



## **4M Harbour Island Ltd. Marina Back of House & Utility Corridor Impact Assessment Rev 1**



**Submitted to:**

Ministry of the Environment and Housing  
The Department of Environmental Planning and Protection  
Charlotte House, Charlotte & Shirley Streets  
Nassau, The Bahamas

**Submitted by:**

Caribbean Coastal Services Limited  
Lot 57, Airport Industrial Park  
Nassau, The Bahamas

**On Behalf of:**

4M Harbour Island Ltd.  
Harbour Island, The Bahamas

5 November 2020

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Document Title	Date Submitted
Back of House Impact Assessment Submitted to Department of Environmental Planning & Protection (DEPP)	October 2 <sup>nd</sup> , 2020
DEPP letter to Caribbean Coastal Services Ltd.	October 17 <sup>th</sup> , 2020
Back of House Impact Assessment Rev 1 Submitted to DEPP	November 5 <sup>th</sup> , 2020

**Caribbean Coastal Services Ltd.**

## Introduction

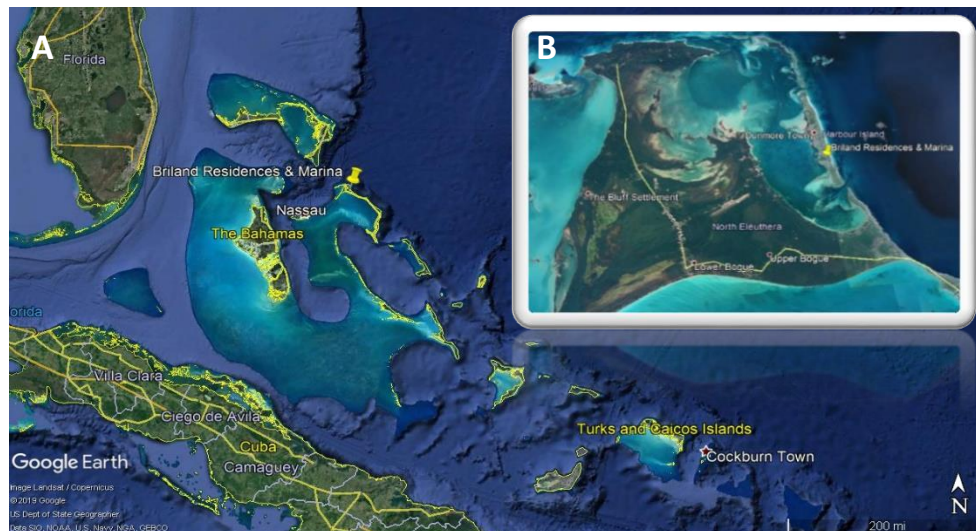
Caribbean Coastal Services Ltd. (CCS) was engaged by 4M Harbour Island Ltd. (4M) and 4M2 Harbour Island Ltd. (4M2) to produce an Impact Assessment for the Utility Corridor and Back of House for the 4M Harbour Island Ltd. Marina (hereinafter referred to as the “Project”). The Project is located south of the settlement Dunmore Town in Harbour Island, Bahamas.

An initial Environmental Impact Assessment (EIA) titled “Environmental Impact Assessment Harbour Island Marina and Resort Harbour Island, The Bahamas” and Environmental Management Plan was approved by the Bahamas Environment Sciences & Technology Commission (BEST) on December 11, 2017. Since receiving the environmental clearance, 4M2 secured additional acreage. The Utility Corridor and Back of House (BOH) area for the Marina will be constructed on 1.65 acres in this additional acreage secured by 4M2. Figure 1 shows project location on Harbour Island relative to other islands in The Bahamas and Figure 2 shows the Utility Corridor and Back of House Area on Harbour Island.

The scope of the current document includes a description of the Utility Corridor and BOH area for the approved 5.6 acre project described in the initial EIA and EMP, the associated impacts of its construction and operation, and the related proposed mitigation.

Note: The Department of Environmental Planning and Protection is the government agency that subsumed the BEST Commission in 2020. While the initial EIA was reviewed and approved by the BEST Commission, the current document will be submitted to DEPP for review and approval.

Figure 1. A. Project location relative to other islands in The Bahamas. B. Project location on Harbour Island.



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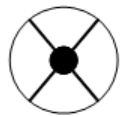
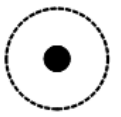
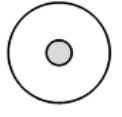


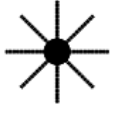
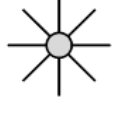

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**4M Harbour Island Ltd. Marina · BOH & Utility Corridor Impact Assessment · 5 November 2020**

Figure 2 Utility Corridor shown with red arrow connecting 5.61 acres to Back of House area. Trees to be removed are classified using the symbols shown in the Legend and are further identified in Appendix A.



**Legend**

- |   |                    |   |                      |  |                      |   |                           |
|---|--------------------|---|----------------------|--|----------------------|---|---------------------------|
|  | TREE TO BE REMOVED |  | TREE TO BE RELOCATED |  | TREE TO BE PRESERVED |  | Haunted House             |
|  | PALM TO BE REMOVED |  | PALM TO BE RELOCATED |  | PALM TO BE PRESERVED |  | Initial 5.6-acre boundary |

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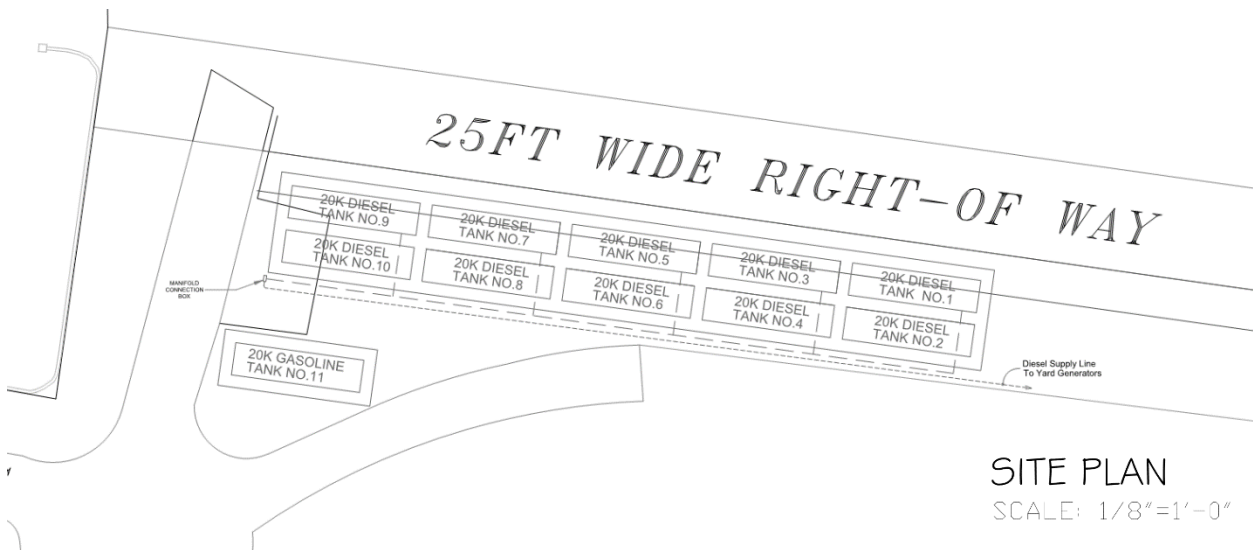


## Utility Corridor & Back of House Description

### Utility Corridor

The Utility Corridor will connect the Marina to the Back of House area as shown in Figure 2. It will be constructed within the northern property boundary. 50% of the paved 25 feet wide right of way road will be incorporated in the Utility Corridor and the remaining 50% will remain open during construction. Once construction of the Corridor is complete, the 25ft right of way road will be reestablished. The Utility Corridor will also include the former entrance of the Harbour Island Marina and the previously cleared land as shown in the habitat map. Potable water lines, sanitary, electrical and fuel lines will be installed in the Utility Corridor. The figure below shows the location of the fuel tanks within the Utility Corridor. Appendix B shows the Fuel Tank drawings.

Figure 3 Proposed Site Plan for Fuel Tanks located in Utility Corridor.



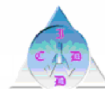
**4M HARBOUR ISLAND LTD.**  
**4M HARBOUR ISLAND 2 LTD TO SUPPORT MARINA**  
 PACKAGE: FOR PERMITTING HARBOUR ISLAND, THE BAHAMAS

DRAWING TITLE :  
SITE PLAN – FUEL TANKS

SCALE: AS SHOWN	CHECKED: CTI
DATE: NOVEMBER 3, 2020	DRAWN: CST
JOB NO.: 0000-20	APPROVED: CTI

**Island Dimensions & Development Company LTD.**

Consulting Civil, Structural & Environmental Engineers  
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Back of House (BOH)

The BOH area will include the wastewater treatment plant, standby generators, standby Reverse Osmosis plant and water storage tanks. It is located in the north east corner of the property near Queen’s Highway. Potable water will be provided via a combination of potable water supply from the Water and Sewerage Corporation and the onsite standby Reverse Osmosis (RO) Plants, a sanitary sewer system will be constructed on site to treat all wastewater produced by the development, “stormwater from roads and buildings will be collected in drainage swales, drainage wells and conveyed to dry stormwater retention areas throughout the site”<sup>1</sup>. Table 1 shows the demand for the property. Bahamas Power and Light (BPL) will provide electricity for the property and standby diesel generators will be installed to provide backup power supply to the site. The BOH Schematic and Civil Plans are shown in Appendix C.

Table 1. Water Consumption Table for the property.

**BRILAND RESIDENCES & MARINA  
WATER CONSUMPTION TABLE**

BUILDING TYPE	DESCRIPTION	# LOTS	PER CAPITA/LOT	CONSUMPTION	ADF (GPD)	PF (GPD)	DF (GPD)	DF (GPM)	DF (CFS)
A	2BDRM VILLA	4	4	100	1600	3200	6400	4.4444	0.0099
C	MULTI	4	16	100	6400	12800	25600	17.7778	0.0396
D3	BACK HOUSE				4500	9000	18000	12.5000	0.0278
J	RESTAURANT	1	128	24	3072	6144	12288	8.5333	0.0190
K	RETAIL SHOP	1			300	600	1200	0.8333	0.0019
L	LIGHTHOUSE	1			500	1000	2000	1.3889	0.0031
M	HAUNTED HOUSE	1	150	24	3600	7200	14400	10.0000	0.0223
	LAUNDRY	1			2800	5600	11200	7.7778	0.0173
	RO/WWTP	1			1000	2000	4000	2.7778	0.0062
MARINA		1			10000	20000	40000	27.7778	0.0619
					65022	130044	260088	180.6167	0.4023

ROUNDED TOTAL			300000	20.8333	0.0464
5 DAY STORAGE			150000	104.1667	0.2320
WWTP			65000	34.7222	0.0773
FUTURE UPGRADE			25000	17.3611	0.0387
			225000	156.2500	0.3480

<sup>1</sup> October 2017 “Environmental Impact Assessment Harbour Island Marina and Resort” prepared by Coastal Systems International Inc. in association with Innovative Solutions Group.

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## Impact Assessment

### Methodology

First, the area identified by 4M and 4M2 as the Utility Corridor and BOH was overlaid on a Google Earth imagery. Then the habitat identified by Mark Daniels, CCS Botanist, and the Queen's Highway road were included in the Google Earth imagery to determine the size of the Area of Impact for the Utility Corridor and BOH construction. Mr. Daniels identified protected species on site in January 2020. These include the Lignum Vitae and the Narrow Leaved Bolly. Invasive species identified during that site visit include the Casuarina and Snake Plant.

The Utility Corridor and BOH area will impact 1.65 acres of land as shown in the habitat map. Trees that will be impacted were tagged and numbered by the Landscape Architect, Mr. Tyler Nielson, and are shown in Appendix A. Much of the Utility Corridor will be constructed on 0.46 acres of previously cleared land. The figure below shows this area. The total amount of Interior Broadleaf Coppice impacted by the Utility Corridor and BOH will be 1.19 acres. Appendix A includes the list of plants identified by Mr. Nielson and Mr. Franklin Hall. Curriculum Vitae for both consultants are included in Appendix D. The habitat map and supporting photos for the Area of Impact are shown on the following pages.

*Figure 4 Previously cleared land and narrow strip of Interior Broadleaf Coppice to be incorporated in the Utility Corridor.*



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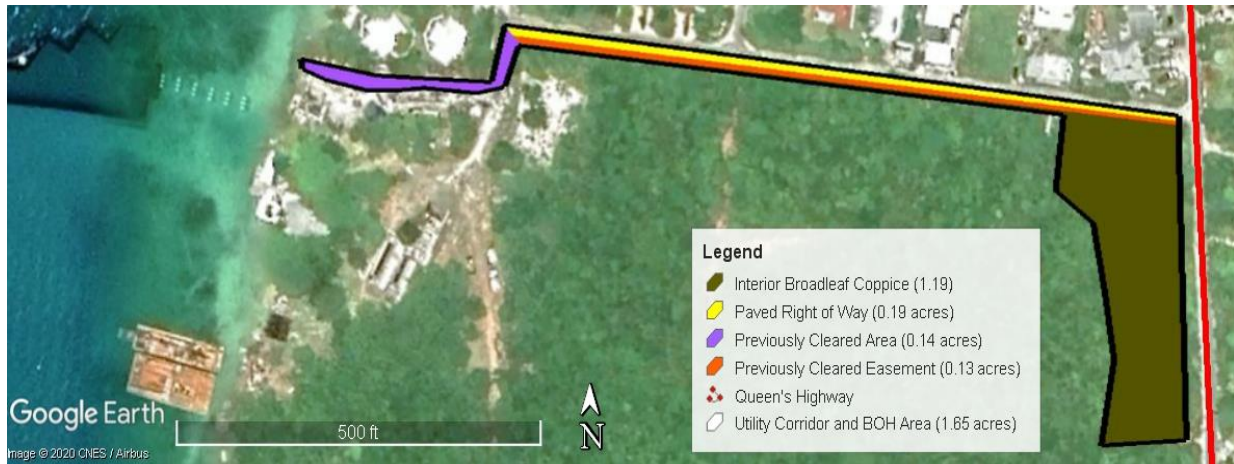
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## Habitat Map

Figure 5. Habitat Map showing Utility Corridor and BOH outlined in black (Google Earth, 2020).



## Photos

Figure 6A & B BOH area view from Queen's Highway.



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Figure 7A & B. BOH area view from inside Interior Broadleaf Coppice.



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*Figure 8A, B, C & D. Species found in the proposed Utility Corridor area.*



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*Figure 9A & B. Views of the 25ft wide right of way pathway and previously cleared easement.*



*Figure 10A & B. Entrance to former Harbour Island Marina. The path shown in A is now quarry trail, shown in the Habitat Map in purple.*



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Figure 11. Debris observed in the Utility Corridor area (A) and the BOH area (B).



## Plant Species

Plants identified by Mark Daniels are listed in the table below.

Table 2 Plant species identified by Mark Daniels in January 2020.

No.	Common Name	Scientific Name
1	Stopper	<i>Eugenia axillaris</i>
2	Mastic	<i>Sideroxylon foetidissimum</i>
3	Sapodilly	<i>Manilkara zapota</i>
4	n/a	<i>Coccoloba sp.</i>
5	Moses in the basket	<i>Tradescantia spathacea</i>
6	Ram's Horn	<i>Pithecellobium keyense</i>
7	Jamaican dogwood	<i>Piscidia piscipula</i>
8	Wireweed	<i>Sida acuta</i>
9	Pigeon Plum	<i>Coccoloba diversifolia</i>
10	Butter Bough	<i>Exothea paniculata</i>
11	Morning glory	<i>Ipomoea purpurea</i>
12	Stopper	<i>Eugenia foetida</i>
13	Bamboo Grass	<i>Lasiacis divaricata</i>
14	Boxwood	<i>Randia aculeata</i>
15	Shepherd's Needle	<i>Bidens alba</i>
16	Pencil Flower	<i>Stylosanthes hamada</i>
17	Papaya	<i>Carica papaya</i>
18	Wooly Booger	<i>Corchorus hirsutus</i>
19	Florida Boxwood	<i>Schaefferia frutescens</i>
20	Wild Coffee	<i>Psychotria nervosa</i>
21	Razor Vine	<i>Smilax havanensis</i>
22	n/a	<i>Ateleia popenoei</i>
23	Wild Tobacco	<i>Solanum erianthum</i>
24	Sweet coastal Indian mallow	<i>Abutilon permolle</i>
25	Tamarind	<i>Tamarindus indica</i>

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26	Narrow Leaved Blolly	<i>Guapira discolor</i> (protected)
27	Strongback	<i>Borreria succulenta</i>
28	Wild tantan	<i>Desmanthus virgatus</i>
29	Yellow elder	<i>Tecoma stans</i>
30	Darling Plum	<i>Reynosia septentrionalis</i>
31	Broad Leaf Blolly	<i>Guapira obtusata</i>
32	Candlewood	<i>Phialanthus myrtilloides</i>
33	Cinnecord	<i>Vachelia choriophylla</i>
34	Poison wood	<i>Metopium toxiferum</i>
35	Snowberry	<i>Chiococca alba</i>
36	Lignum Vitae	<i>Guaiacum sanctum</i>

### Avian Survey

An Avian Survey was conducted on September 30 through October 1 2020 by Dr. Ancilleno Davis. The following text and list of species is taken from by Dr. Davis’s Avian Survey report.

