

**SOLID & HAZARDOUS WASTE DIVISION
STORAGE TANK PROGRAM
GUIDANCE DOCUMENT #6**

SUBJECT: MINIMUM SITE ASSESSMENTS (MSAs)

SCOPE: This document provides guidance for preparation of Minimum Site Assessment (MSA) work plans and to WDEQ staff reviewing work plans and final reports. This document explains technical aspects of the MSA process. If there are any conflicts between this document and any rule or regulation, the rule or regulation will prevail.

INTRODUCTION: Chapter 17, Part F, Wyoming Water Quality Rules and Regulations (Chapter 17), defines the requirements for conducting an MSA. This Guidance Document is provided to assist storage tank owners and operators, consultants, lending institutions, and others involved with the MSA process in understanding the requirements to comply with Chapter 17.

An MSA consists of a subsurface investigation to determine if a regulated substance from a storage tank is causing, or has caused, soil or groundwater contamination in excess of acceptable limits. If permanent closure of a tank is accomplished by removal of the tank, the STP will complete a permanent site closure assessment during the tank removal. (Note that WDEQ Solid & Hazardous Waste Division [SHWD] Guideline #1 details the requirements for petroleum storage tank waste [tank and contents] disposal.)

Figures referenced in this document are attached to the document. The current STP district office map, providing addresses and telephone numbers for each office, can be found at: <http://deq.state.wy.us/shwd/stp> and clicking on the "Map Showing District Office Sites" link.

GUIDELINES:

1. MSA Work Plan

At least 30 days prior to performing an MSA, a work plan must be submitted for review and approval to the Storage Tank Program (STP) District Office where the property is located. The STP will review the work plan within 15 working days if possible. If not possible, the STP will notify the party submitting the work plan with an estimated date for review completion. Approval of the work plan will ensure that the MSA will meet all requirements of Chapter 17 and will be accepted by the STP. At a minimum, the work plan must contain:

- A. Facility name, address, and identification number, if applicable.
- B. Name, address, and telephone number of person(s) who will be conducting the MSA.

- C. Number of storage tanks, whether they are aboveground storage tanks (ASTs) or underground storage tanks (USTs), how many tanks are regulated, and how many tanks are unregulated.
- D. Description of the MSA methodology to be used for storage tanks and connected piping, including borehole and soil excavation installation and closure, monitor well installation and closure, equipment decontamination, and contaminated soil and groundwater disposal.
- E. Soil and groundwater Sampling and Analysis Plan, including proposed sample collection, preservation, and shipment protocols. STP analytical requirements are available in STP Guidance Document #7, which can be found at <http://deg.state.wy.us/shwd/stp> and clicking on the “Guidance Document” link. The procedures, analyses, and laboratory methods found in Guidance Document #7 must be followed as they relate to MSAs. MSA constituents of concern for all tank sites are benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbons (TPH) as diesel range organics (DRO), and naphthalene. Additionally, at fuel tank sites, TPH as gasoline range organics (GRO) must be included in the sampling and analyses plan.
- F. A site map (to scale with a north arrow) showing the location of property lines; drainages; buildings; tanks; connected piping; utilities; and proposed boreholes, monitor wells, and soil excavations.

2. Storage Tank MSA

Boreholes or soil excavations should be completed within 5 horizontal feet of the UST or AST secondary containment. The boreholes or soil excavations should extend a minimum of 3 feet below the bottom of an UST. The boreholes or soil excavations should extend a minimum of 15 feet below the bottom of an AST. If an AST is very large in diameter and, depending on the location of the boreholes or soil excavations, the minimum depth for boreholes or soil excavations may need to be deeper to detect a petroleum release. These distances should be measured from the outside and bottom of secondary containment structures. Whenever a water table is encountered, the borehole or soil excavation should be extended to a depth necessary for collection of a groundwater sample.

To provide adequate characterization of potential soil and groundwater contamination, borehole or soil excavation locations should be located as shown on Figure 1. If buildings, concrete foundations, utilities, or other obstructions prevent locating the boreholes or soil excavations as shown on Figure 1, alternate locations should be proposed and explained in the work plan.

3. Connected Piping and Dispenser MSA

Boreholes or soil excavations should be completed within 3 horizontal feet of the piping and extend to at least 3 feet below the piping. Whenever a water table is encountered, the borehole or soil excavation should be extended to a depth necessary for collection of a groundwater sample.

