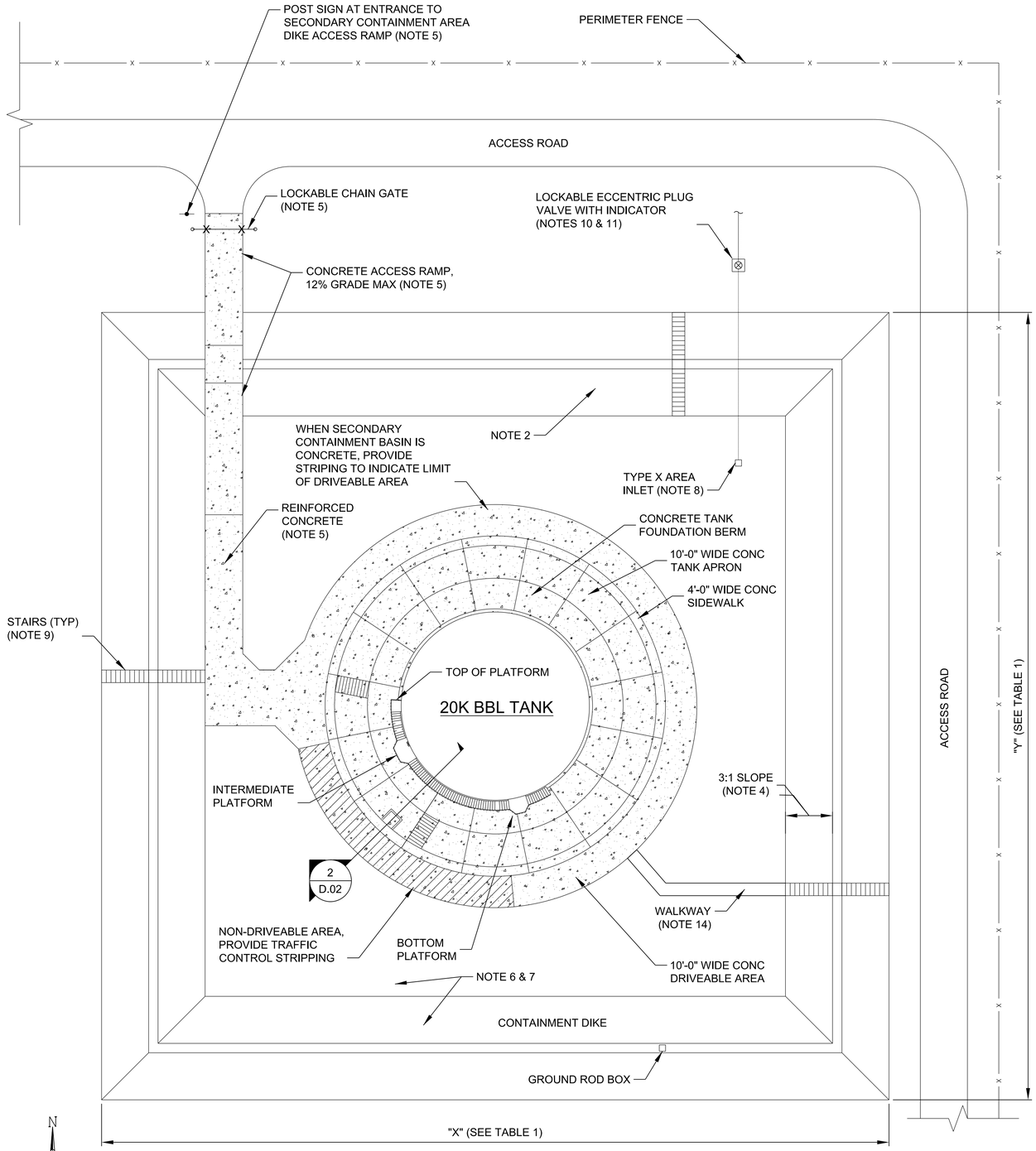

TYPICAL SITE PLAN

SCALE: 1"=20'-0"

0 10' 20' 40'

DESIGNER NOTES:

