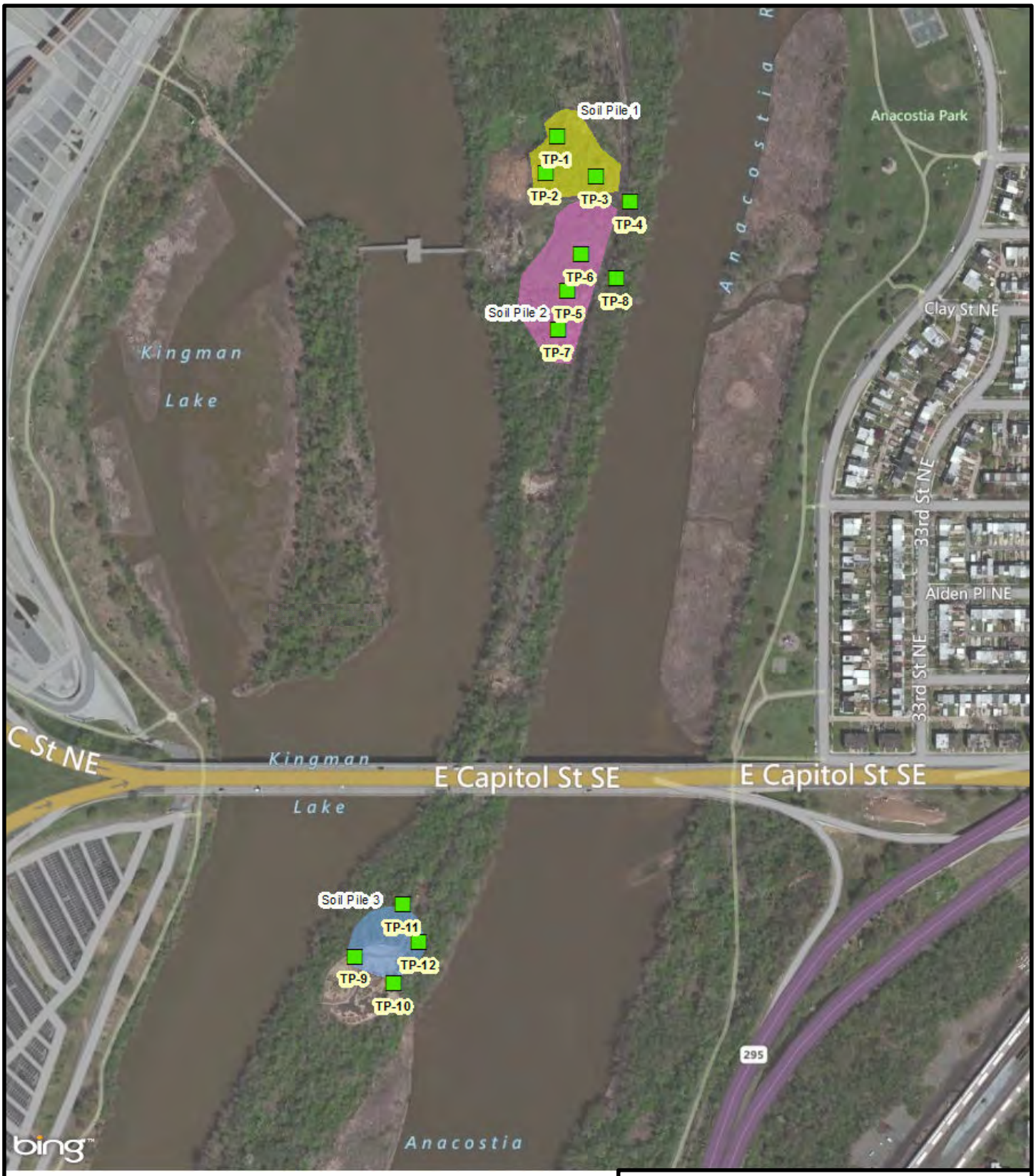
0 200 400
Feet

KINGMAN ISLAND
SOIL PILE INVESTIGATION
WASHINGTON, DC

FIGURE 2
SOIL BORING LOCATION MAP

TETRA TECH

Date Saved: 2/10/2016 1:14:48 PM User: joel.peters Path: C:\CADD\S\3636\014\mxd\DDOE_KingmanLake_2.mxd



Legend

- Test Pit
- Soil Pile 1
- Soil Pile 2
- Soil Pile 3

N
W E
S

0 200 400
Feet

SOURCE: MODIFIED FROM BING MAPS HYBRID IMAGERY, 2011.