“Conservation status is based on the International Union for the Conservation of Nature (IUCN) classifications and specific regulations of the species in the Laws of the Bahamas. IUCN classifications include: species of Least Concern (LC) for whom no conservation intervention or management is required and the species is not expected to decline or be lost in the foreseeable future; Near Threatened (NT) species whose populations may decline drastically without significant protection or constant management; Vulnerable (VU) species are likely to become endangered if the risks facing the species in the wild are not addressed; Unassessed (UA) species have not received a formal evaluation from the IUCN and are generally not considered species of conservation concern. In addition to the IUCN categories, Species that are specified in the Wild Birds Protection Act Chapter 249 of the Statute Laws of the Bahamas are designated as Managed (MA).”

Table 3 Avian species identified on site. PRB=Permanent Resident Breeding, WR=Winter Resident, SRB=Summer Resident Breeding, E= Endemic, LC= Least Concern, NT=Near Threatened, MA =Managed (Regulated in The Bahamas)

No.	Common Name	Scientific Name	Range	Status
1	American Kestrel	<i>Falco sparverius</i>	PRB	LC
2	American Redstart	<i>Setophaga ruticilla</i>	WR	LC
3	Bahama Woodstar	<i>Nesophlox evelynae</i>	PRB E	LC
4	Bananaquit	<i>Coereba flaveola</i>	PRB	LC
5	Black Whiskered Vireo	<i>Vireo altiloquus</i>	SRB	LC
6	Brown Pelican	<i>Pelicanus occidentalis</i>	PR	LC
7	Cape May Warbler	<i>Setophaga tigrina</i>	WR	LC
8	Common Ground-dove	<i>Columbina passerine</i>	PRB	LC
9	Gray Kingbird	<i>Tyrannus dominicensis</i>	SRB	LC
10	Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	PRB	LC

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11	Hairy Woodpecker	<i>Dryobates villosus</i>	PRB	LC
12	Laughing Gull	<i>Leucophaeus atricilla</i>	PRB	LC
13	Mangrove Cuckoo	<i>Coccyzus minor</i>	PRB	LC
14	Northern Mockingbird	<i>Mimus polyglottos</i>	PRB	LC
15	Northern Parula	<i>Setophaga americana</i>	WR	LC
16	Pine Warbler	<i>Setophaga pinus</i>	WR	LC
17	Prairie Warbler	<i>Setophaga discolor</i>	WR	LC
18	Spotted Sandpiper	<i>Actitis macularius</i>	WR	LC
19	Thick-billed Vireo	<i>Vireo crassirostris</i>	PRB-E	LC
20	Western Spindalis	<i>Spindalis zena</i>	PRB-E	LC
21	White-crowned Pigeon	<i>Patagioenas leucocephala</i>	PRB	NT MA
22	<b>Yellow-throated Warbler</b>	<b><i>Setophaga dominica</i></b>	<b>WR</b>	<b>LC</b>

Figure 12 Common Ground Dove



## Fire and Hurricane Risk

The nature of fuel storage and transport is an inherent fire risk. With this in mind, the developer will follow industry standards during the installation of the fuel lines in the Utility Corridor. The fuel lines will be located underground and removed from populated areas which will reduce the fire risk. Additionally, fire wells will be constructed in the BOH area and a mobile fire pump will

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be available on site to further help reduce the risk of fire. The fuel storage area is shown in Figure 3.

Harbour Island is exposed to hurricanes annually. To mitigate against the hurricanes in the BOH infrastructure will use hurricane proof material in buildings. The Hurricane Preparedness Plan described in the EMP titled, “Environmental Management Plan (Fifth Submittal) Briland Residences and Marina (Formally Known as Harbour Island Marina) Harbour Island, The Bahamas” will also apply to the BOH and Utility Corridor.

## Proposed Mitigation

A summary of impacts and proposed mitigation is discussed in the table below. Tree mitigation related to land clearing of the Utility Corridor and BOH is described in Appendix A.

Table 4. Potential Impacts and Proposed Mitigation.

Impacting Factor	Potential Impact	Proposed Mitigation
<b>Excavation</b>	Habitat Loss	As the BOH and Utility Corridor is developed, species currently using the areas will still have access to adjacent property south of the BOH and Utility Corridor. Through landscaping in the BOH area 5% of the vegetation will be replaced in the BOH area. Material generated from excavation will be retained for use in the construction of the site. Organic material generated from the excavation activities will be separated and incorporated in landscaping of the site.
	Increased Turbidity	Sediment controls will help avoid increased turbidity in Dunmore Harbour and the adjacent areas during development of the utility corridor near the Harbour. Stockpiles will not be located near Dunmore Harbour to prevent runoff into the Harbour.
	Decreased Air Quality	The site will be watered as needed to prevent increased dust in the air during excavation and trenching.
<b>Land Clearing</b>	Habitat Fragmentation	Natural habitat for the native fauna will be incorporated in the development of the full property through landscaping to help reduce habitat loss and habitat fragmentation.

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	Protected Tree Removal	To mitigate the removal and relocation of protected trees, 94 trees will be incorporated in the site landscaping.
	Increased Ambient Sound	This impact is temporary and will be mitigated by informing neighbors of the ongoing construction and avoiding construction during in the early morning and evenings.
	Debris Removal	Removing debris from the site is a benefit for the site and the community. Debris may harbor nuisance species and pose a potential human and wildlife health risk.
<b>Infrastructure Installation</b>	Increased Traffic	Heavy equipment and materials will not be transported to site via the main government dock to help reduce the impact on the island's transportation. A barge will transport material to the site via Dunmore Harbour on the southwest coast of the property, shown in the figure below.
	<i>Habitat Fragmentation Increased Ambient Sound</i>	<i>See Proposed Mitigation described for Habitat Fragmentation and Increased Ambient Sound related to Land Clearing.</i>
	Decreased Air Quality	Dust Suppression will be conducted as needed throughout construction by watering the site. To prevent dust plumes vehicles on site will not speed on the construction site and fill / aggregate will be transferred slowly to stockpiles from trucks. Note the project is not a new importer of fill. Pipe bedding material will be imported and specifications will be based on the Ministry of Works guidelines.
	Change in Land Use	The 25 feet wide right of way road and the previously cleared easement is currently used by residents near the site. To mitigate against the temporary loss of this space, half of this area will remain accessible for the residents in proximity to the site during construction. Once construction is complete, the right of way road will be reestablished and remain accessible.

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Figure 13 Barge access area is southwest of the Utility Corridor and BOH area in Dunmore Harbour (Google Earth, 2020)



## Environmental Management

The approved EMP for the original acreage titled, “Environmental Management Plan (Fifth Submittal) Briland Residences and Marina (Formally Known as Harbour Island Marina) Harbour Island, The Bahamas” will also apply to the BOH and Utility Corridor as it relates to Petroleum and Fuel Spill Recovery, Solid Waste, Wastewater, Excavation, Emergency Response, Handling of Fuel and Hazardous Substances. The EMP is included as Appendix E. The Landscape Architect (LA) prepared Tree Protection Notes, Relocation and Pruning Specifications that will be used to guide the mitigation of habitat loss and removal of protected trees. The information below was prepared by Mr. Tyler Nielson, LA.

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## CONTRACTOR QUALIFICATIONS

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1. CONTRACTOR MUST BE A LICENSED LANDSCAPE CONTRACTOR.
2. CONTRACTOR MUST HAVE A MINIMUM OF 10 YEARS OF PROVEN EXPERIENCE RELOCATING LARGE SPECIMEN TREES AND PALMS
3. CONTRACTOR MUST HAVE PROVEN EXPERIENCE RELOCATING TREES AND PALMS OF THE SAME SPECIES AND SIZE AS THOSE TO BE RELOCATED FOR THE CURRENT PROJECT.
4. CONTRACTOR MUST HAVE A CERTIFIED ARBORIST ON STAFF

## CONTRACTOR REQUIREMENTS

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1. CONTRACTOR MUST VISIT THE JOBSITE AND INSPECT ALL TREES AND PALMS TO BE RELOCATED AS WELL AS EXISTING SITE CONDITIONS AND RESTRICTIONS PRIOR TO PREPARING BID.
2. CONTRACTOR MUST VERIFY AND ENSURE THAT ALL TREES AND PALMS IDENTIFIED ON THE PLANS AND THOSE TAGGED ON THE JOBSITE CORRESPOND AS TO NUMBER AND DESCRIPTION. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT IMMEDIATELY, PRIOR TO PREPARING BID.
3. CONTRACTOR MUST CONDUCT ALL WORK ASSOCIATED WITH RELOCATION AND MAINTENANCE OF TREES AND PALMS TO BE RELOCATED. NO WORK IS TO BE SUBCONTRACTED WITHOUT PRIOR WRITTEN CONSENT OF THE OWNER AND/OR LANDSCAPE ARCHITECT.
4. CONTRACTOR MUST DESIGNATE A COMPETENT, ENGLISH-SPEAKING SUPERVISOR OR FOREMAN OVERSEE AND DIRECT ALL RELOCATION AND MAINTENANCE ACTIVITIES AS OUTLINED IN THESE SPECIFICATIONS.
5. CONTRACTOR MUST SCHEDULE ROOT PRUNING TO PROVIDE THE MAXIMUM POSSIBLE TIME FOR NEW ROOT GROWTH. EVEN TREES AND PALMS THAT TYPICALLY DO NOT REQUIRE LONG (OR ANY) ROOT PRUNING WILL BENEFIT FROM MORE ROOT PRUNING TIME; THEREFORE, ALL TREES AND PALMS TO BE RELOCATED MUST BE ROOT PRUNED. CONTRACTOR MUST PROVIDE A ROOT PRUNE SCHEDULE FOR EACH TREE OR PALM TO BE RELOCATED AS AN ATTACHMENT TO THE BID.
6. CONTRACTOR MUST VERIFY WITH THE GENERAL CONTRACTOR THE ABSENCE OF ANY UNDERGROUND CONSTRUCTION OR OBSTRUCTIONS (E.G., BULKHEADS, SEPTIC SYSTEMS, ETC.) IN THE CURRENT AND FUTURE LOCATIONS OF ALL TREES AND PALMS TO BE RELOCATED.

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7. CONTRACTOR MUST ALERT THE LANDSCAPE ARCHITECT OF ANY TREES OR PALMS THAT WILL NOT SUCCESSFULLY RELOCATE DUE TO POOR HEALTH PRIOR TO BEGINNING ROOT PRUNING.
8. CONTRACTOR MUST FLAG ALL PROPOSED TRANSPLANT LOCATION FOR THE LANDSCAPE ARCHITECT'S APPROVAL A MINIMUM OF 15 DAYS PRIOR TO RELOCATION.
9. CONTRACTOR MUST ENSURE THAT ALL TREES AND PALMS TO BE RELOCATED ARE INSTALLED AT THE CORRECT GRADE OR ELEVATION, ACCORDING TO THE GRADING PLAN.
10. CONTRACTOR MUST BE ENSURE THAT ALL ROOT FLARES ARE EXPOSED AFTER RELOCATION.
11. CONTRACTOR MUST REMOVE ALL RESIDUAL ROOTS, STUMPS, AND PORTIONS THEREOF AND BACKFILL PITS FROM WHICH RELOCATED TREES AND PALMS WERE REMOVED WITH CLEAN FILL FLUSH WITH THE SURROUNDING GRADE.
12. CONTRACTOR MUST BE REPAIR ANY DAMAGE TO OTHER PLANTS, LAWN, HARDSCAPES, OR NEW CONSTRUCTION WITHIN THE RELOCATION AREA AT CONTRACTOR'S EXPENSE. HARDSCAPES INCLUDE BUT ARE NOT LIMITED TO CURBS, WALKS, ROADS, FENCES, SITE FURNISHINGS, ETC.
13. CONTRACTOR MUST PHOTOGRAPHICALLY DOCUMENT NEW ROOT GROWTH FOLLOWING EACH ROOT PRUNE AND SUBMIT THIS DOCUMENTATION TO THE LANDSCAPE ARCHITECT. THE PURPOSE OF THIS REQUIREMENT IS TO ENSURE THAT SUFFICIENT ROOT GROWTH HAS OCCURRED PRIOR TO THE SECOND AND SUBSEQUENT ROOT PRUNES AND FOLLOWING THE FINAL ROOT PRUNE PRIOR TO RELOCATION.
14. CONTRACTOR MUST INSTALL AND MAINTAIN PROTECTION FENCING AROUND EACH TREE AND PALM TO BE RELOCATED BOTH DURING ROOT PRUNING AND AFTER RELOCATION. PROTECTION FENCING MUST CONSIST OF GALVANIZED WELDED WIRE FABRIC OR PLASTIC MESH ATTACHED TO 4" X 4" POSTS INSERTED AROUND THE PERIMETER OF THE DRIPLINE OF THE TREE OR PALM. PROTECTION FENCING MUST BE PLUMB, TAUT, AND STURDY AT ALL TIMES AND MUST REMAIN IN PLACE THROUGHOUT THE ROOT PRUNING AND WARRANTY PERIODS, OR AS DIRECTED BY THE LANDSCAPE ARCHITECT.
15. CONTRACTOR MUST OBTAIN ALL NECESSARY OR REQUIRED PERMITS FOR THE RELOCATION AND TRANSPORTATION OF THE TREES AND PALMS TO BE RELOCATED.
16. CONTRACTOR MUST GUARANTEE ALL RELOCATED TREES AND PALMS FOR ONE YEAR FROM THE DATE OF RELOCATION TO THE FINAL LOCATION. GUARANTEE MUST INCLUDE TREE HEALTH AND SETTLING.
17. CONTRACTOR MUST PROVIDE ALL MATERIAL NECESSARY TO PERFORM THE WORK COVERED HEREIN, INCLUDING BUT NOT LIMITED TO BACKFILL MATERIAL, PROTECTION FENCING, FLAGGING, ADDITIVES AND SUPPLEMENTS, TEMPORARY IRRIGATION, BURLAP, WIRE, SHRINK WRAP, AND ALL NECESSARY TOOLS AND EQUIPMENT.