Boreholes or soil excavations must extend to at least 10 feet below the bottom of a dispenser sump. If the dispenser is located less than 20 feet from the storage tank(s), one borehole or soil excavation should be completed at the dispenser. At sites where the dispenser location is more than 20 feet from the storage tank(s), a borehole or soil excavation should be completed at the dispenser and at every 20 feet along the piping from the dispenser to the storage tank(s).

The exact location of buried product lines may not be known at some facilities. Because line leaks are a primary source of contamination at many sites, every effort should be made to locate product lines and collect soil and groundwater samples from under them. Concerns regarding sampling under dispensers and buried piping should be discussed with STP district office staff.

4. Borehole and Soil Excavation Completion

Hollow stem auger or direct push drilling are the preferred drilling methods for completing boreholes. If these drilling methods are not appropriate at a storage tank location, an alternate drilling method must be proposed and justified in the work plan. Soil excavations are usually accomplished using standard backhoe equipment that can excavate to a depth of at least 15 feet below ground surface.

An accurate log of subsurface conditions must be provided for all boreholes and excavations using the attached Borehole Installation Diagram (or similar form that provides the same information and details). The log should include a description of the soils and groundwater (color, odor, petroleum sheen, etc.), and where groundwater was encountered during drilling or excavating. The depth to groundwater from the ground surface should be recorded.

All down-hole drilling or soil excavation equipment must be decontaminated with clean water between boreholes and excavations to minimize the risk for cross contamination. Decontamination water must be disposed of according to local, state, and federal regulations.

If the soils removed from the boreholes or soil excavations are not contaminated, they may be disposed of on site if approved by the site owner. If the soils are contaminated, they must be disposed of at a site approved by the WDEQ, Solid and Hazardous Waste Division, (307) 777-7752. WDEQ, SHWD Guideline #2 details the requirements for handling petroleum-contaminated soils.

Shallow boreholes that do not penetrate the groundwater table may be abandoned with uncontaminated drill cuttings from the bottom of the borehole to within 2 feet of the surface. The top 2 feet must be closed with either bentonite

slurry or hydrated bentonite chips. All other boreholes must be abandoned with bentonite slurry from the bottom of the borehole to the surface. Soil excavation closure should be completed by filling the excavation with uncontaminated and compacted backfill material. The surface must be returned to pre-excavation conditions.

5. Monitor Wells

All boreholes or soil excavations that encounter groundwater must be completed as monitoring wells. All monitor wells must be constructed using 2- or 4-inch diameter Schedule 40 PVC well casing. Other casing diameters or materials may be used, if they have been proposed in the work plan and approved by the STP.

All well casing sections must be flush-threaded. PVC glue or plastic welding solvents may not be used to join casings. The casing should be fitted with a threaded, free draining bottom cap of the same material as the casing. The top of the casing must be fitted with a locking cap.

The well screen must be commercially manufactured plastic screen or slotted casing. The screened interval shall extend at least 2 feet above the highest seasonal groundwater level and at least 5 feet below the lowest expected groundwater table. The granular pack around the screened interval shall contain no particles larger than 10 times the slot width of the screen and extend to 1 foot above the screen.

A bentonite plug, 2 feet in thickness, shall be placed above the granular pack. The annular space above the bentonite plug must be sealed with neat cement, sand-cement grout, bentonite clay, or concrete as specified in Water Quality Rules and Regulations, Chapter 11, Part G, Section 65 (c).

Monitor wells shall be completed with an 8-inch diameter, watertight, flush-mounted, traffic-rated well box set 1-inch above the ground surface in non-paved areas. Monitor wells in paved areas shall be installed flush with the existing paving or grade. The well box shall be set in place with a concrete surface seal (4,000 pounds per square), 12-inches thick. A wire-mesh reinforced concrete apron shall slope to the ground surface to facilitate runoff. A schedule 40 PVC watertight well plug with a locking cap must be provided.

Monitor well construction details should be documented on the attached Monitor Well Installation Diagram (or similar form providing the same information).

Monitor wells should be abandoned by filling the entire screen and casing with high-quality sodium bentonite in slurry, hydrated chip or granular form, and filling the well box with concrete finished to grade.