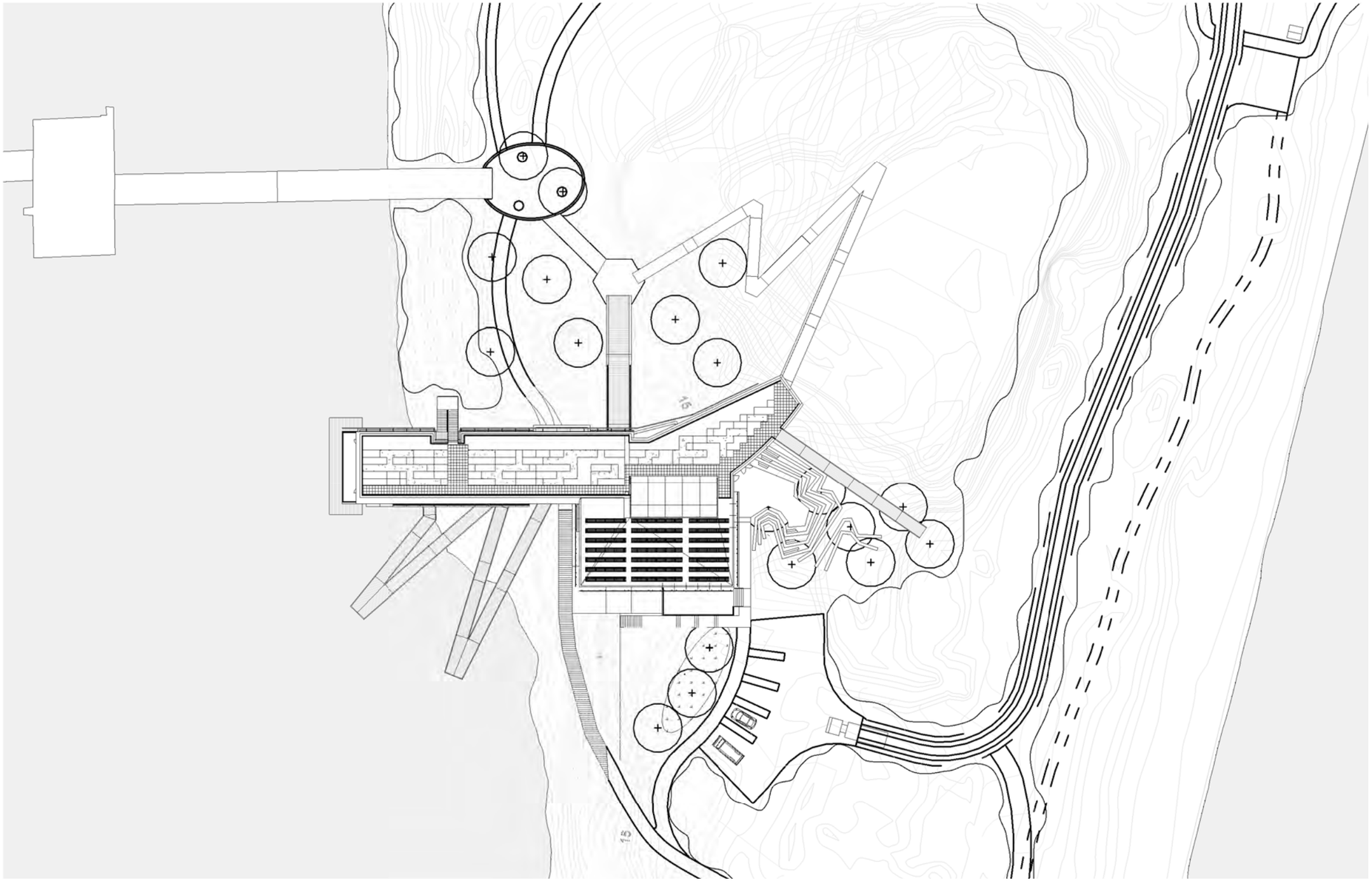
KINGMAN ISLAND
SOIL PILE INVESTIGATION
WASHINGTON, DC

FIGURE 3
TEST PIT LOCATIONS

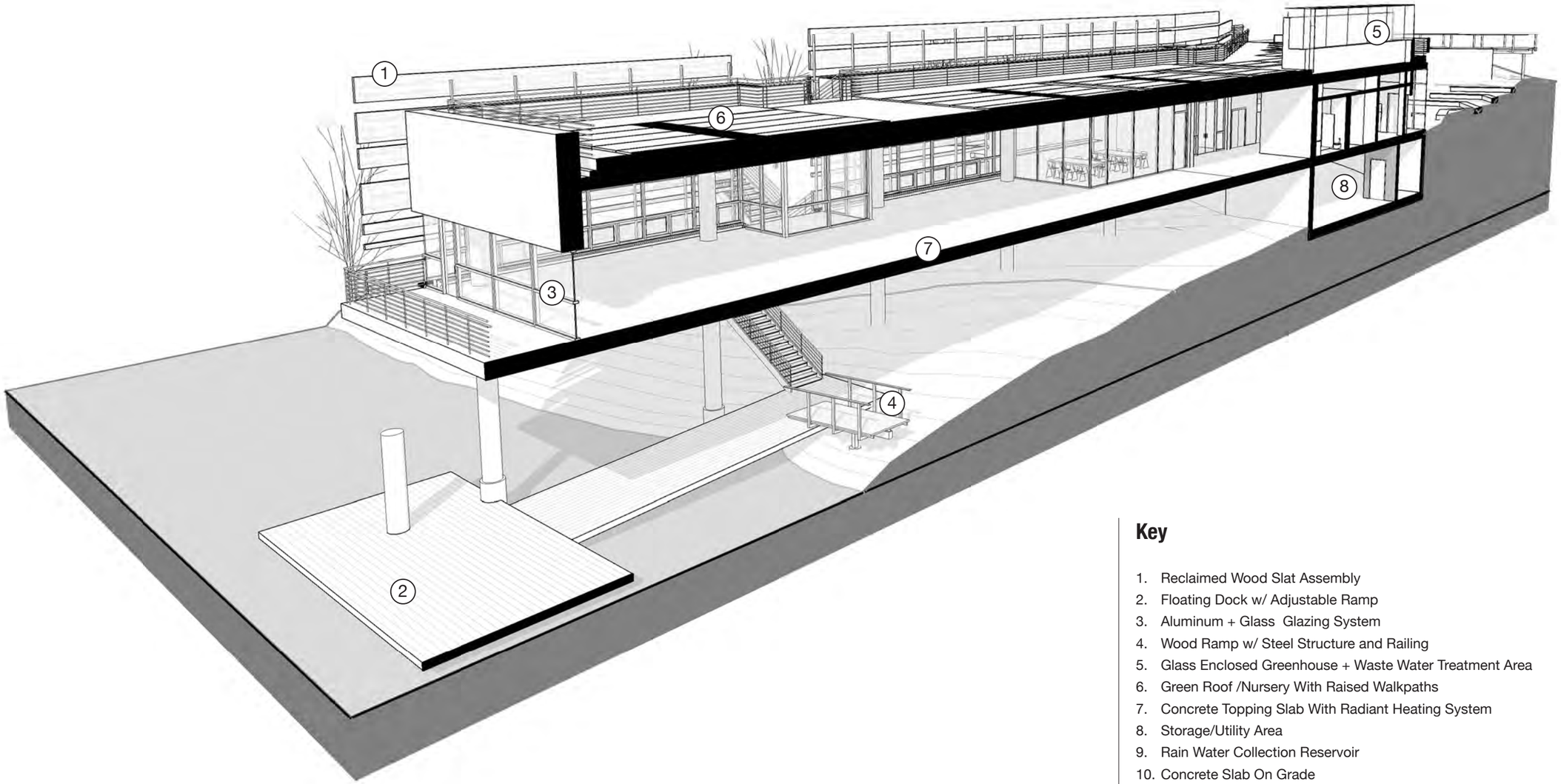
TETRA TECH

Date Saved: 2/23/2016 1:32:23 PM User: joel.peters Path: S:\CADD\S\3636\014\mxd\DDOE_KingmanLake_3.mxd