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## TREE ROOT PRUNING SPECIFICATIONS

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1. ALL TREES AND PALMS TO BE RELOCATED MUST BE WATERED DAILY FOR AT LEAST 2-3 DAYS PRIOR TO ANY ROOTS BEING CUT TO ENSURE THAT THEY ARE FULLY HYDRATED. EACH WATERING MUST THOROUGHLY SATURATE THE ROOTBALL TO ITS FULL DEPTH.
2. EACH TREE AND PALMS MUST THEN BE WATERED EVERY OTHER DAY, NOT RELYING ON RAIN, DURING THE ENTIRE ROOT PRUNING PROCESS EITHER BY A TEMPORARY IRRIGATION SYSTEM OR BY HAND. EACH WATERING MUST THOROUGHLY SATURATE THE ROOTBALL TO ITS FULL DEPTH.
3. TREE AND PALM RELOCATION ACTIVITIES MUST BE SCHEDULED SO THAT REMOVAL AND REPLANTING TAKE PLACE IN THE SAME 24-HOUR PERIOD. NO TREES OR PALMS MAY BE "STOCKPILED" ONSITE OR OFFSITE FOR ANY PERIOD OF TIME WITHOUT PRIOR WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT. WHEN ALLOWED, APPROVAL FOR THE METHOD OF "STOCKPILING" MUST BE OBTAINED FROM THE LANDSCAPE ARCHITECT.
4. ALL DIGGING IN THE ROOT ZONE DURING THE ROOT PRUNE PROCESS MUST BE DONE BY HAND; NO MACHINERY WILL BE ALLOWED. PRUNING OF ROOTS MUST BE DONE BY HAND WITH CLEAN, SHARP TOOLS. DO NOT PAINT CUT ROOTS WITH TREE PAINT OR ANY KIND OF SEALANT.
5. MYCORRHIZA (ROOTS® TRANSPLANT OR EQUIVALENT) MUST BE INCORPORATED INTO THE BACKFILL SOIL PRIOR TO BACKFILLING AS PER MANUFACTURER'S RECOMMENDATIONS.
6. AFTER EACH ROOT PRUNE, EACH SECTION OF ROOTBALL THAT IS PRUNED MUST BE WRAPPED WITH BLACK PLASTIC AND THE TRENCH BACKFILLED WITH ORIGINAL EXCAVATED SOIL. A TREE RING WITH A MINIMUM HEIGHT OF 6" MUST BE CONSTRUCTED 6-12" OUTSIDE THE OUTERMOST EDGE OF THE ROOTBALL AND AROUND THE ENTIRE PERIMETER OF THE ROOTBALL TO DIRECT IRRIGATION WATER AND ANY ADDED SUPPLEMENTS DOWN INTO THE ROOTBALL DURING ROOT REGENERATION.
7. ONCE THE TREE RING IS CONSTRUCTED AFTER EACH ROOT PRUNE, A HIGH-PHOSPHORUS ROOT STIMULANT MUST BE LIBERALLY APPLIED TO THE SURFACE OF THE ROOTBALL AND THOROUGHLY WATERED IN TO ENCOURAGE NEW ROOT GROWTH.
8. PRIOR TO ANY ROOTS BEING CUT, ALL MAJOR ROOTS MUST BE IDENTIFIED TO DETERMINE THE ROOTBALL DIAMETER BASED ON THE RELATIVE LOCATION AND SIZE OF THE ROOTS.
9. MANY TREE RELOCATION SPECIFICATIONS USE "GENERAL RULES" TO CALCULATE MINIMUM ROOTBALL DIAMETER, SUCH AS MULTIPLYING THE DIAMETER AT BREAST HEIGHT (DBH) OF THE TREE BY A FACTOR OF 10 OR ALLOWING A MINIMUM OF 9"-12" OF ROOTBALL FOR EVERY 1" OF TREE CALIPER. OTHERS LIST UNREALISTIC MINIMUM SIZES FOR THE ROOTBALLS OF VARIOUS TREE CALIPERS OR OTHERS LIST UNREALISTIC MINIMUM SIZES FOR THE ROOTBALLS OF VARIOUS TREE CALIPERS OR HEIGHTS. IN MANY CASES, SUCH APPROACHES RESULT IN ROOTBALLS THAT ARE EITHER TOO LARGE OR TOO SMALL FOR A GIVEN TREE. THE FOLLOWING TABLE LIST MINIMUM ROOTBALL DIAMETERS BASED ON REAL-WORLD EXPERIENCE OF TREE RELOCATION SPECIALISTS

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<u>CALIPER</u> <u>(inches)</u>	<u>MIN. ROOTBALL</u> <u>DIA. (feet)</u>	<u>CALIPER</u> <u>(inches)</u>	<u>MIN. ROOTBALL</u> <u>DIA. (feet)</u>
1-4	3	12-14	8
4-5	4	15-17	10
6-7	5	18-24	12-15
8-9	6	25-30	15-25
10-11	7	30+	as needed

1. WHENEVER POSSIBLE, ROOTBALLS MUST BE CIRCULAR IN SHAPE WITH AN EQUAL DISTANCE FROM THE TRUNK TO THE EDGE OF ROOTBALL ALL AROUND.
2. MINIMUM ROOTBALL DEPTH MUST BE 24"-36" FOR ALL TREES TO BE RELOCATED, WITH THE ACTUAL DEPTH TO BE DETERMINED ONLY AFTER A THOROUGH EXAMINATION OF ALL ROOTS DURING THE INITIAL ROOT INSPECTION AND BASED ON THE ABSENCE OF MAJOR ROOTS AT THE BOTTOM OF THE ROOTBALL. ROOTBALLS DEEPER THAN 36" MAY BE REQUIRED FOR LARGE SPECIMEN TREES, DEPENDING ON THE RELATIVE LOCATIONS AND DEPTHS OF THE MAJOR ROOTS AS OBSERVED DURING THE INITIAL ROOT INSPECTION.
3. AS A GENERAL RULE, MINIMUM ROOT PRUNE TIME FOR TREES WITH A DBH OF LESS THAN 10" IS 12 WEEKS. THE FIRST ROOT PRUNE MUST BE ON TWO OPPOSING SIDES OF THE ROOTBALL, WITH THE SECOND ROOT PRUNE ON ONE OF THE OTHER TWO SIDES DONE A MINIMUM OF 6 WEEKS LATER, AND A THIRD ROOT PRUNE ON THE LAST SIDE DONE A MINIMUM OF 3 WEEKS AFTER THAT. THE SECOND AND THIRD ROOT PRUNES MAY ONLY BE DONE WHEN HEALTHY NEW ROOT GROWTH FROM EARLIER ROOT PRUNES IS EVIDENT (SEE SECTION 2.14 ABOVE FOR SPECIFICATIONS ON PHOTOGRAPHICALLY DOCUMENTING NEW ROOT GROWTH DURING THE ROOT PRUNE PROCESS). MORE TIME MAY BE NEEDED DURING THE COOLER MONTHS OF THE YEAR.
4. AS A GENERAL RULE, MINIMUM ROOT PRUNE TIME FOR TREES WITH A DBH OF 10" OR GREATER IS 24 WEEKS, THE FIRST ROOT PRUNE MUST BE ON TWO OPPOSING SIDES OF THE ROOTBALL, WITH THE SECOND ROOT PRUNE ON ONE OF THE OTHER TWO SIDES DONE A MINIMUM OF 12 WEEKS LATER, AND A THIRD ROOT PRUNE ON THE LAST SIDE DONE A MINIMUM OF 6 WEEKS AFTER THAT. THE SECOND AND THIRD ROOT PRUNES MAY ONLY BE DONE WHEN HEALTHY NEW ROOT GROWTH FROM EARLIER ROOT PRUNES IS EVIDENT (SEE SECTION 2.14 ABOVE FOR SPECIFICATIONS ON PHOTOGRAPHICALLY DOCUMENTING NEW ROOT GROWTH DURING THE ROOT PRUNE PROCESS). MORE TIME MAY BE NEEDED DURING THE COOLER MONTHS OF THE YEAR.
5. CERTAIN HARDWOOD TREES AND GYMNOSPERMS REQUIRE LONGER ROOT PRUNING TIMES. THESE INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
  - AVOCADO (PERSEA AMERICANA)
  - BLACK OLIVE (BUCIDA BUCERAS)
  - BRIDALVEIL (CAESALPINIA GRANADILLO)
  - CASSIAS (ALL SPECIES OF CASSIA)
  - LIGNUM VITAE (GUA/ACUM SANCTUM & G. OFFICINALE)
  - MAHOGANY (SWIETENIA MAHAGONI)
  - MANGO (MANGIFERA INDICA)

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## PALM ROOT PRUNING SPECIFICATIONS

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1. THE FOLLOWING TABLE LISTS MINIMUM ROOTBALL DIAMETERS FOR VARIOUS SPECIES OF PALMS BASED ON REAL-WORLD EXPERIENCE OF RELOCATION SPECIALISTS IN SOUTH FLORIDA.

<u>PALM SPECIES</u>	<u>ROOTBALL SPECIFICATIONS</u>
SABAL/CABBAGE PALM	36" diameter
QUEEN & FOXTAIL PALMS	12" from trunk in all directions
ROYAL & COCONUT PALMS	18-24" from trunk in all directions
CANARY DATE PALM	24" from trunk in all directions
SLOW-GROWING PALMS	24" from trunk in all directions

2. PALM ROOTBALL MUST BE A MINIMUM OF 24" DEEP, WHENEVER POSSIBLE, ROOTBALLS MUST BE CIRCULAR IN SHAPE WITH AN EQUAL DISTANCE FROM THE TRUNK TO THE EDGE OF THE ROOTBALL ALL AROUND.
3. AS A GENERAL RULE, MINIMUM ROOT PRUNE TIME FOR PALMS IS 6-8 WEEKS. THE FIRST ROOT PRUNE MUST BE ON TWO OPPOSING SIDES OF THE ROOTBALL, WITH THE SECOND ROOT PRUNE ON ONE OF THE OTHER TWO SIDES DONE A MINIMUM OF 3-4 WEEKS LATER, AND A THIRD ROOT PRUNE ON THE LAST SIDE DONE A MINIMUM OF 4.5-6 WEEKS AFTER THAT. THE SECOND AND THIRD ROOT PRUNES MAY ONLY BE DONE WHEN HEALTHY NEW ROOT GROWTH FROM EARLIER ROOT PRUNES IS EVIDENT (SEE SECTION 2.14 ABOVE FOR SPECIFICATIONS ON PHOTOGRAPHICALLY DOCUMENTING NEW ROOT GROWTH DURING THE ROOT PRUNE PROCESS). MORE TIME MAY BE NEEDED DURING THE COOLER MONTHS OF THE YEAR.
4. CERTAIN PALMS, IN PARTICULAR THOSE THAT ARE SLOW GROWING, REQUIRE LONGER ROOT PRUNING TIME. THESE INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING.
  - ALL SPECIES OF ARCHONTOPHOENIX
  - ALL SPECIES OF CORYPHA
  - AMERICAN OIL PALMS (ALL SPECIES OF ATTALEA)
  - BISMARCK PALM (BISMARCKIA NOBILIS)
  - CUBAN & CARIBBEAN COPERNICIA
  - CUBAN BELLY PALM (GASTROCOCOS CRISPA)
  - GINGERBREAD/DOUM PALMS (ALL SPECIES OF HYPHAENE)
  - PALMYRA PALMS (ALL SPECIES OF BORASSUS)
  - SATAKE PALM (SATAKENTIA LIUKIUENSIS)
  - SAW PALMETTO (SERENOA REPENS)
  - SILVER PALM (COCCOTHRINAX ARGENTATA)
  - ZOMBIE PALM (ZOMBIA ANTILLARUM)

FOR THESE PALMS, THE MINIMUM ROOT PRUNING TIME IS 4-6 MONTHS OR GREATER. ONLY WHEN SUFFICIENT NEW ROOT GROWTH HAS TAKEN PLACE FOLLOWING AN EARLIER ROOT PRUNE CAN THE NEXT ROOT PRUNE BE DONE, AND ONLY WHEN SUFFICIENT NEW ROOT GROWTH HAS TAKEN PLACE FOLLOWING THE FINAL ROOT PRUNE MAY THE TREE BE RELOCATED (SEE SECTION 2.14 ABOVE FOR SPECIFICATIONS ON PHOTOGRAPHICALLY DOCUMENTING NEW ROOT GROWTH DURING THE ROOT PRUNE PROCESS).

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## TREE CANOPY PRUNING SPECIFICATIONS

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1. PRIOR TO RELOCATION, THE CANOPY OF EACH TREE TO BE RELOCATED MUST BE SELECTIVELY PRUNED TO REMOVE CROSSING DEAD, DISEASED, BROKEN, AND LOW HANGING BRANCHES THAT MAY INTERFERE WITH CONSTRUCTION ACTIVITIES, OR THAT MAY INTERFERE OR RESTRICT STRAPPING OR LIFTING THE TREE DURING RELOCATION.
2. FOR TREES BEING RELOCATED ONSITE, THE CANOPY MAY BE SELECTIVELY THINNED AND REDUCED BY NO MORE THAN 1/3 OF THE OVERALL CANOPY MASS, AT THE DIRECTION OF THE LANDSCAPE ARCHITECT; HOWEVER, THE BASIC SHAPE, FORM, AND CHARACTER OF THE TREES MUST BE PRESERVED.
3. FOR TREES BEING RELOCATED OFFSITE, THE CANOPY MUST BE PRUNED, AT THE DIRECTIONS OF THE LANDSCAPE ARCHITECT, TO FIT ON THE TRAILER FOR TRANSPORT. EVERY EFFORT MUST BE MADE TO RETAIN AS MANY BRANCHES AS POSSIBLE. TO THE WIDEST LOAD WIDTH ALLOWABLE BY THE FLORIDA DEPARTMENT OF TRANSPORTATION. CONTRACTOR MUST OBTAIN ALL NECESSARY PERMITS AND ESCORTS TO TRANSPORT WIDE LOADS, PER FLORIDA LAW.
4. ALL CANOPY PRUNING MUST BE CONDUCTED FOLLOWING ANSI A-300 TREE PRUNING STANDARDS AND BEST MANAGEMENT PRACTICES.
5. ALL DEBRIS GENERATED DURING CANOPY PRUNING MUST BE REMOVED OFFSITE AND DISPOSED.

## PALM CANOPY PRUNING SPECIFICATIONS

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1. IT IS WELL KNOWN THAT SOME PALMS SURVIVE RELOCATION BETTER WHEN ALL OF THE LEAVES ARE REMOVED (E.G., CABBAGE PALM, SABAL PALMETTO), AND THAT OTHER PALMS BENEFIT FROM HAVING THEIR LEAVES CUT IN HALF DURING RELOCATION (E.G., COCONUT PALM, COCOS NUCIFERA). BOTH OF THESE HORTICULTURAL PRACTICES, WHILE TRUE, ARE ONLY APPLICABLE WHEN PALMS ARE NOT ROOT PRUNED. LEAVES DO NOT NEED TO BE CUT IN HALF OR REMOVED FROM PALMS THAT ARE ADEQUATELY ROOT PRUNED. ON OCCASION WHEN SUFFICIENT ROOT PRUNING TIME IS NOT AVAILABLE, PALMS TO BE RELOCATED MAY HAVE THEIR LEAVES CUT IN HALF OR REMOVED ENTIRELY AT THE DIRECTION OF THE LANDSCAPE ARCHITECT.
2. PALMS LEAVES MUST BE TIED UP WITH 2-PLY BIODEGRADABLE TWINE PRIOR TO RELOCATION TO PREVENT MECHANICAL DAMAGE DURING THE RELOCATION PROCESS.
3. PALM TRUNKS SHALL ONLY BE 'CLEANED UP' ACCORDING TO THE LANDSCAPE ARCHITECT'S SPECIFICATIONS SPECIFIC TO EACH PALM.

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## MAINTENANCE SPECIFICATIONS

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1. ALL RELOCATED TREES AND PALMS MUST BE MAINTAINED FOR ONE YEAR FROM THE DATE OF RELOCATION TO THEIR FINAL LOCATIONS.
2. CONTRACTOR MUST MAINTAIN ALL RELOCATED TREES AND PALMS FOR ONE FULL YEAR FROM THE DATE OF RELOCATION TO THE FINAL LOCATION.
3. WHENEVER POSSIBLE, EACH TREE AND PALM MUST BE WATERED BY A PERMANENT AUTOMATIC IRRIGATION SYSTEM FOLLOWING RELOCATION. EACH WATERING MUST THOROUGHLY SATURATE THE ROOTBALL TO ITS FULL DEPTH; THIS WILL REQUIRE 25-50 GALLONS OF WATER FOR SMALL TREES AND PALMS DEPENDING ON ROOTBALL SIZE, WHILE LARGE TREES WILL REQUIRE A MINIMUM OF 10 GALLONS PER FOOT OF ROOTBALL DIAMETER (I.E., A 10' DIAMETER ROOTBALL WILL REQUIRE A MINIMUM OF 100 GALLONS PER WATERING EVENT). WATERING FREQUENCY MUST BE EVERY DAY FOR THE FIRST TWO WEEKS, EVERY OTHER DAY FOR THE NEXT THREE WEEKS, AND EVERY THIRD DAY FOR THE NEXT 6-8 WEEKS.
4. WHEN AN AUTOMATIC IRRIGATION SYSTEM IS NOT POSSIBLE, CONTRACTOR IS RESPONSIBLE FOR HAND WATERING RELOCATED TREES AND PALMS THROUGHOUT THE MAINTENANCE PERIOD AND UNTIL FINAL ACCEPTANCE BY THE LANDSCAPE ARCHITECT AND/OR CLIENT.
5. IMMEDIATELY AFTER RELOCATION TO THE FINAL LOCATION. A HIGH-PHOSPHORUS ROOT STIMULANT MUST BE APPLIED TO THE SURFACE OF THE ROOTBALL AT THE RECOMMENDED LABEL RATE AND WATERED IN WITH A DRENCH CONSISTING OF A SYSTEMIC INSECTICIDE AND A CONTACT ROOT ROT FUNGICIDE, FOLLOWING LABEL INSTRUCTIONS, AS INITIAL PREVENTATIVE MAINTENANCE.
6. EVERY THREE MONTHS THEREAFTER, A HIGH-PHOSPHORUS ROOT STIMULANT MUST BE APPLIED TO THE SURFACE OF THE ROOTBALL AT THE RECOMMENDED LABEL RATE AND WATERED IN WITH A DRENCH CONSISTING OF A SYSTEMIC INSECTICIDE AND A BROAD-SPECTRUM SYSTEMIC FUNGICIDE, FOLLOWING LABEL INSTRUCTIONS, AS CONTINUING PREVENTATIVE MAINTENANCE.
7. IRRIGATION AND BRACING MUST BE CHECKED AND EACH TREE OR PALM THOROUGHLY INSPECTED FOR SIGNS OF STRESS, DISEASE, OR PEST PROBLEMS ON A MONTHLY BASIS.
8. IMMEDIATELY AFTER RELOCATION TO THE FINAL LOCATION AND EVERY THREE MONTHS THEREAFTER, A HIGH-QUALITY, SLOW-RELEASE 15-2-15 GRANULAR FERTILIZER MUST BE APPLIED, AT THE RECOMMENDED LABEL RATE, SPREAD EVENLY ACROSS THE SURFACE OF THE ROOTBALL.
9. IMMEDIATELY AFTER RELOCATION TO THE FINAL LOCATION AND EVERY THREE MONTHS THEREAFTER A HIGH-QUALITY, SLOW-RELEASE 15-2-15 GRANULAR FERTILIZER MUST BE APPLIED, AT THE RECOMMENDED LABEL RATE, SPREAD EVENLY ACROSS THE SURFACE OF THE ROOTBALL.