6. Soil Sampling

If contamination is encountered within a borehole or soil excavation at the tank or piping system, a soil sample must be collected from the most

contaminated section of the borehole or excavation. The determination of the most contaminated location may be done visually or with field instrumentation, such as a photoionization detector (PID).

If contamination is not observed or detected with a field monitoring instrument, a soil sample must be collected from the bottom of the borehole or excavation. If groundwater is encountered in a borehole or excavation, the soil sample must be collected from the most contaminated area and, if possible, immediately above the groundwater table. The soil description must be documented on the Borehole Installation Diagram and must contain the type and color of soils (grey clay, brown sand, sandy loam, etc.) and any unusual conditions (gas/diesel odor, oily feel, heavily stained, chemical odor, etc.).

Soil samples must be collected, preserved, packaged, and analyzed in accordance with the laboratory's requirements and as provided in the approved work plan and STP Guidance Document #7.

7. Groundwater Sampling

The depth to the groundwater table and a description of the water (color, odor, petroleum sheen, etc.) must be recorded on the Borehole Installation Diagram whenever groundwater is encountered during drilling or excavating. A representative sample of the groundwater must be collected, preserved, packaged and sent to the laboratory as soon as possible for analysis. If the groundwater contains floating free product, a sample does not need to be collected; but the depth to, and thickness of, the free product must be recorded on the Borehole Installation Diagram.

New monitor wells must be developed by mechanical bailing or pumping at least 48 hours prior to sampling. Static water level and free product thickness must be measured prior to sampling. A minimum of three well-casing volumes of water must be removed from the well prior to sampling. Low-yield wells can be purged to dryness. Sampling should not occur until the well has completely recovered. Sampling equipment must be decontaminated between each well to prevent cross contamination.

Sample handling procedures must be presented in the work plan and approved by the STP. Groundwater samples must be collected, preserved, packaged, and analyzed in accordance with the laboratories requirements and as provided in STP Guidance Document #7. Sample analyses must be accomplished at laboratories accredited by the American Association for Laboratory Accreditation (A2LA) for the Wyoming Storage Tank Program. A list of these labs can be found on the STP's website: <http://deq.state.wy.us/shwd/stp> and clicking on the "Prequalified Contractors" link.

If a regulated hazardous substance (chemical substance) is stored in the tank, the STP district office staff must be contacted to obtain the specific chemical analyses and procedures to use for soil and groundwater samples.

8. Soil and Water Disposal

Contaminated soil, groundwater, and decontamination water must be disposed of in accordance with local, state, and federal regulations. Specific disposal methods must be proposed in the work plan and approved by the STP. WDEQ, SHWD Guideline #2 details the requirements for handling petroleum-contaminated soils.

9. Documented contamination

If evidence of a recent or current release is discovered during an MSA at an active storage tank facility, the owner and/or operator of the facility is required to immediately notify the STP district office.

10. Final MSA Report

Within 45 days after completing the MSA, the owner and/or operator is required to submit two copies of a final MSA summary report to the appropriate STP district office for review and approval. The report may be in the form of a consultant's report or provided on the attached MSA Report Form. At a minimum, the report must include:

- A. Facility name, address, and ID number and the name of person(s) performing the MSA
- B. Date(s) the MSA was performed
- C. Storage tank information for each tank, including tank number, type (AST or UST), capacity, regulated substance stored, and depth to top and bottom of tank
- D. Borehole and soil excavation information, including identification, total depth, depth to groundwater, and description of soils and groundwater
- E. Discussion of any contamination including depths encountered or lack of contamination discovered
- F. Description of all monitor well installations
- G. A copy of all laboratory results and field measurements, if applicable
- H. A map of the facility (to scale and including a title and north arrow) showing structures; drainages; property lines; tanks; piping; dispensers; and location of boreholes, soil excavations, and monitor wells