KINGMAN ISLAND
ENVIRONMENTAL EDUCATION CENTER
STUDIOS
architecture



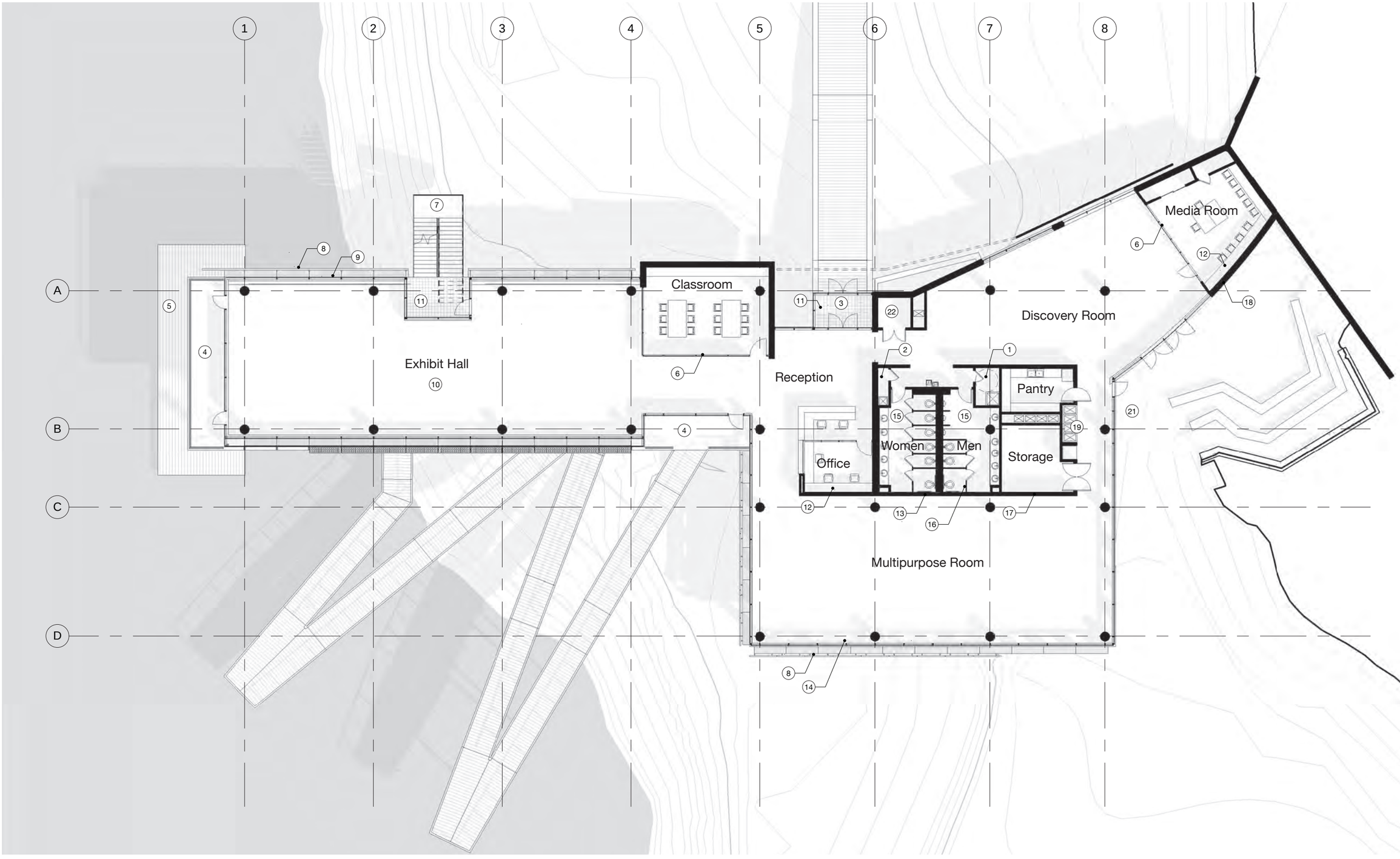
Enlarged Site Plan



Key

1. Reclaimed Wood Slat Assembly
2. Floating Dock w/ Adjustable Ramp
3. Aluminum + Glass Glazing System
4. Wood Ramp w/ Steel Structure and Railing
5. Glass Enclosed Greenhouse + Waste Water Treatment Area
6. Green Roof /Nursery With Raised Walkpaths
7. Concrete Topping Slab With Radiant Heating System
8. Storage/Utility Area
9. Rain Water Collection Reservoir
10. Concrete Slab On Grade
11. Recycling Containers
12. Overhead Door
13. Cast Concrete Exterior Walls