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10. FOLIAR FEED FOUR TIMES PER YEAR.
11. STRING MUST BE REMOVED FROM THE TIED UP LEAVES IMMEDIATELY AFTER RELOCATION TO THE FINAL LOCATION IF THE PALM WAS ROOT PRUNED OR WITHIN 30-45 DAYS AFTER RELOCATION ON THE OCCASION THE LANDSCAPE ARCHITECT APPROVED RELOCATION WITHOUT ROOT PRUNING DUE TO TIME CONSTRAINTS.
12. IMMEDIATELY AFTER RELOCATION TO THE FINAL LOCATION AND EVERY THREE MONTHS THEREAFTER A HIGH-QUALITY, SLOW-RELEASE 8-4-12 GRANULAR PALM FERTILIZER WITH MINORS MUST BE APPLIED. AT THE RECOMMENDED LABEL RATE, SPREAD EVENLY ACROSS THE SURFACE OF THE ROOTBALL.
13. FOLIAR FEED PALMS SIX TIMES PER YEAR.

## TREES PROTECTION NOTES

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1. CONTRACTOR TO PROTECT ALL EXISTING TREES PRIOR TO THE DEMOLITION OF THE EXISTING STRUCTURE.
2. UPON COMPLETION OF OF SITE DEMOLITION, CONTRACTOR TO RELOCATE ALL SPECIFIED TREES AND PALMS FOR RELOCATION. CONTRACTOR TO REINSTALL TREE PROTECTION FENCE AROUND RELOCATED AND EXISTING TREES.
3. FENCING AT A MINIMUM FOUR (4) FEET HEIGHT INSTALLED NO CLOSER TO THE TREE TRUNK THAN ITS DRIPLINE. THIS FENCE SHALL BE MAINTAINED IN WORKING ORDER DURING ALL PHASES OF CONSTRUCTION. MAINTAIN TREE PROTECTION ZONES FREE OF WEEDS AND TRASH.
4. THE PROJECT LIMIT OF CONSTRUCTION AND ALL EXISTING VEGETATION TO REMAIN IS TO BE CLEARLY DEFINED BY STURDY, WEATHERPROOF FENCING AT A MINIMUM OF FOUR (4) FEET HIGH.
5. STURDY TEMPORARY BARRIERS SHALL BE INSTALLED AROUND ALL TREE PROTECTION ZONES. BARRIERS SHALL BE A MINIMUM OF FOUR FEET HIGH, AND SHALL BE CONSTRUCTED OF CONTINUOUS CHAIN LINK FENCE WITH METAL POSTS AT EIGHT-FOOT SPACING, OR OF TWO-BY-FOUR INCH POSTS WITH THREE EQUALLY SPACED TWO-BY-FOUR RAILS. POSTS MAY BE SHIFTED TO AVOID ROOTS.

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## RELOCATION SPECIFICATIONS

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1. LANDSCAPE CONTRACTOR TO FLAG ALL PROPOSED PLANT LOCATIONS FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION. NOTIFY LANDSCAPE ARCHITECT A MINIMUM OF 15 DAYS PRIOR TO REVIEW.
2. ALL TREES AND PALMS TO BE RELOCATED MUST BE WATERED DAILY FOR AT LEAST 5 DAYS PRIOR TO ANY RELOCATION TO ENSURE THAT THEY ARE FULLY HYDRATED. EACH WATERING MUST THOROUGHLY SATURATE THE ROOTBALL TO ITS FULL DEPTH.
3. ALL ROOTBALLS MUST BE WRAPPED IN BURLAP AND THE TIGHTLY WIRE-WRAPPED (USING REDLINE HORSE WIRE OR EQUIVALENT) TO KEEP THE ENTIRE ROOTBALL INTACT DURING RELOCATION. TREES AND PALMS GROWING IN LIMESTONE MUST BE DUG AND RELOCATED WITH THE ROOT ATTACHED TO A SECTION OF ROCK AS PART OF THE ROOTBALL SUCH THAT THE ROOTS REMAIN INTACT, ROOTBALLS COMING FROM SAND OR SANDY SOIL MAY ALSO NEED TO BE BOXED PRIOR TO RELOCATION, AT THE DISCRETION OF THE LANDSCAPE ARCHITECT.
4. TREES AND PALMS BEING RELOCATED OFFSITE MUST HAVE THEIR ENTIRE ROOTBALLS THOROUGHLY AND TIGHTLY WRAPPED WITH PLASTIC SHRINK WRAP ON THE OUTSIDE OF THE WIRE WRAP, AND THE ENTIRE TREE OR PALM (INCLUDING CANOPY, TRUNK, AND ROOTBALL) MUST BE COVERED WITH A BREATHABLE TARP (E.G., SHADE CLOTH) DURING TRANSPORT.
5. NEW PLANTING PITS FOR RELOCATED TREES AND PALMS MUST BE PREPARED PRIOR TO LIFTING THE PALM OR TREE FROM ITS CURRENT LOCATION AND MUST BE AT LEAST 3-4 FEET WIDER THAN THE ROOTBALL AND THE SAME DEPTH AS THE ROOTBALL, SUCH THAT THE FINAL ELEVATION OF THE TOP OF THE ROOTBALL IS AT OR SLIGHTLY ABOVE (NO MORE THAN 2" HIGHER) FINAL GRADE.
6. TREES AND PALMS TO BE RELOCATED MUST BE LIFTED BY THE ROOTBALL ONLY, USING APPROPRIATELY SIZED (LENGTH AND STRENGTH) LIFTING STRAPS OR CHAINS. DURING LIFTING, THE TREE OR PALM MUST BE BALANCED IN A MORE-OR-LESS UPRIGHT POSITION, WITH THE STRAP THE TRUNK USED ONLY FOR BALANCING AND MANEUVERING THE TREE OR PALM INTO A POSITION. NO CHAINS MAY BE USED AROUND OR AGAINST THE TRUNK AT ANY TIME. AT NO TIME SHALL 100% OF THE WEIGHT OF THE TREE OR PALM BE ON THE STRAP ATTACHED TO THE TRUNK. TRUNKS MUST BE HEAVILY PADDED WITH 30-60 LAYERS (DEPENDING ON SIZE AND WEIGHT) OF BURLAP BENEATH THE BALANCING STRAP.

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7. TREES AND PALMS MUST BE LIFTED WITH A CRANE OR BACKHOE APPROPRIATELY SIZED FOR THE SIZE AND WEIGHT OF THE TREE OR PALM AND LIFTED OR CARRIED DIRECTLY TO THE FINAL INSTALL LOCATION OR TRANSPORT TRAILER.
8. ONCE LIFTING BEINGS, ANY UNCUT ROOTS UNDER OR AROUND THE ROOTBALL THAT MAY YET REMAIN MUST BE IMMEDIATELY SEVERED WITH HAND PRUNING TOOLS TO MINIMIZE TEARING AND ROOT DAMAGE.
9. AGRIFORM PLANTING TABLETS (OR APPROVED EQUIVALENT) MUST BE EVENLY DISTRIBUTED AROUND THE PERIMETER OF THE PLANTING PIT AT THE RATE OF 2 TABLETS PER 1" TRUNK CALIPER PRIOR TO BACKFILLING.
10. MYCORRHIZA (ROOTS® TRANSPLANT OR EQUIVALENT) MUST BE INCORPORATED INTO THE BACKFILL SOIL PRIOR TO BACKFILLING.
11. RELOCATED TREES AND PALMS MUST BE CENTERED IN THE PLANTING PIT, AND THE PIT BACKFILLED USING A 1:1 MIXTURE OF EXISTING SOIL AND 80:20 (DOT SAND:MUCK) SOIL MIX THOROUGHLY BLENDED TOGETHER. DO NOT USE MUDDY SOIL AS BACKFILL.
12. SMALL TREES AND PALMS MUST BE FIRMLY BRACED USING A MINIMUM OF FOUR 4"X 4" WOODEN BRACES ATTACHED TO 2" X 4" WOODEN BATTENS HELD IN PLACE WITH TWO STEEL BANDS. LARGER TREES MAY REQUIRE 6"X 6" WOODEN POSTS OR EVEN TELEPHONE POLES TO PROVIDE SUFFICIENT BRACING STRENGTH TO PREVENT TOPPLING DURING WIND EVENTS. A SUFFICIENT NUMBER OF BATTENS MUST BE STRATEGICALLY PLACED AROUND THE TRUNK SUCH THAT THE STEEL BANDS NEVER CONTACT THE TRUNK. NO BURLAP IS TO REMAIN UNDER THE WOODEN BATTENS ON TREES DURING BRACING, BUT SEVERAL LAYERS OF BURLAP SHOULD BE LEFT UNDER THE WOODEN BATTENS WHEN BRACING PALMS. NAILS SHALL NEVER BE DRIVEN DIRECTLY INTO THE TRUNK DURING BRACING. BRACING MUST REMAIN IN PLACE FOR A MINIMUM OF ONE YEAR.
13. A TREE RING WITH A MINIMUM HEIGHT OF 6" MUST BE CONSTRUCTED 6-12" OUTSIDE THE OUTERMOST EDGE OF THE ROOTBALL AND AROUND THE ENTIRE PERIMETER OF THE ROOTBALL TO DIRECT IRRIGATION WATER AND ANY SUPPLEMENTS THAT ARE ADDED DOWN INTO THE ROOTBALL DURING ROOT REGENERATION.

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14. ONCE THE TREE RING IS CONSTRUCTED, A HIGH-PHOSPHORUS ROOT STIMULANT MUST BE LIBERALLY APPLIED TO THE SURFACE AND THOROUGHLY WATERED IN.
15. ROOTBALLS MUST BE A THOROUGHLY WATERED IN USING A HOSE AND JOHNSON BAR INSERTED TO THE VERY BOTTOM OF THE ROOTBALL AND SWUNG BACK AND FORTH TO PREVENT FORMATION OF AIR POCKETS. THE JOHNSON BAR TECHNIQUE MUST BE REPEATED AT LEAST ONCE MORE WITHIN 6" OF THE TRUNK. MULCH MUST NOT BE APPLIED OR ALLOWED TO ACCUMULATE DIRECTLY AGAINST THE TRUNK.
16. PITS FROM WHICH THE RELOCATED TREES AND PALMS WERE REMOVED MUST BE CLEANED OFF ALL RESIDUAL ROOTS, STUMPS, AND PORTIONS THEREOF AND BACKFILLED WITH CLEAN FILL FLUSH WITH THE SURROUNDING GRADE.
17. RESTORE THE SURFACE WITH MATERIAL TO MATCH ADJACENT AREAS, MATERIAL TO BE APPROVED BY LANDSCAPE ARCHITECT. CONTRACTOR TO PROVIDE A MINIMUM OF ONE YEAR WARRANTY ON SETTLING AND PLANT MATERIAL FROM THE SUBSTANTIAL COMPLETION.
18. MULTI-TRUNK TREES AND PALMS MUST BE RELOCATED AS ONE UNIT WITH A SINGLE ROOTBALL.
19. PLANTING PITS FOR EDIBLE DATE PALMS (PHOENIX DACTYLIFERA) MUST BE BACKFILLED WITH PURE SILICA SAND.

## WARRANTY NOTES

---

1. ALL RELOCATED TREES AND PALMS MUST BE GUARANTEED FOR ONE YEAR FROM THE DATE OF RELOCATION TO THEIR FINAL LOCATIONS.
2. IF A TREE OR PALM DIES WITHIN THE 1-YEAR WARRANTY PERIOD, IT MUST BE REMOVED AND REPLACED AT CONTRACTOR'S EXPENSE.
3. IF A TREE OR PALM PERFORMS POORLY WITHIN THE 1-YEAR WARRANTY PERIOD, IT MUST BE REMOVED AND REPLACED AT CONTRACTOR'S EXPENSE. THE DECISION TO REPLACE BASED ON POOR HEALTH IS AT THE DISCRETION OF THE LANDSCAPE ARCHITECT.
4. IF A TREE OR PALM SETTLES TO AN UNHEALTHY DEPTH WITHIN THE 1-YEAR WARRANTY PERIOD, AS DEEMED BY THE BY THE LANDSCAPE ARCHITECT, IT MUST BE RAISED TO THE CORRECT GRADE AT CONTRACTOR'S EXPENSE.

### Determination

Through implementation of the proposed mitigation activities, impacts associated with the construction of the BOH area and the utility corridor should be sufficiently mitigated.

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## Appendix A – Tree Mitigation Narrative & Disposition Plan

### TREE MITIGATION NARRATIVE

1. THE PROPOSED SCOPE OF WORK AREA IS 72,092 SQUARE FEET (1.65 ACRES)
2. THE PROPOSED SCOPE OF WORK IMPACTS THE EXISTING VEGETATION IN THE FOLLOWING MANNER:
  - 2.1. (9) HARDWOOD TREES ARE SPECIFIED FOR PRESERVATION.
  - 2.2. (47) HARDWOOD TREES ARE SPECIFIED FOR REMOVAL.
  - 2.3. (3) HARDWOOD TREES ARE SPECIFIED FOR RELOCATION.
  - 2.4. (3) PALMS ARE SPECIFIED FOR RELOCATION.

REFER TO THE TREE DISPOSITION SCHEDULE FOR EXACT SPECIES, SIZE, AND DISPOSITION IN THE FOLLOWING TABLES.

3. THE DEVELOPMENT PROPOSES TO MITIGATE THE REMOVAL OF HARDWOOD TREES IN THE FOLLOWING MANNER:
  - 3.1. PLANT (2) NATIVE HARDWOOD TREES FOR EVERY (1) HARDWOOD TREE REMOVED.
  - 3.2. THE REPLACEMENT TREES ARE TO BE A NATIVE BAHAMIAN SPECIES.

4. THE TREE DISPOSITION PLANS NECESSITATE THE PLANTING OF 94 TREES.

FIGURES 14 – 16 SHOW LOCATIONS FOR THE SPECIES LISTED IN THE FOLLOWING TABLES.