1. SITE PLAN SHOWN IS A TYPICAL 20K BBL TANK WITH A MOUNDED TANK FOUNDATION AND IS PROVIDED FOR GENERAL PLANNING PURPOSES ONLY. DIMENSIONS SHOWN IN TABLE 1 ARE FOR PLANNING PURPOSES ONLY AND ARE INTENDED TO INDICATE THE APPROXIMATE AMOUNT OF AREA REQUIRED FOR SECONDARY CONTAINMENT.
2. FOR PLANNING PURPOSES, THE SECONDARY CONTAINMENT AREA SIZE SHOWN HERE IS BASED UPON A 5'-0" HIGH TRAPEZOIDAL DIKE BERM INCLUDING 1'-0" OF FREEBOARD. THE DIKE SLOPES INDICATED ARE 3 TO 1. THE DIKE HEIGHT AND SLOPES SHOWN HERE ARE NOT STANDARD BUT ONLY AN ASSUMED DIKE HEIGHT TO ALLOW FLEXIBILITY IN PLANNING.
3. GROUPS OF TANKS, WITH NO TANK LARGER THAN 10K BBLs AND NOT EXCEEDING 15K BBLs IN AGGREGATE CAPACITY, MAY BE ENCLOSED IN A SINGLE DIKED CONTAINMENT ENCLOSURE. SUBDIVIDE EACH DIKED CONTAINMENT ENCLOSURE CONTAINING TWO OR MORE TANKS BY INTERMEDIATE WALLS OR DIKES NO LESS THAN 18" IN HEIGHT TO PROVIDE A SEPARATE DRAINAGE AREA FOR EACH TANK. SEE SHEET CD.08 FOR INTERMEDIATE WALL DETAIL. SEE UFC 3-460-01 FOR DETAILED REQUIREMENTS.
4. UNSURFACED AND AGGREGATE SURFACED DIKES SHALL BE SLOPE AT NO GREATER THAN 3 TO 1. CONCRETE SURFACED DIKES HAVE A PREFERRED MAXIMUM SLOPE OF 2.5 TO 1, WITH AN ABSOLUTE MAXIMUM OF 2 TO 1 WHEN SPACE IS RESTRICTED. A 3'-0" FLAT SURFACE IS REQUIRED ON THE TOP OF THE TRAPEZOIDAL DIKES. THE MAXIMUM ALLOWABLE DIKE HEIGHT IS 6'-0". UFC 3-460-01 REQUIRES A MINIMUM OF 12" OF FREEBOARD. VERTICAL CONCRETE DIKE WALLS ARE AN ACCEPTABLE ALTERNATIVE WHEN THERE IS NOT ENOUGH LAND AVAILABLE FOR TRAPEZOIDAL BERMS. SECONDARY CONTAINMENT AREA DESIGN SHALL COMPLY WITH UFC 3-460-01, 29 CFR 1910.106, NFPA 30 AND OTHER FEDERAL, STATE, COUNTY, AND LOCAL REGULATIONS.
5. A CONCRETE ACCESS RAMP IS PERMITTED IN DIKE AREAS FOR 20K BBL OR GREATER ASTs. VEHICLE ACCESS SHOULD BE STRICTLY CONTROLLED WITH A LOCKABLE BARRIER (I.E. CHAIN GATE) AND A SIGN. THE SIGN SHOULD READ: "ACCESS IS RESTRICTED TO AUTHORIZED VEHICLES ONLY. VEHICLES MUST BE LIGHT-DUTY AND RATED FOR USE IN CLASS 1, DIVISION 2 HAZARDOUS LOCATIONS". DESIGN DIKE ACCESS RAMPS AND BASIN/FLOOR TO WITHSTAND THE VEHICLE TRAFFIC. VEHICLE TRAFFIC SHALL NOT BE ALLOWED ON EXPOSED LINERS.
6. SECONDARY CONTAINMENT SHALL BE PROVIDED BY A FUEL IMPERMEABLE LINER. THE LINER SHOULD BE A FLEXIBLE MEMBRANE LINER (FML) PER UFGS SECTION 33 56 63 FUEL IMPERMEABLE LINER SYSTEM. A 60 MIL HIGH DENSITY POLYETHYLENE (HDPE) LINER MAY BE USED IF THE LINER IS COMPLETELY COVERED WITH CONCRETE. BALLAST MATERIAL NEEDS TO BE PROVIDED TO PREVENT WIND UPLIFT DAMAGE TO THE LINER. BALLAST MATERIALS INCLUDE CONCRETE SURFACING, SMOOTH RIVER ROCK, SAND TUBES, AND PRECAST CONCRETE BLOCKS. WIND UPLIFT CALCULATIONS ARE REQUIRED WHEN ANY PORTION OF THE FML IS EXPOSED. SEE UFGS SECTION 33 56 63 FOR FURTHER GUIDANCE.
7. CONCRETE DIKE SURFACING SHALL BE PER UFGS SECTION 32 13 15.20 CONCRETE PAVEMENT FOR CONTAINMENT DIKES. THE CONCRETE SHALL BE REINFORCED WITH SYNTHETIC FIBERS. LOCATE CONTROL JOINTS NO GREATER THAN 10 FEET APART AND SEAL THE JOINTS USING FUEL RESISTANT JOINT SEALANT (NON-SAG ON THE SLOPES). SEE SHEET C.04 FOR A TYPICAL JOINT LAYOUT PLAN.
8. SLOPE DIKE BASIN SURFACES A MINIMUM OF 1% FOR DRAINAGE. DRAINAGE SWALES SHOULD BE SLOPED NO FLATTER THAN 0.5% TO THE DRAINAGE INLET. SEE SHEET CD.09 FOR INLET DETAILS.
9. PROVIDE CONCRETE OR STEEL STAIRWAYS OVER THE DIKE BERMS. NO LESS THAN TWO DIKE STAIRWAYS SHALL BE PROVIDED OVER DIKE BERMS OR WALLS FOR EMERGENCY EGRESS. SEE DETAILS ON SHEETS CD.06 & CD.07.
10. CONSTRUCT A CONTAINMENT DRAIN LINE FROM THE DRAINAGE INLET TO THE CONTAINMENT DRAIN VALVE USING DUCTILE IRON PIPING. A NORMALLY CLOSED, LOCKABLE ECCENTRIC PLUG VALVE SHALL BE PROVIDED TO CONTROL DRAINAGE AND MUST BE ACCESSIBLE DURING A FIRE. SEE DETAILS ON SHEET CD.09.
11. DO NOT USE BURIED CONTAINMENT DRAIN VALVES IN CLIMATES WITH LOWEST ONE-DAY MEAN TEMPERATURE BELOW -15°F PER API STANDARD 650 FIGURE 4.2. PROVIDE MEANS TO CONTROL DRAINAGE THAT WILL NOT NORMALLY REMAIN FROZEN AFTER THAW OF SECONDARY CONTAINMENT CONTENTS. CONTAINMENT DRAIN VALVE OR OTHER CONTROL MEANS, WHEN PROVIDED, SHALL BE LOCKABLE.
12. PROVIDE FIRE HYDRANTS TO PROTECT POL STORAGE FACILITIES IN ACCORDANCE WITH UFC 3-460-01 & 3-600-01, INCLUDING A MINIMUM OF TWO HYDRANTS SPACED A MAXIMUM OF 300 FT APART. LOCATE HYDRANTS SUCH THAT ASTS CAN BE REACHED BY HOSE LAYS NOT EXCEEDING 300 FT IN LENGTH. FIRE HYDRANTS MUST BE ACCESSIBLE TO FIRE DEPARTMENT PUMPER VEHICLES.
13. FOR A TYPICAL PIPING LAYOUT PLAN SEE SHEET C.05.
14. FOR EXPOSED GEOMEMBRANES, SKID-RESISTANT WALKWAYS SHOULD BE PROVIDED AT EXPECTED FOOT TRAFFIC PATHS, INCLUDING THE TOP OF THE DIKES. SEE UFGS SECTION 33 56 63 FUEL IMPERMEABLE LINER SYSTEM FOR MATERIALS.