North/South Section

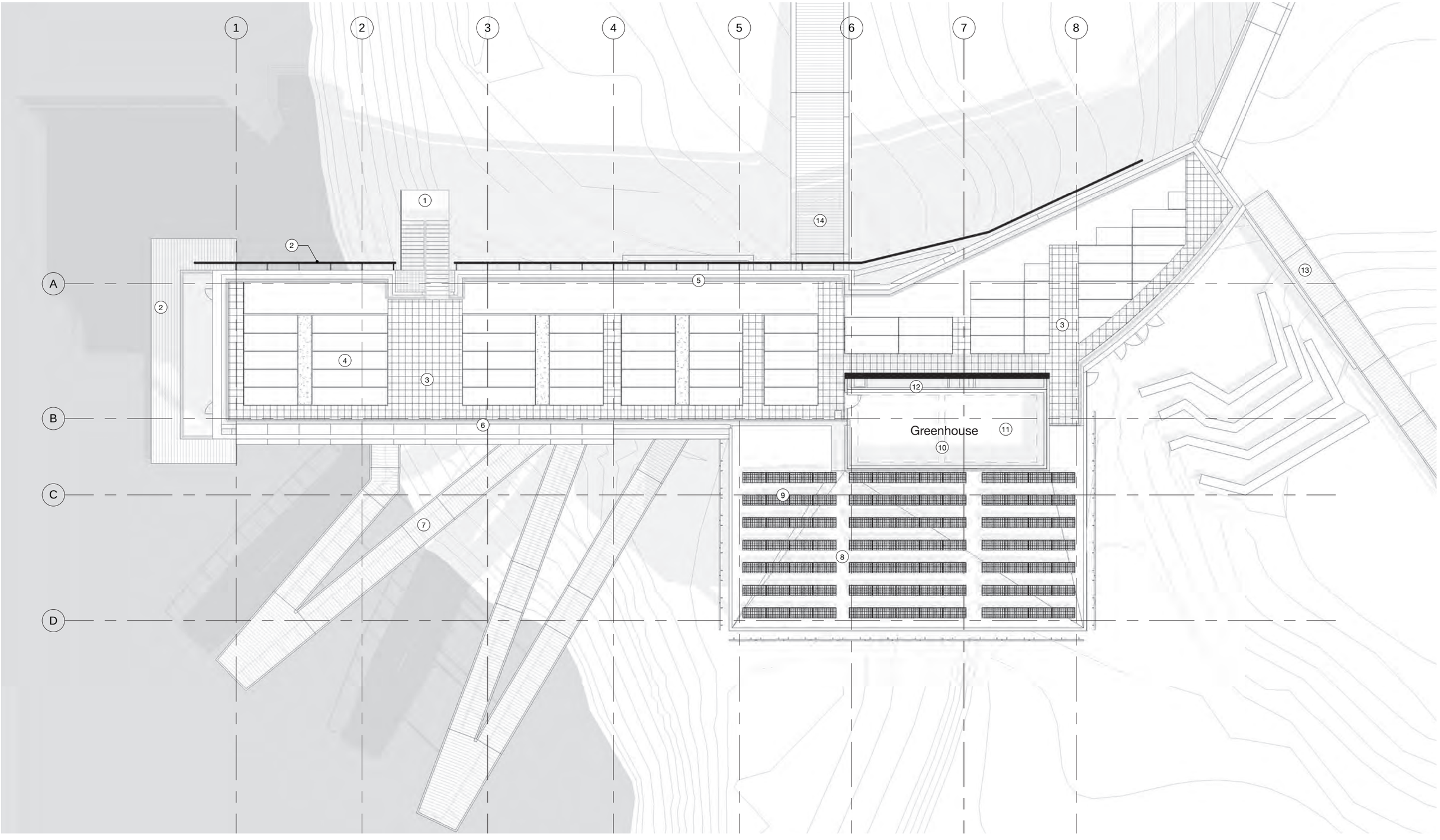


N

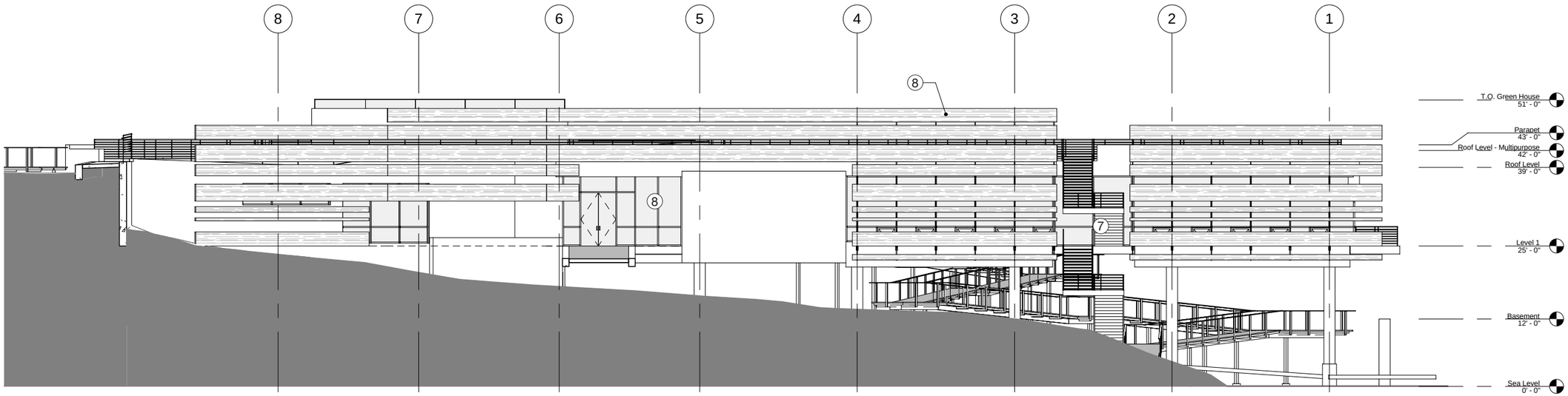
0 5 20 40

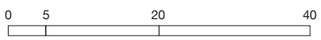
1" = 20'

Ground Floor Plan



Roof Level Plan



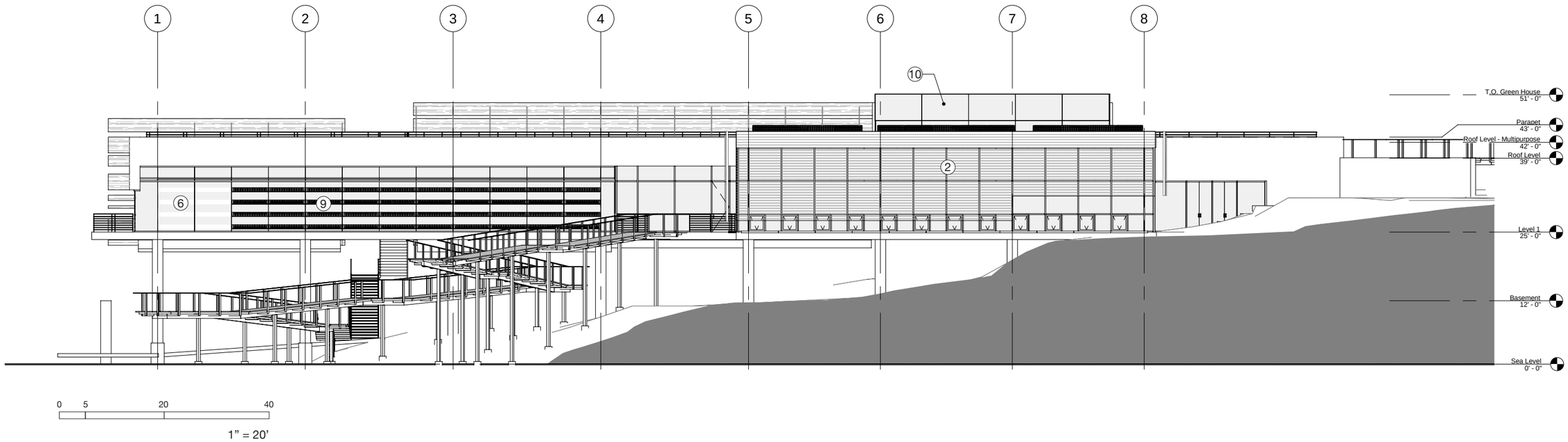


1” = 20’

Key

1. Shower
2. Janitor’s Closet
3. Vestibule
4. Exterior Balcony w/ Steel Rails And Wire Guards
5. Floating Wood Dock Below
6. Interior Aluminum + Glass Glazing System w/ Laminated Art Glass
7. Exterior Concrete Stair w/ Steel Guard And Cable Handrail
8. Reclaimed Wood Slat Screen Assembly
9. Insulated Aluminum + Glass Glazing System
10. Exposed Concrete Topping Slab w/ Radiant Tubes Over Rigid Insulation And Structural Concrete Slab, Typ.
11. Recessed Aluminum Grate Walk-off Mat
12. Exposed Wheat Board Millwork Surfaces W/ Overhead Cabinets
13. 4” Nominal CMU Core Walls w/ Recycled Content
14. Perimeter Motorized Black-out Shades
15. Porcelain Floor Wall Tiles w/ Recycled Content
16. Framed Toilet Partitions w/ Porcelain Tile
17. Heat Chimney Air Intake
18. Insulated Concrete Structural Wall Panels
19. Recycling Center w/ Chutes To Lower Level Collection Containers
20. FSC Certified Solid Core Wood Doors w/ Hollow Metal Frames, Typ.
21. Exterior Open Grass Paving Blocks
22. Coat Closet