Number	Common name	Scientific name	Action	Height	Canopy	DBH	Condition	Native
89	Gumbo Limbo	<i>Bursera simaruba</i>	RELOCATE	24'	30'	12"	Good	YES
90	Gumbo Limbo	<i>Bursera simaruba</i>	RELOCATE	24'	30'	12"	Good	YES
91	Gumbo Limbo	<i>Bursera simaruba</i>	RELOCATE	24'	30'	12"	Good	YES
92	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
93	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
94	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
95	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
96	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
97	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
98	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
99	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
100	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
101	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
102	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
103	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	16'	24'	6"	Good	YES
104	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
105	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
106	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES
107	Pigeon Plum	<i>Coccoloba diversifolia</i>	PRESERVE	16'	24'	6"	Good	YES

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Number	Common name	Scientific name	Action	Height	Canopy	DBH	Condition	Native
569	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
570	Sabal Palm	<i>Sabal palmetto</i>	REMOVE	16'	8'	8"	Good	YES
571	Mastic	<i>Sideroxylon foetidissimum</i>	REMOVE	20'	16'	10"	Good	YES
572	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
573	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
574	Poisonwood	<i>Metopium toxiferum</i>	REMOVE	24'	18'	8"	Good	YES
575	Poisonwood	<i>Metopium toxiferum</i>	REMOVE	24'	18'	8"	Good	YES
576	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
577	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
578	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
579	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
580	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
581	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
582	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
583	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
584	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
585	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
586	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
587	Tropical Almond	<i>Terminalia catappa</i>	REMOVE	30'	20'	18"	Good	NO
Number	Common name	Scientific name	Action	Height	Canopy	DBH	Condition	Native
588	Sapodilla	<i>Manilkara zapota</i>	REMOVE	35'	25'	18"	Good	NO
589	Coconut Palm	<i>Cocos nucifera</i>	RELOCATE	30'	16'	10"	Good	YES
590	Coconut Palm	<i>Cocos nucifera</i>	RELOCATE	30'	16'	10"	Good	YES
591	Coconut Palm	<i>Cocos nucifera</i>	RELOCATE	30'	16'	10"	Good	YES
592	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
593	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
594	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
595	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
596	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
597	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
598	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
599	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
600	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
601	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
602	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
603	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
604	Pigeon Plum	<i>Coccoloba diversifolia</i>	REMOVE	18'	18'	6"	Good	YES
605	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
606	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
607	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
608	Sabal Palm	<i>Sabal palmetto</i>	REMOVE	16'	8'	8"	Good	YES
609	Poisonwood	<i>Metopium toxiferum</i>	REMOVE	24'	18'	8"	Good	YES
610	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES
611	Gumbo Limbo	<i>Bursera simaruba</i>	REMOVE	24'	18'	8"	Good	YES

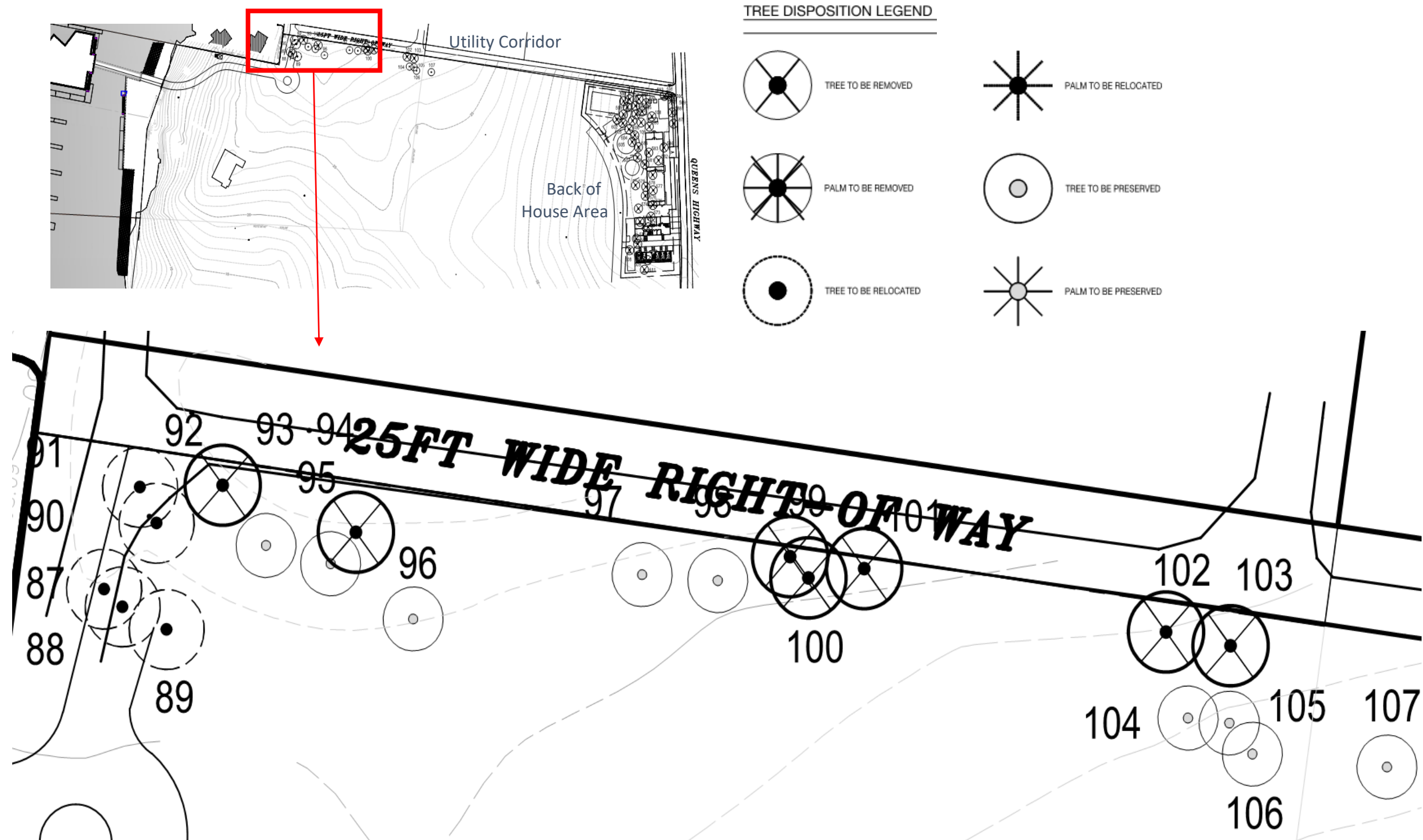
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Figure 14 Tree Disposition Map for the section of the Utility Corridor shown in red.

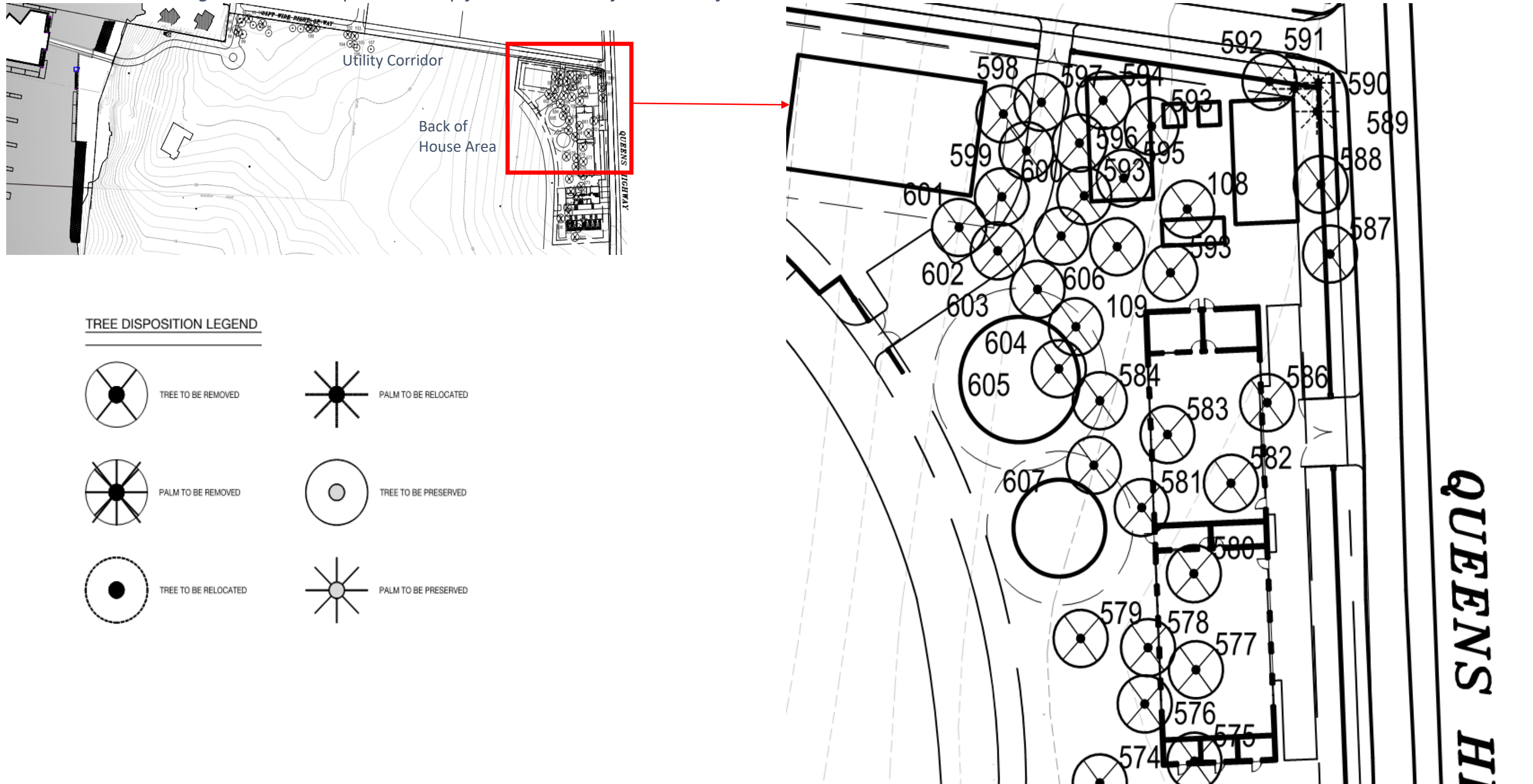


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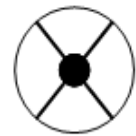
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Figure 15 Tree Disposition Map for the section of the Back of House area shown in red.



TREE DISPOSITION LEGEND



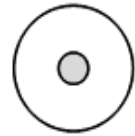
TREE TO BE REMOVED



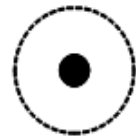
PALM TO BE RELOCATED



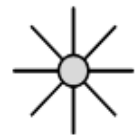
PALM TO BE REMOVED



TREE TO BE PRESERVED



TREE TO BE RELOCATED



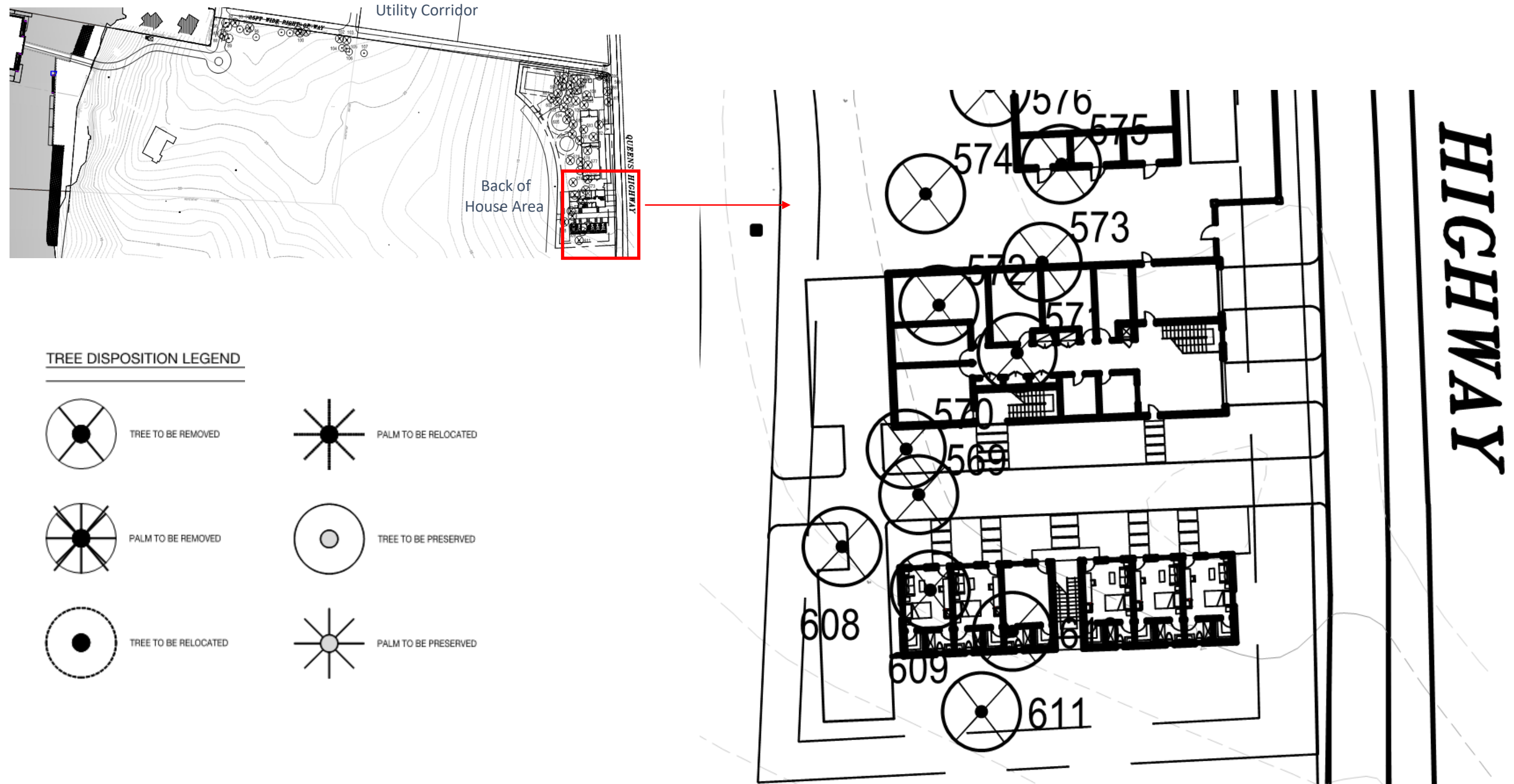
PALM TO BE PRESERVED

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Figure 16 Tree Disposition Map for the section of the Back of House area shown in red.