TABLE 1

NOMINAL TANK SIZE (K BBL)*	NOMINAL DIAMETER (FT)	NOMINAL SHELL HEIGHT (FT)*	FLOWRATE FILL/ISSUE (GPM)	NOZZLE SIZE FILL/ISSUE (INCHES)	SHELL VOLUME (K BBL)***	USABLE VOLUME (K BBL)	LLLA VOLUME (BBL)**	SECONDARY CONTAINMENT DIMENSIONS (5' HIGH DIKES; 3:1 SLOPES)	
								"X" (FT)	"Y" (FT)
5	39	32	1200/1200	8"/12"	6.8	5.0	625	170	170
10	49	40	1200/3000	8"/16"	13.4	10.0	1175	210	210
20	61	48	1200/3000	8"/16"	25.0	20.0	1825	265	265
30	73	48	1200/3000	8"/16"	35.8	28.9	2675	305	305
40	89	48	7000/7000	18"/24"	53.2	41.1	5300	355	355
50	90	56	7000/7000	18"/24"	63.5	50.6	5425	380	380
80	113	56	7000/7000	18"/24"	100.1	80.1	8825	465	465
100	126	56	7000/7000	18"/24"	124.5	100.1	11150	515	515

* NOMINAL TANK SIZE = APPROXIMATE USABLE VOLUME = VOLUME FROM LLA TO HLA.
** APPROXIMATE VOLUME BETWEEN SUMP AND LLLA.
*** SHELL VOLUME = VOLUME INSIDE ALL OF THE SHELL.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

US ARMY CORPS OF ENGINEERS OMAHA DISTRICT

SEAL

A/E INFO.

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO

DES RLG | DRW RLG | CHK ELB

SUBMITTED BY:

DATE: APRIL 2015

NAVAL FACILITIES ENGINEERING COMMAND – ALANTIC

DOD STANDARD DESIGN AW78-24-27

FUEL TANKS WITH FIXED ROOFS ABOVEGROUND VERTICAL STEEL

TYPICAL SITE PLAN - MOUNDED TANK

SCALE: AS NOTED

EPROJECT NO.: XXXXX

CONSTR. CONTR. NO. XXXXX

NAVFAC DRAWING NO. XXXXX

SHEET 6 OF 57

C.01

DRAWFORM REVISION: 10 MAY 2014