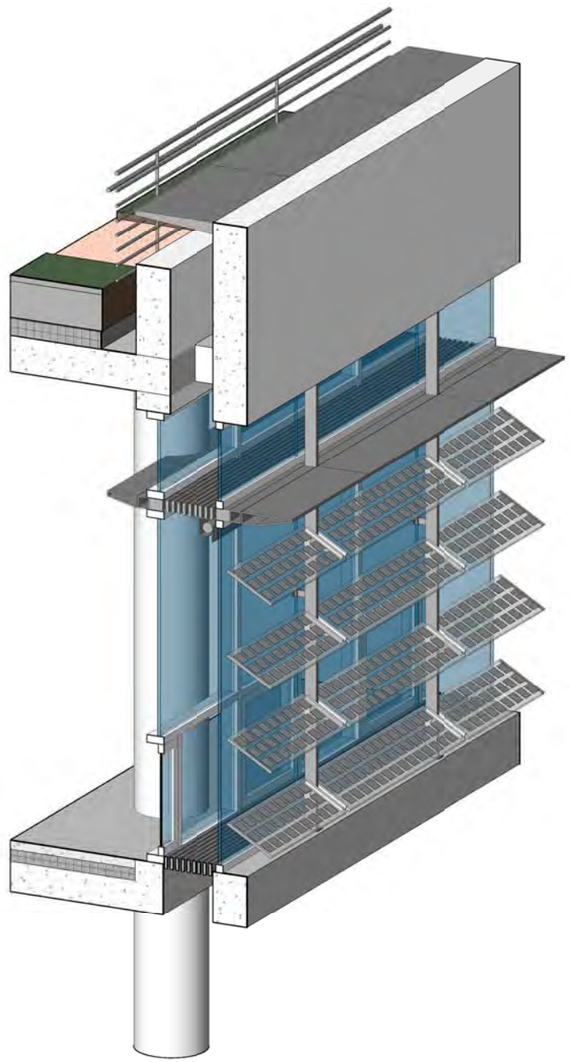
North Elevation

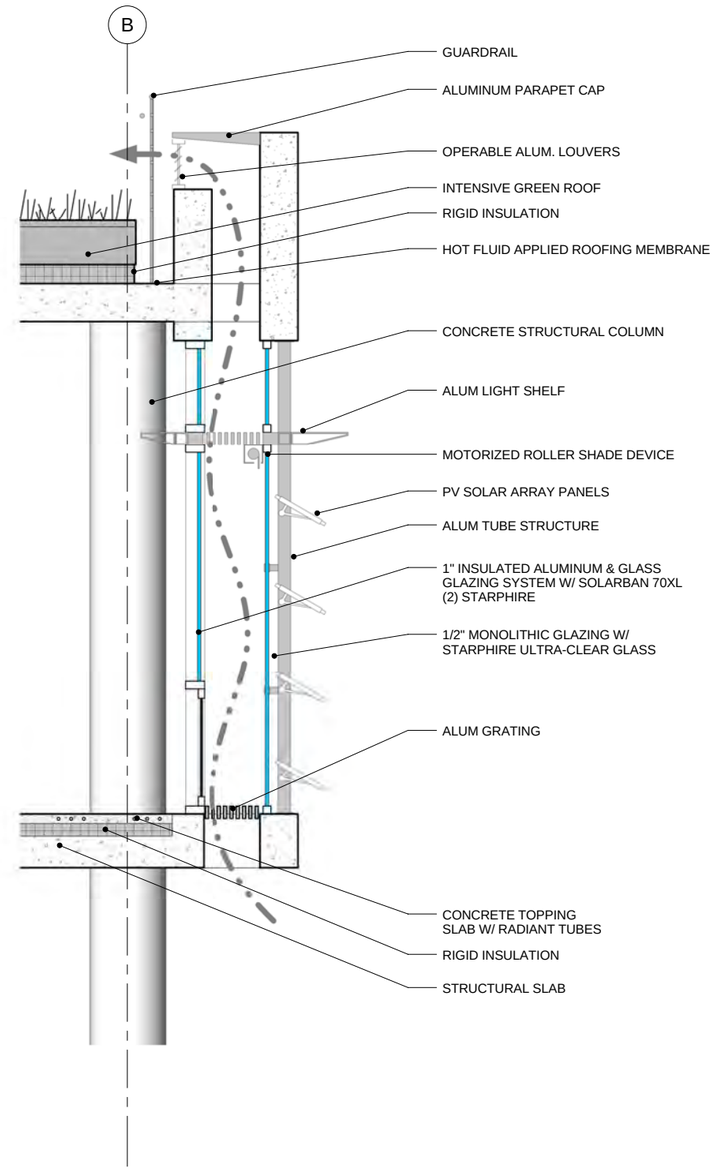


Key

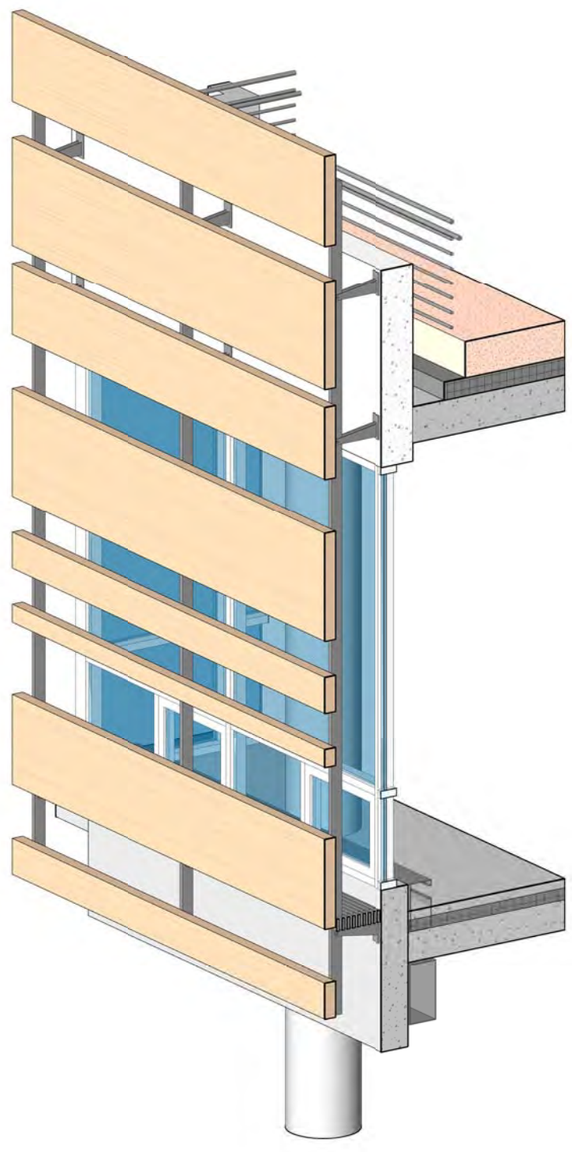
1. Exterior Concrete Stair w/ Steel Guard And Cable Handrail
2. Reclaimed Wood Slat Screen Assembly
3. Raised Walkpaths
4. Green Roof - Grass Plantings and Nursery Trays
5. Rain Water Collection Trough
6. Double Skin Wall - Rooftop Vent And Parapet
7. Wood Ramps Below
8. Hot Fluid Applied Roofing Membrane, Typ. Over Concrete Roof Slab
9. PV Solar Arrays
10. Glass Enclosed Greenhouse/Waste Water Treatment System
11. On-Site Waste Water Wetlands Treatment System
12. Heat Chimney w/ Operable Louvers
13. Wood Ramp/Perch w/ Steel Structure And Cable Guard Rails
14. Concrete Ramps and Retaining Walls