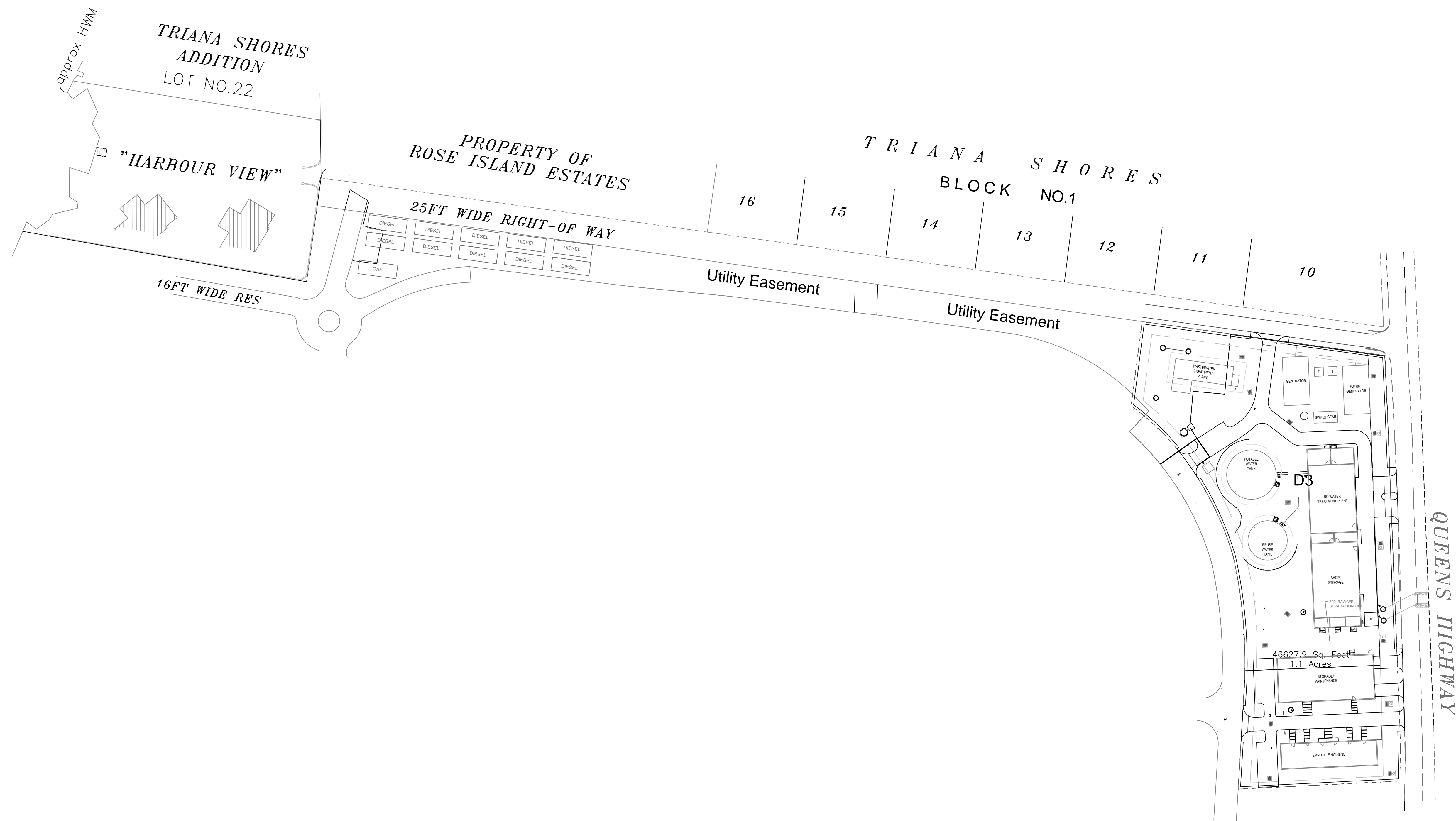


Appendix B – Fuel Tank Drawings

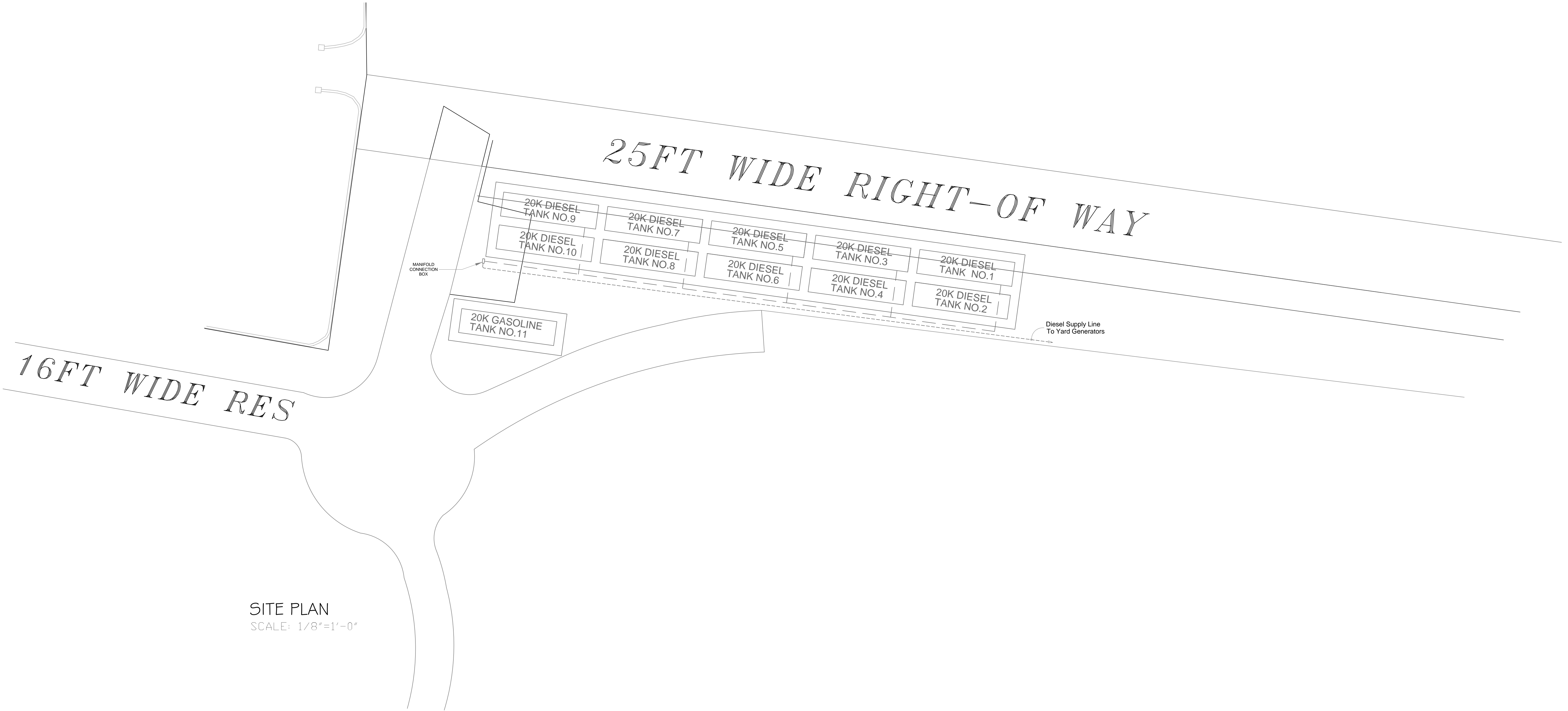
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REVISIONS NO.      DATE      BY		REVISIONS NO.      DATE      BY		4M HARBOUR ISLAND LTD. 4M HARBOUR ISLAND LTD 2 TO SUPPORT MARINA PACKAGE FOR PERMITTING      HARBOUR ISLAND, THE BAHAMAS	DRAWING TITLE : SITE SURVEY PLAN	SCALE: 1:50 DATE: NOVEMBER 3, 2020 JOB NO.: 0000-20	CHECKED: CTI DRAWN: CST APPROVED: CTI	<b>Island Dimensions &amp; Development Company LTD.</b> Consulting Civil, Structural & Environmental Engineers Project Managers, Cost Engineers Land Planners & Developers, License Contractors	Farrington House, Gladstone Road P. O. Box EE-15036 Nassau, Bahamas Tel#: (242)-341-6318/25 Fax#: (242)-361-6312	SHEET No. A-01
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SITE PLAN  
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NO	REVISIONS	DATE	BY

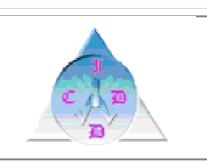
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4M HARBOUR ISLAND 2 LTD TO SUPPORT MARINA  
PACKAGE: FOR PERMITTING  
HARBOUR ISLAND, THE BAHAMAS

DRAWING TITLE :  
SITE PLAN - FUEL TANKS

SCALE: AS SHOWN  
DATE: NOVEMBER 3, 2020  
JOB NO.: 0000-20

CHECKED: CTI  
DRAWN: CST  
APPROVED: CTI

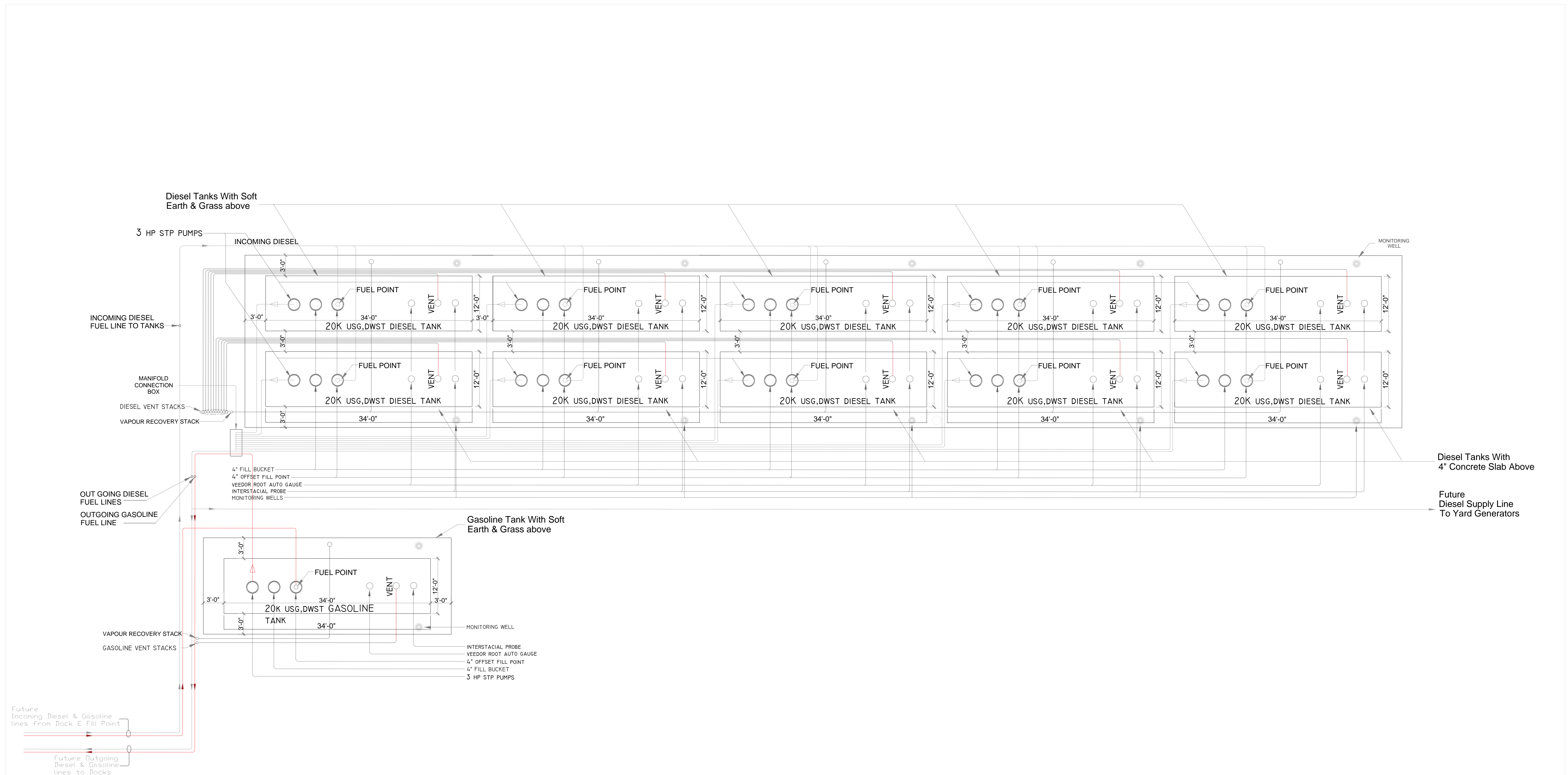
**Island Dimensions & Development Company LTD.**  
Consulting Civil, Structural & Environmental Engineers  
Project Managers, Cost Engineers  
Land Planners & Developers, License Contractors



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Nassau, Bahamas  
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Fax#: (242)-361-6312

SHEET No.  
A-02





FUEL AND TANK LAYOUT  
SCALE: 1/4"=1'-0"

NO	REVISIONS	DATE	BY

4M HARBOUR ISLAND LTD.  
4M HARBOUR ISLAND 2 LTD TO SUPPORT MARINA  
PACKAGE: FOR PERMITTING  
HARBOUR ISLAND, THE BAHAMAS

DRAWING TITLE :  
FUEL TANK LAYOUT

SCALE: AS SHOWN  
DATE: NOVEMBER 3, 2020  
JOB NO.: 0000-20

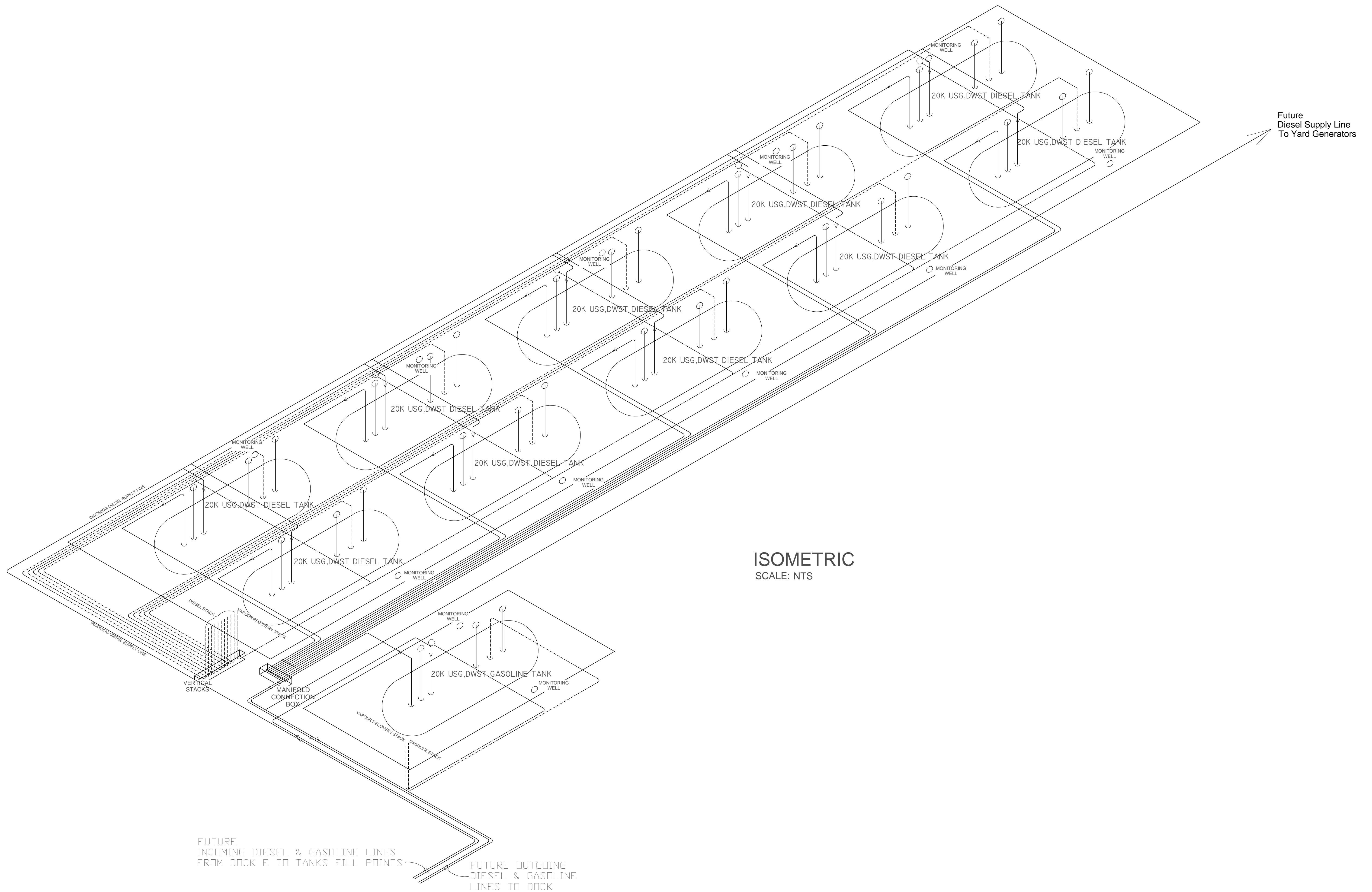
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DRAWN: CST  
APPROVED: CTI

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SHEET No.  
A-03



NO	REVISIONS	DATE	BY	NO	REVISIONS	DATE	BY

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4M HARBOUR ISLAND 2 LTD TO SUPPORT MARINA  
PACKAGE: FOR PERMITTING  
HARBOUR ISLAND, THE BAHAMAS

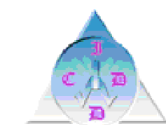
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JOB NO.: 0000-20

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DRAWN: CST  
APPROVED: CTI

**Island Dimensions & Development Company LTD.**

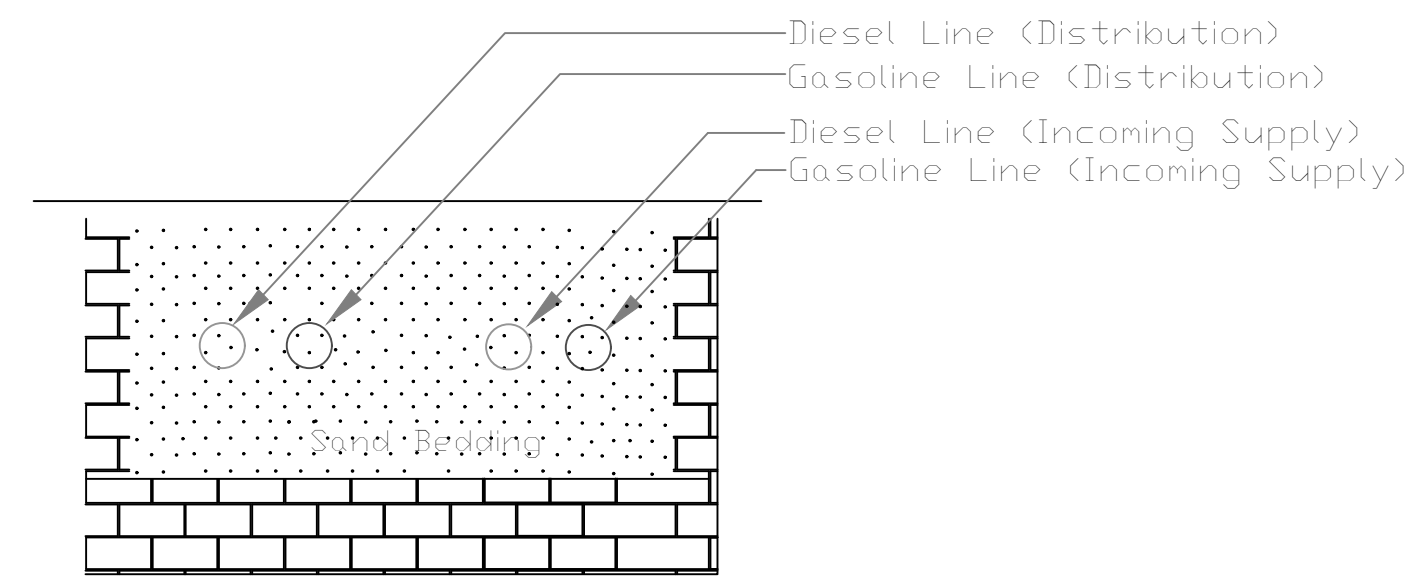
Consulting Civil, Structural & Environmental Engineers  
Project Managers, Cost Engineers  
Land Planners & Developers, License Contractors



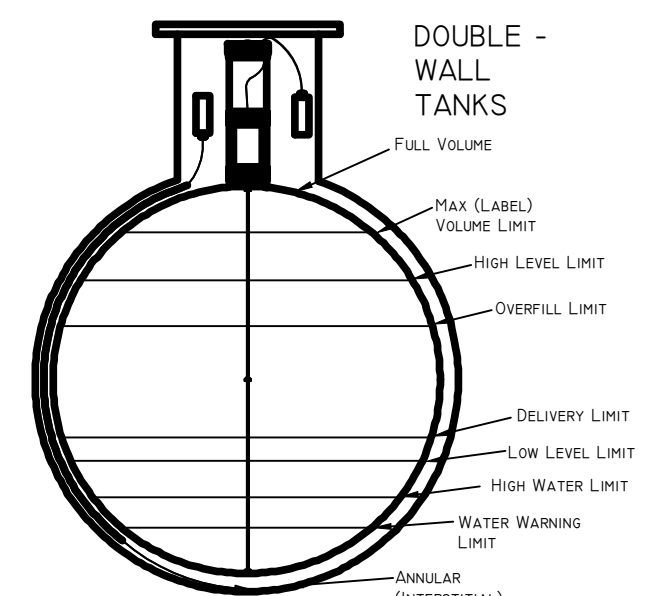
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Fax#: (242)-361-6312

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A-04

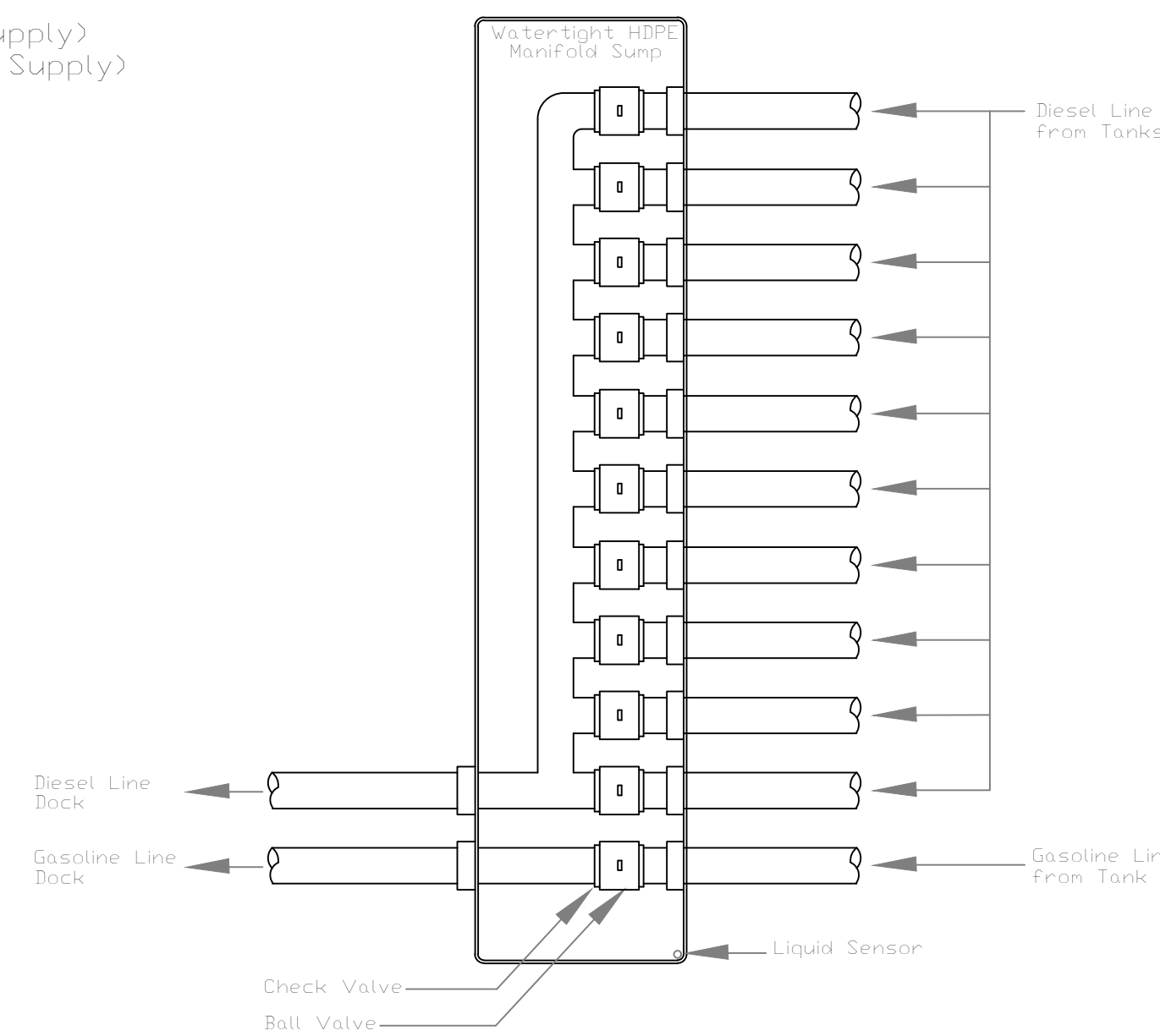




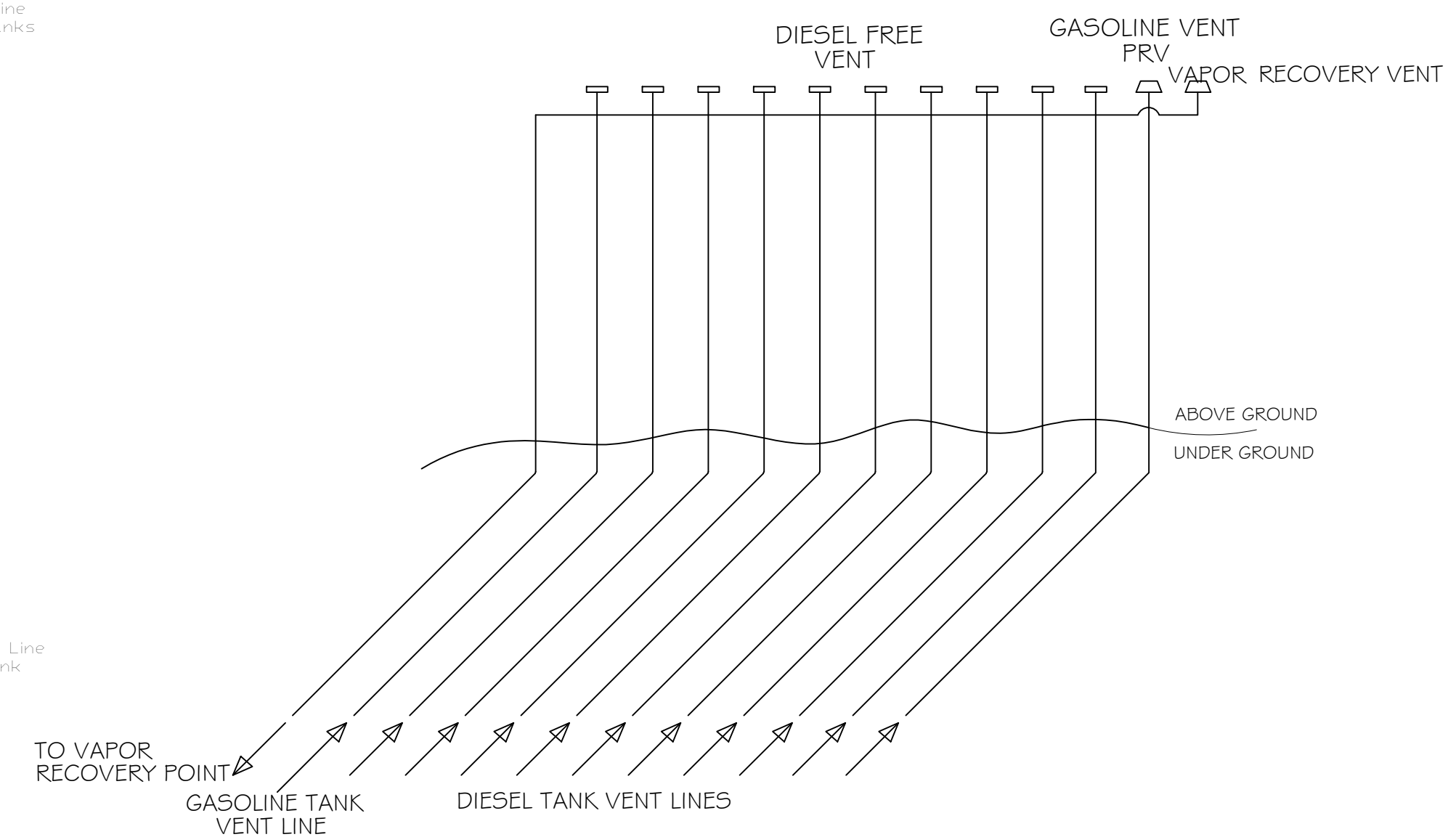
Detail-1: Fuel Line Raceway To Dock Section



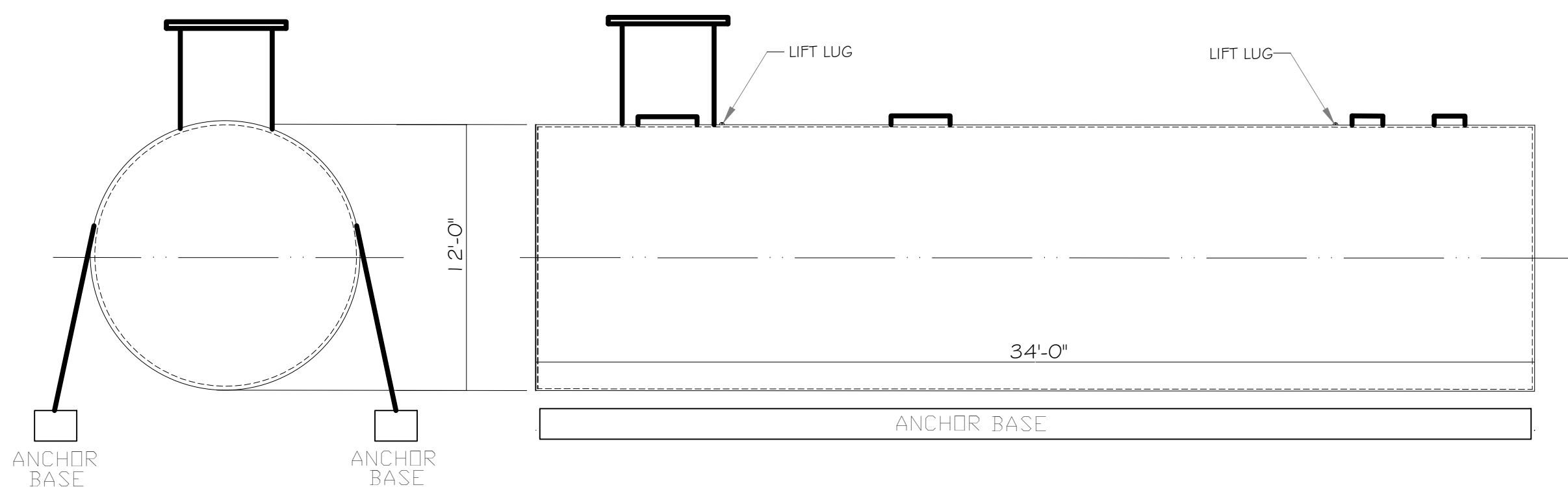
Detail-2: In-Tank Warning and Alarm Limits