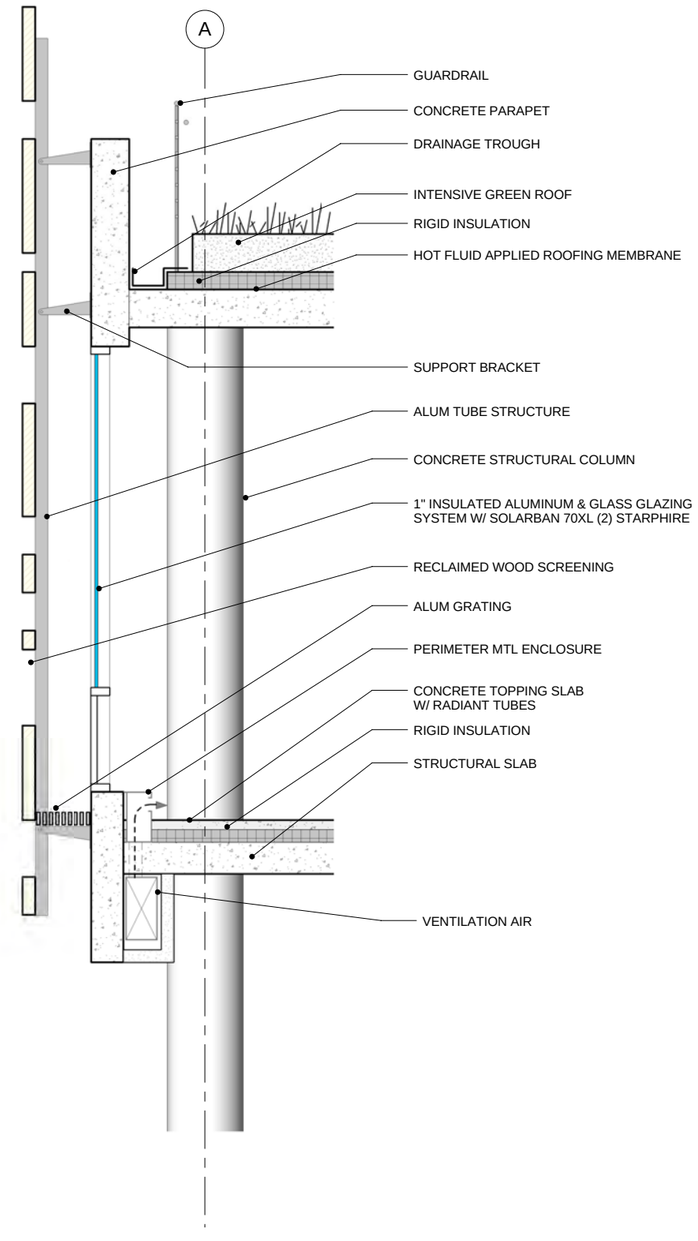
South Elevation



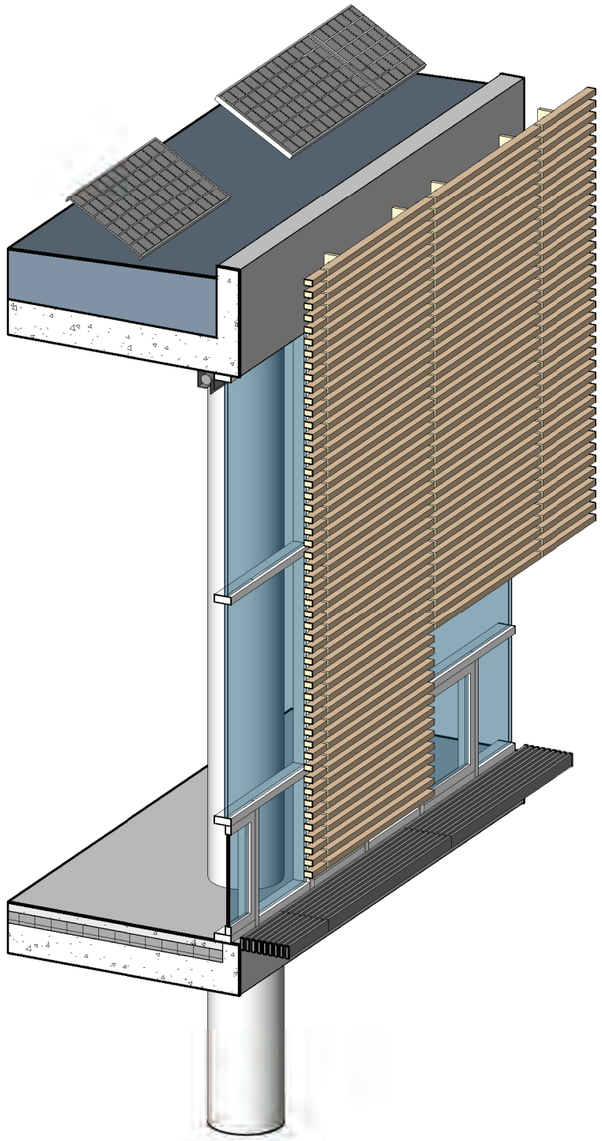


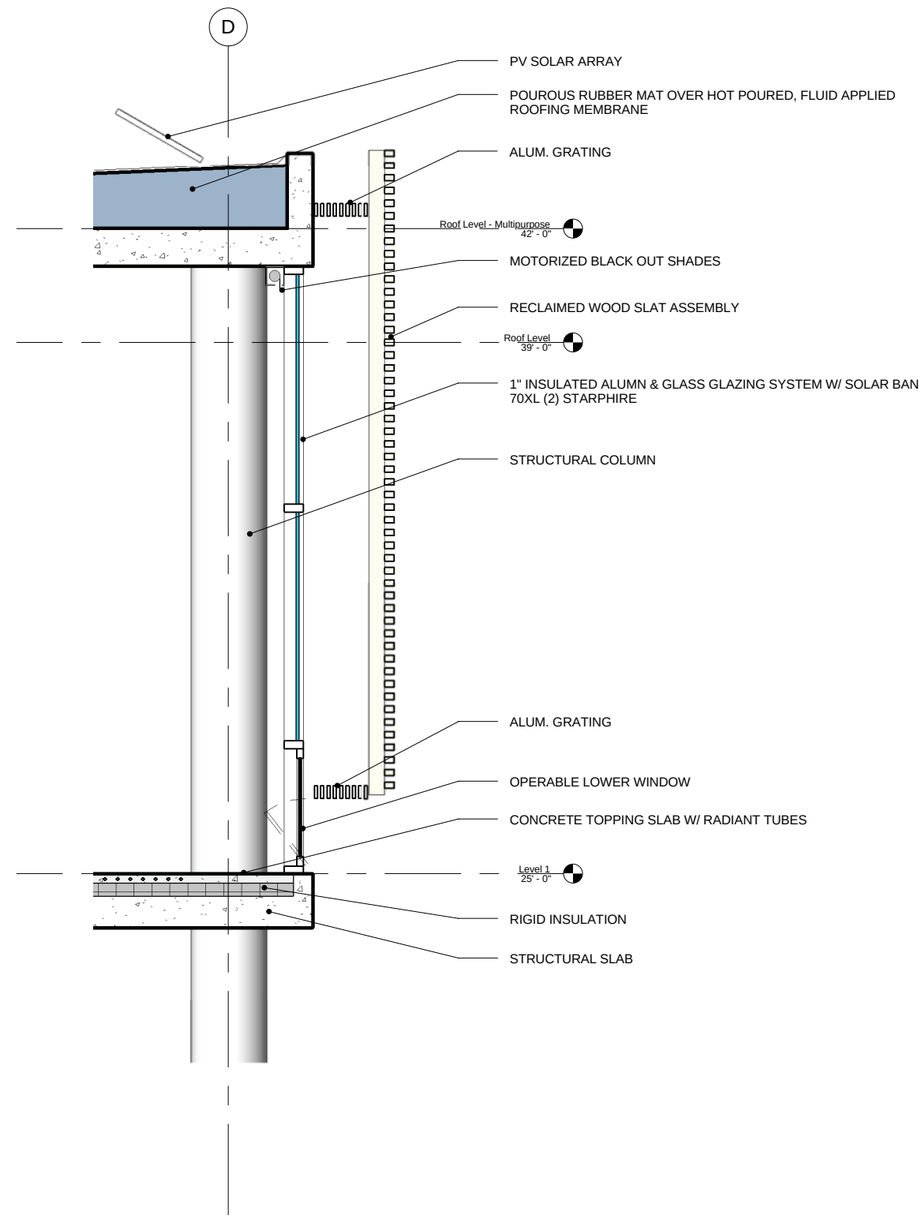
South Facade Detail



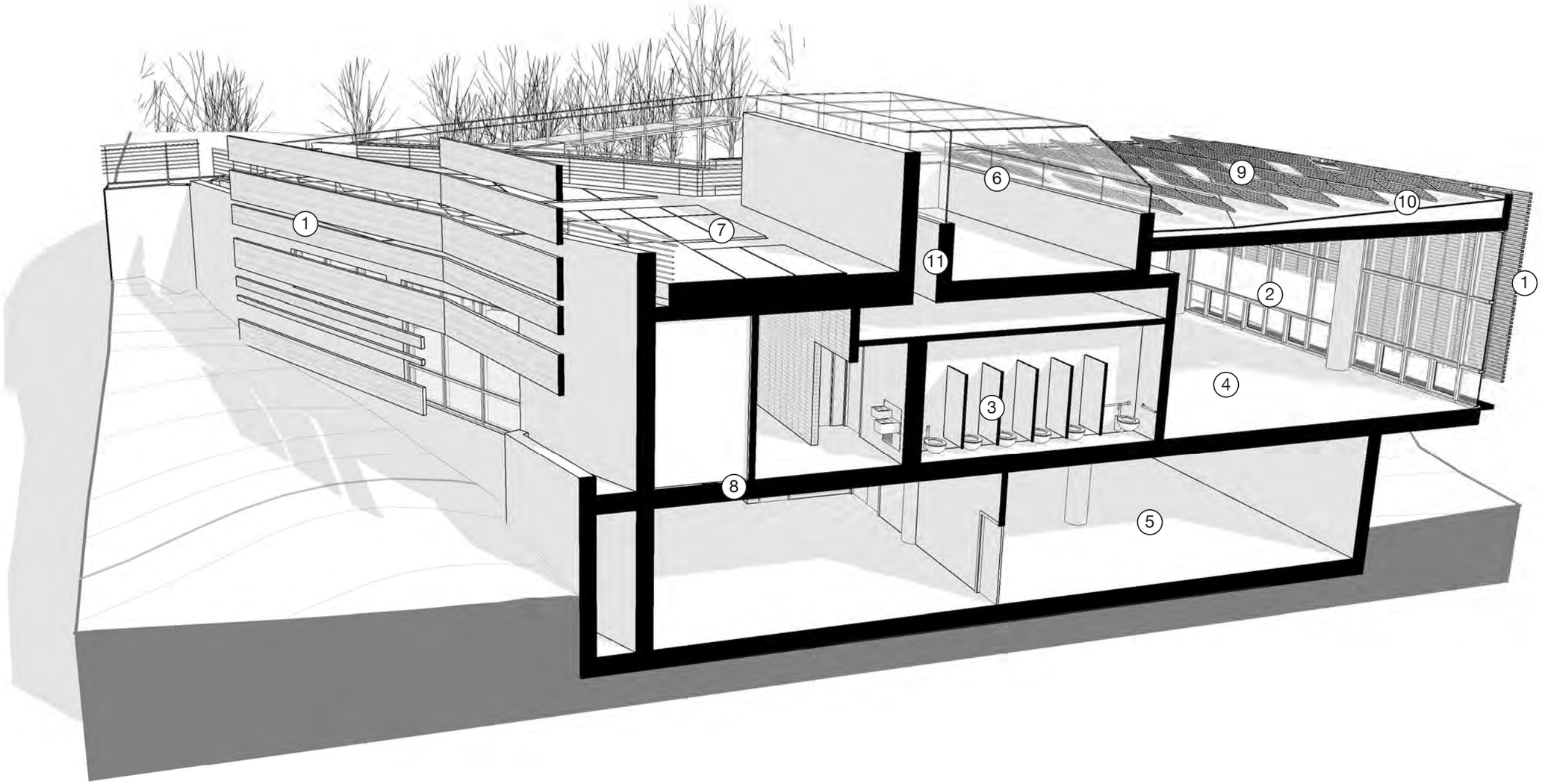


North Facade Detail





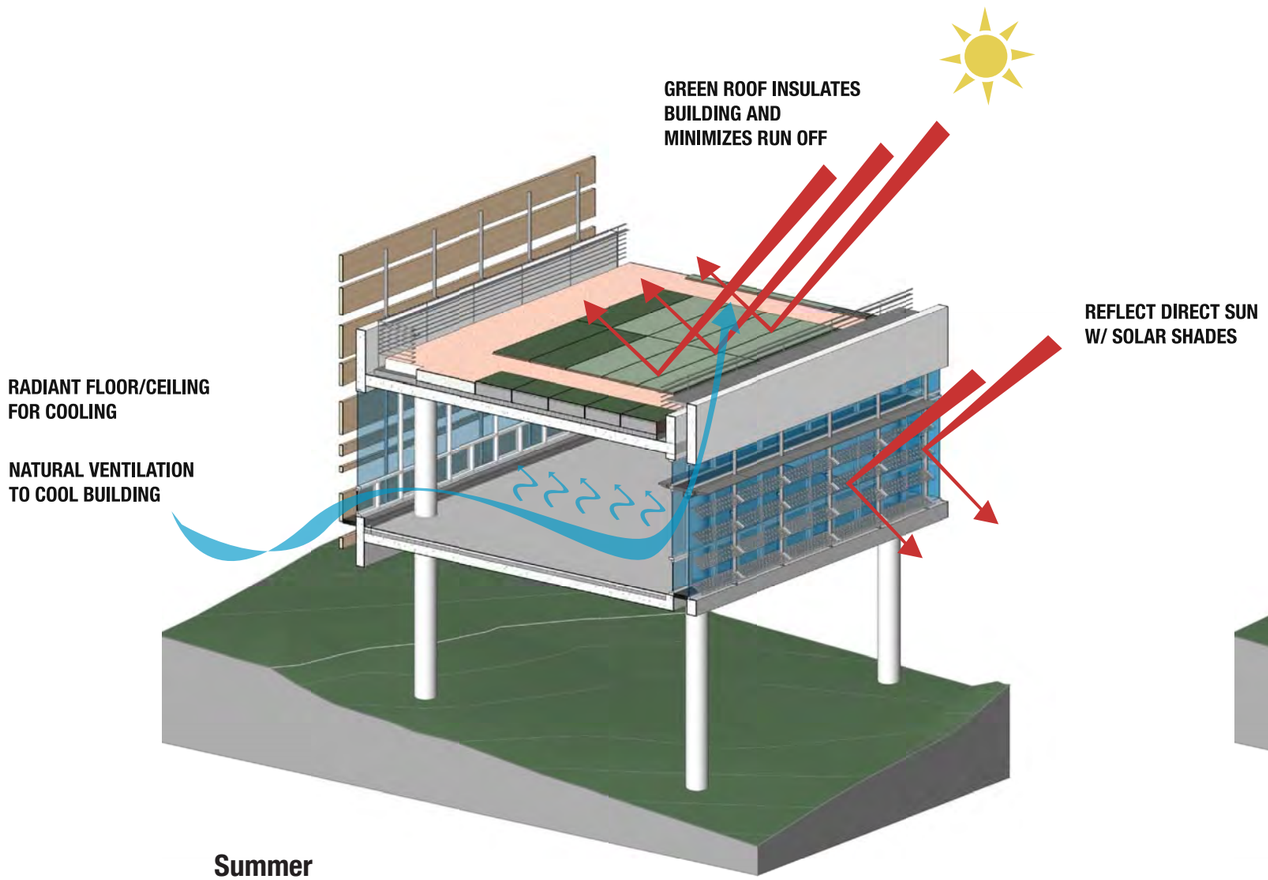
Multipurpose Room Facade Detail



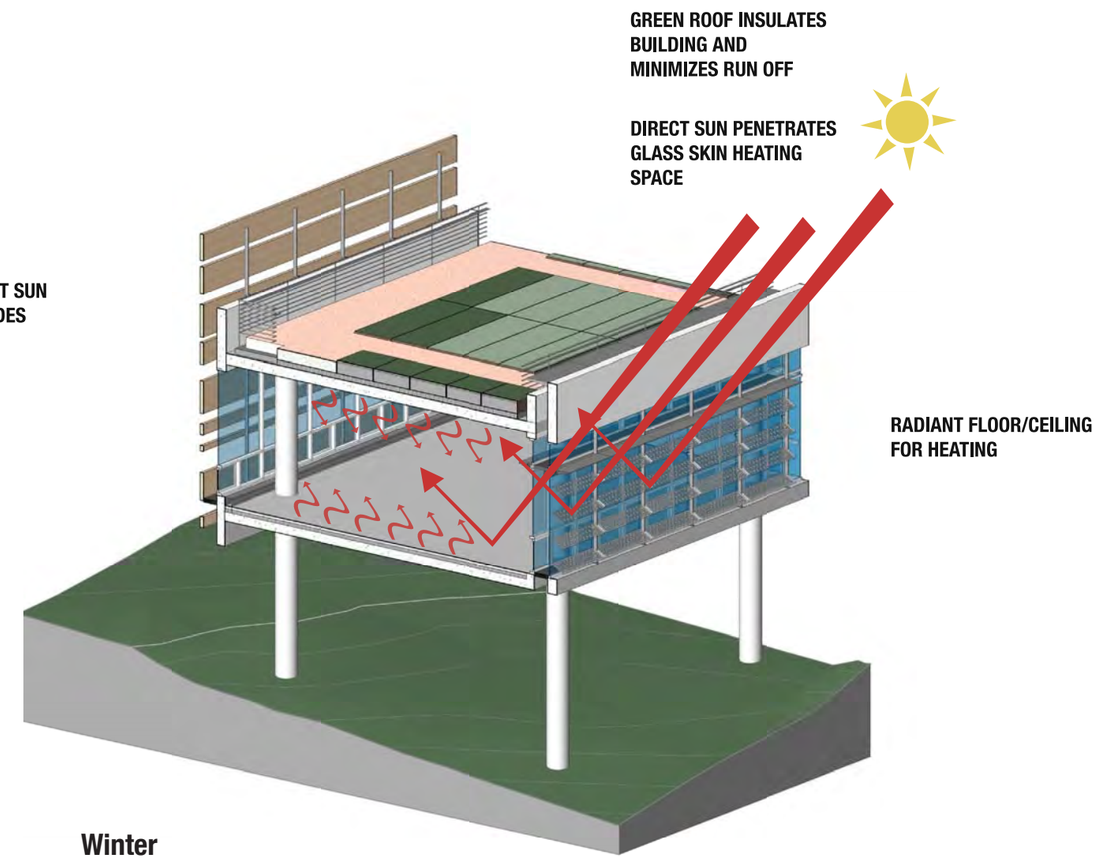
East/West Section

Key

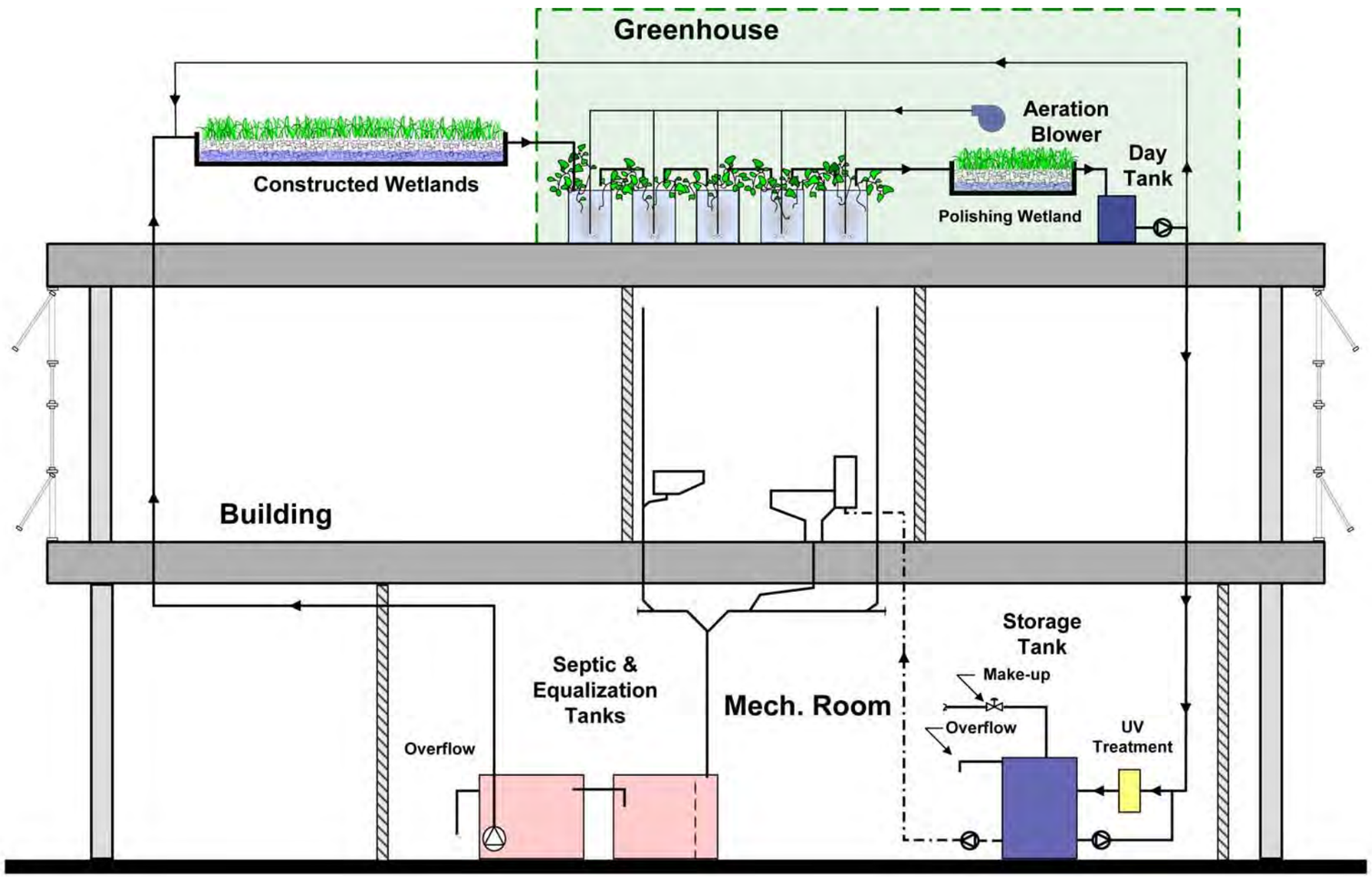
1. Reclaimed Wood Slat Assembly
2. Aluminum + Glass Glazing System
3. Restrooms
4. Multipurpose Room
5. Storage/Utility Area
6. Glass Enclosed Greenhouse + Waste Water Treatment Area
7. Green Roof /Nursery With Raised Walkpaths
8. Concrete Topping Slab With Radiant Heating System
9. Rooftop PV Array
10. Roof Rainwater Collection Area
11. Heat Chimney



Summer



Winter



Waste Water Treatment Concept

All on-site black and grey water produced by the building will be treated using a system of constructed wet lands, aerobic process tanks and polishing wet lands. Black and grey water waste will flow to a septic tank located below the building via gravity. A submersible pump in the septic tank will pump liquid waste up to the treatment system located on the roof and in the roof-mounted green house. Treatment water will flow by gravity to a basement holding and storage tank where it will be pumped up to the building to serve flush fixtures. Filtration and UV treatment will be provided at the holding tank.

On-Site Waste Water Treatment System Diagram

STUDIOS
architecture