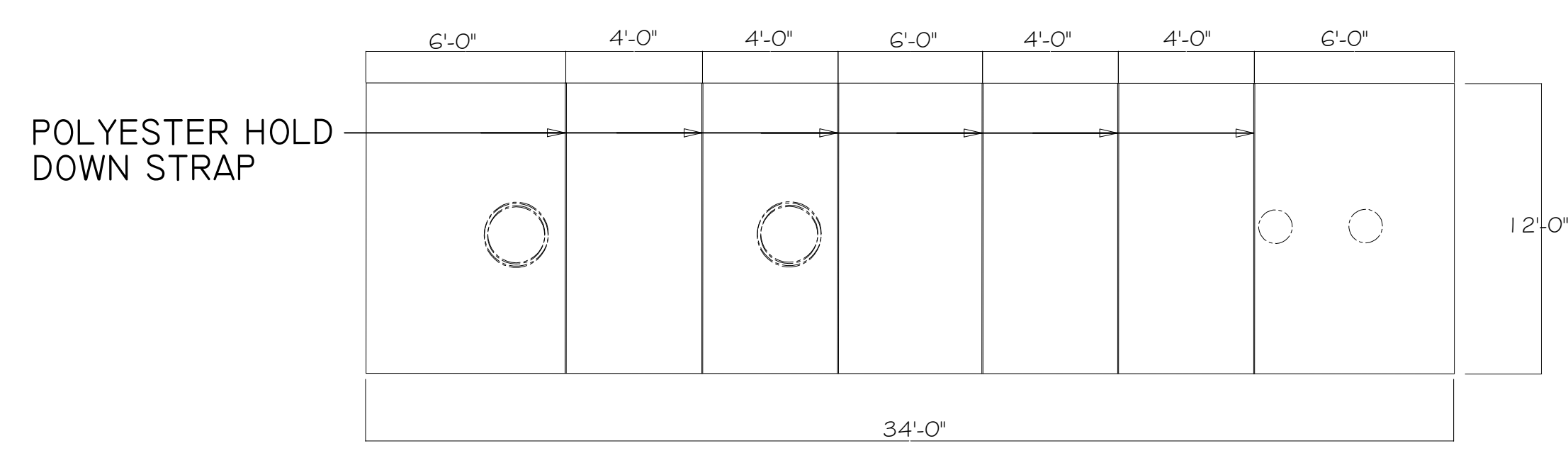
Detail-3: Manifold Connection Box Plan



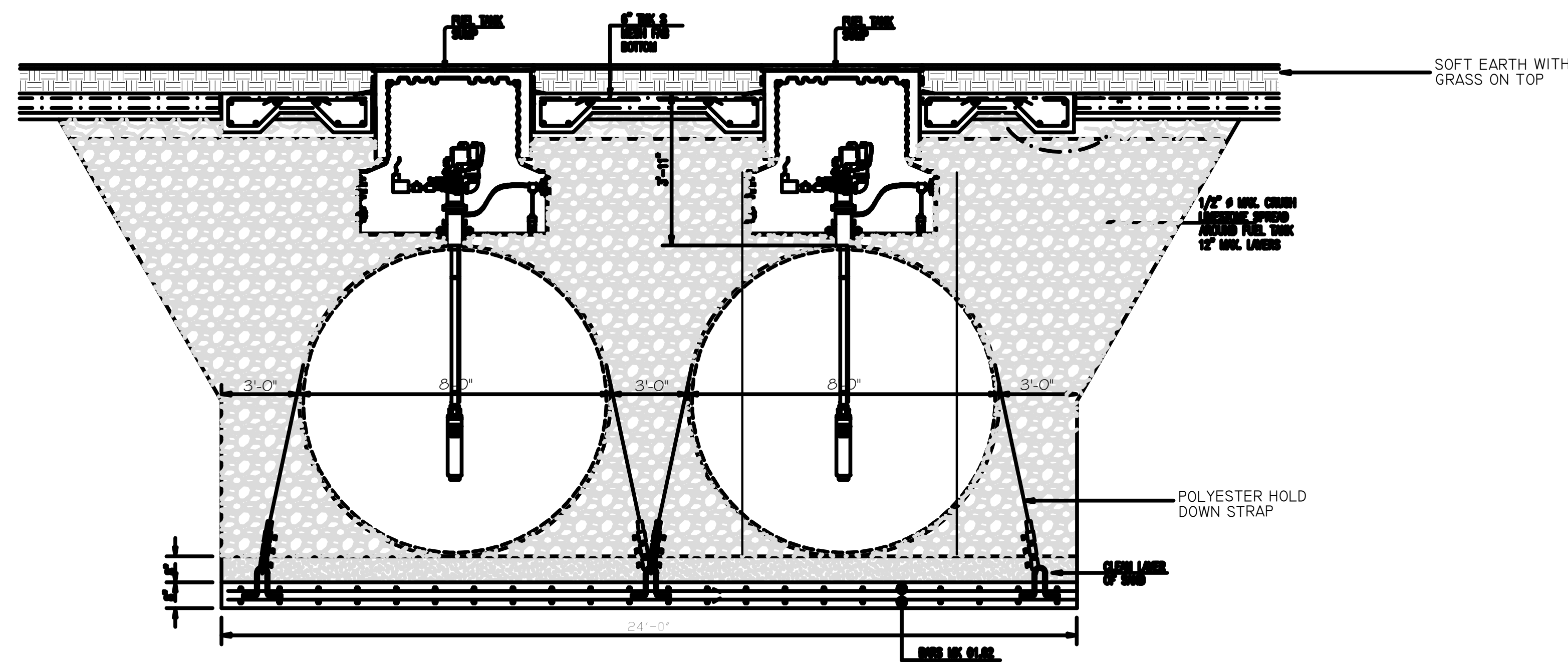
Detail-7: Vent line Section



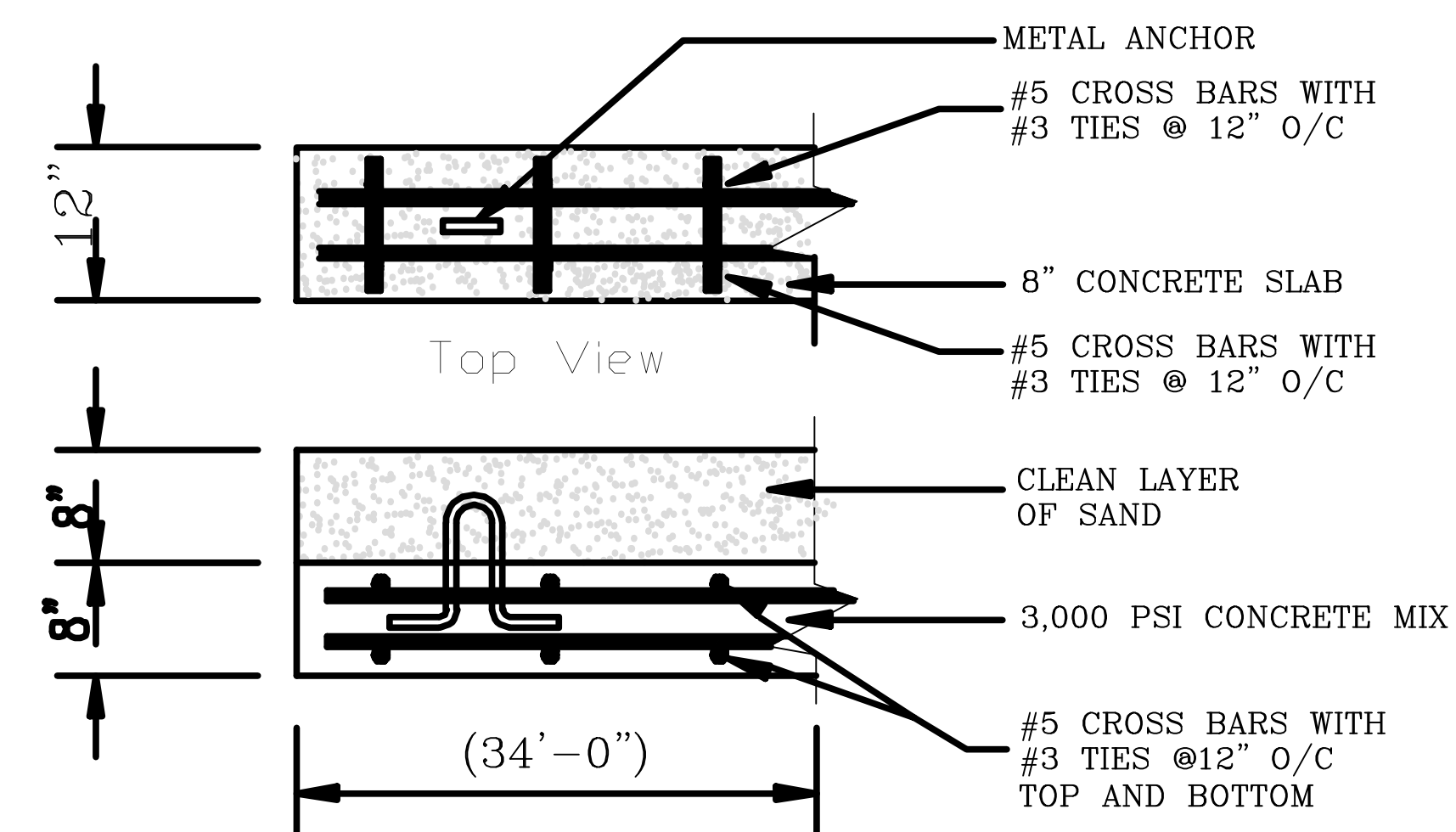
Detail-4: Fuel Tank Views



Detail-5: Top Fuel Tank View



Detail-6: Fuel Tank Cross Section



Detail-8: ANCHOR DETAIL Side View

**GENERAL NOTES:**

- CAPACITY 20,000 GALLONS.
- FAB. PER UL-58 & UL-1746 SPECS. LABELS REQ'D.
- INSTALL STRIKER PLATES UNDER ALL OPENINGS.
- PRESSURE TEST PRIMARY TANKS AT 3-5 PSI AIR. MAKE LEAK FREE PRIOR TO APPLYING SEPERATOR & JACKET.
- APPLY SEPERATOR OVER EXTERIOR OF PRIMARY TANKS & THEN COAT WITH MIN. 100 MILS GLASTEEL PER UL-1746.
- AIR TEST INTERSTITIAL SPACE AT 1 PSI AIR MAX.
- SPARK TEST JACKET AT 35,000 VOLTS.
- TEST SECONDARY TANKS BY APPLYING A VACUUM ON INTERSTITIAL SPACE (12" Hg. MIN.), HOLD FOR 24 HOURS.
- LEAVE VALVES & GAUGES IN PLACE TO VERIFY VACUUM.
- SHIP TANKS WITH VACUUM ON INTERSTITIAL SPACE.
- CLOSE OFF ALL OPENINGS PRIOR TO SHIPMENT.
- ALL VENTS STACKS ARE TO BE 12 FT ABOVE GROUND, 2" DIA. STEEL. GAS STACK TO HAVE PRESSURE RELIEF VALVE TOP.
- MANIFOLD TO BE INSTALLED IN HDPE SUMP NEAR THE USTS AREA
- UNDERGROUND FUEL LINE WALLS UPP - EN (WITH EVOH LINER INSIDE THE PRIMARY PIPE), TYPICALLY 2" OR 2 1/2".
- FILLING LINES FOR REMORT FILLING POINTS: HDPE DOUBLE WALL UPP™- MEN ( WITH EVOH LINER INSIDE THE PRIMARY PIPE), TYPICALLY 4".
- VENT LINES: HDPE SINGLE WALL UPP - EN ( WITH EVOH LINER INSIDE THE PIPE), TYPICALLY 2".
- ALL UNDERGROUND CONNECTIONS TO BE WELDED BY ELECTROFUSION (INCLUDING THE CONNECTION BETWEEN THE HDPE SUMP AND THE UPP PIPE).
- ALL VENT STACKS ARE 12 FT ABOVE GROUND, 2" DIA. STEEL. GAS STACK TO HAVE PRESSURE RELIEF VALVE TOP.



Appendix C – Back of House Schematic and Civil Plans

**Caribbean Coastal Services Ltd.**

P.O. Box CB-11524 Nassau, The Bahamas | Phone (242) 327-5348 | Fax (242) 327-4981  
[info@caribbeancoastal.com](mailto:info@caribbeancoastal.com) | [www.caribbeancoastal.com](http://www.caribbeancoastal.com)

# BRILAND RESIDENCE AND MARINA

BAHAMAS

## BACK OF HOUSE

50% SCHEMATIC DESIGN  
JANUARY 2020

CMA DESIGN STUDIO, INC.

ARCHITECTURE PLANNING INTERIORS

232 Andrus Avenue Suite 101 Coral Gables, Florida 33134 • T: 305.448.4200 • F: 305.448.4215

MICHAEL WIENER, 4M HARBOUR ISLAND LTD.

MICHAEL WEINER, 4M HARBOUR ISLAND LTD.

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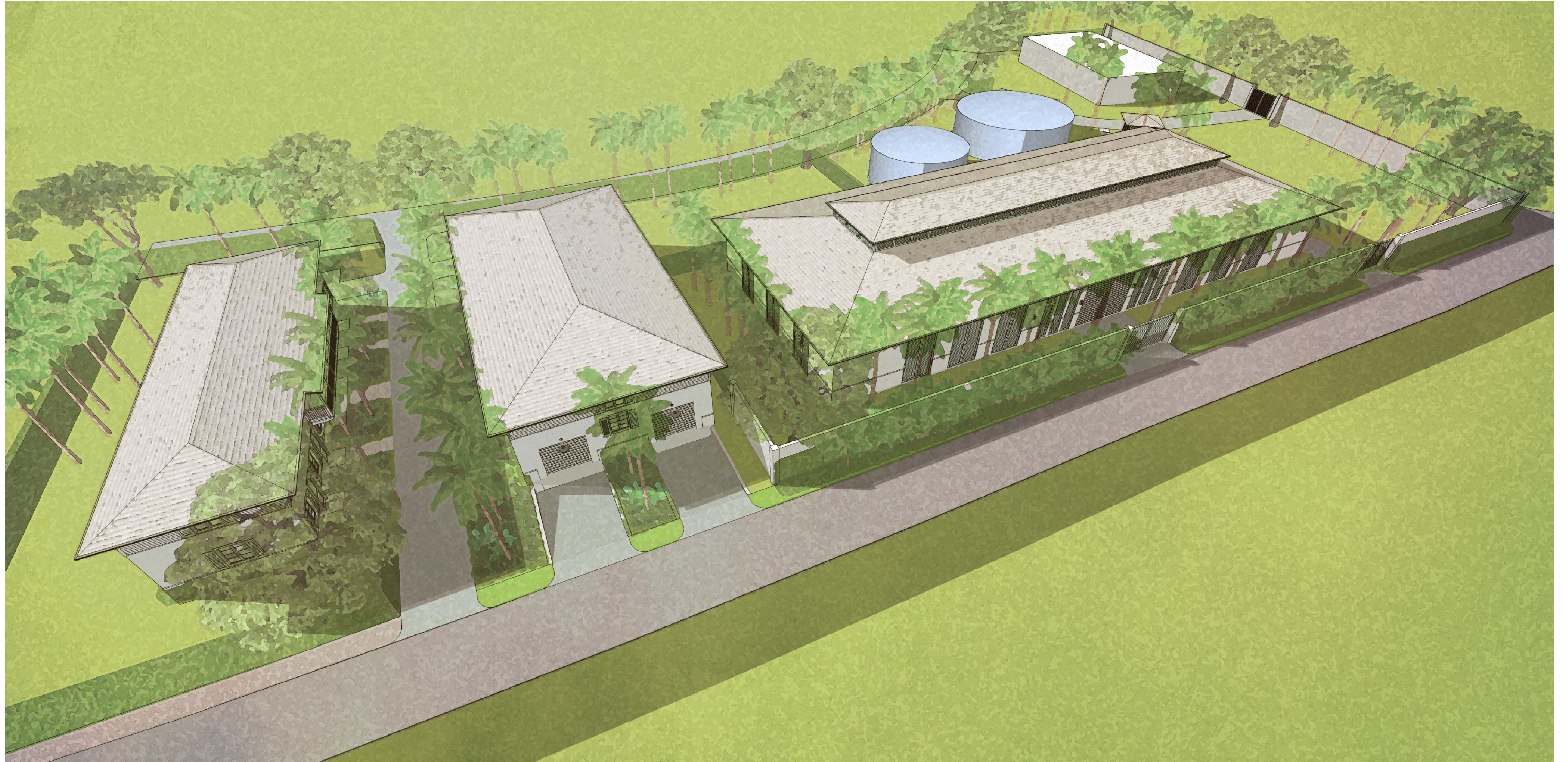


**BRILAND RESIDENCES AND MARINA**  
BAHAMAS

BACK OF HOUSE - AERIAL RENDERING SCALE: N.T.S.  
**Schematic Design** JANUARY 2020

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232 Andalusia Avenue • Suite 101 • Coral Gables, Florida 33134 • T: 305.448.4200





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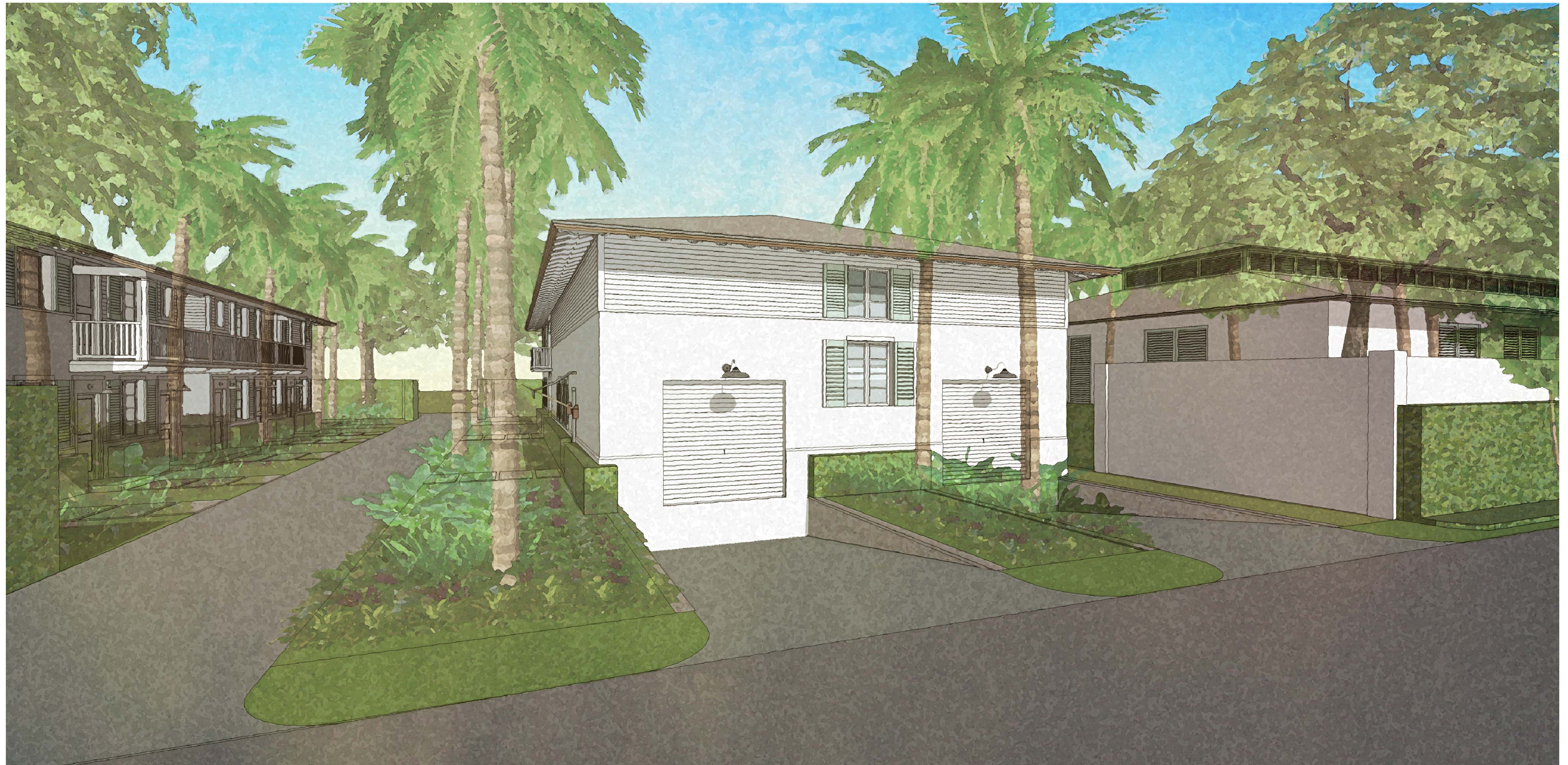


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