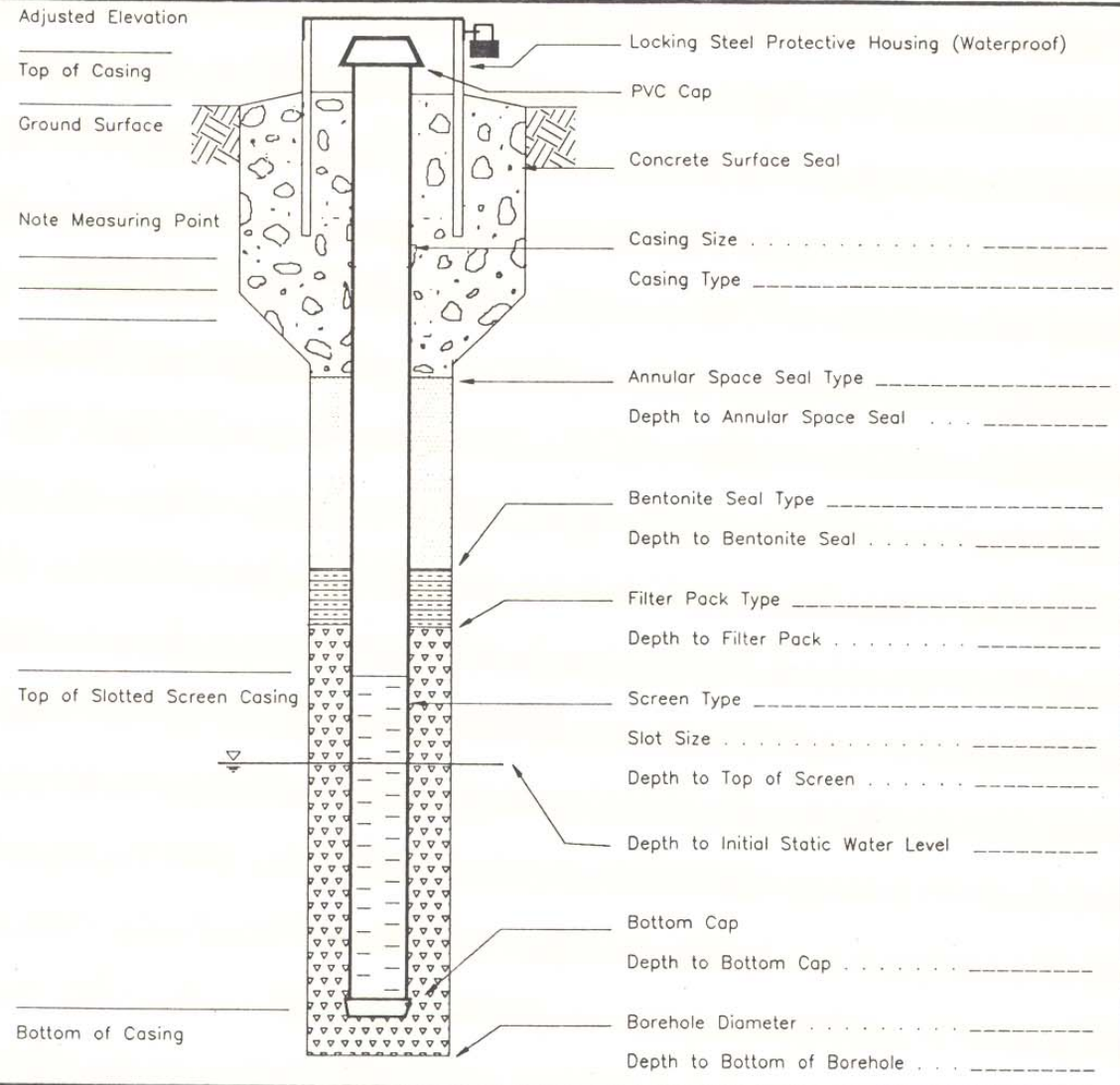
Any questions concerning the format or content of the MSA report should be discussed with the STP district office staff prior to submitting the report.

**STP GUIDANCE DOCUMENT #6
MINIMUM SITE ASSESSMENTS**

ATTACHMENTS

MONITOR WELL INSTALLATION DIAGRAM

Project _____ Monitor Well No. _____
 Location _____ Borehole No. _____
 Contractor _____ Date _____
 Driller _____ Observed by _____
 Method _____ Checked by _____
 Sheet _____ of _____



Surveyed by _____ Date _____
 Remarks _____

**Wyoming Department of Environmental Quality
Storage Tank Program
Minimum Site Assessment Report**

Facility Name: _____

Facility ID Number: _____

Facility Address: _____

Owner/Consultant Completing MSA (Name and Address):

TANK INFORMATION						
Tank No	Type (AST/UST)	Volume Gallons	Regulated Substance Stored		Depth to Tank Top (feet)	Depth to Tank Bottom (feet)
			Currently	Previously		

NOTE: If more than 6 tanks exist at the site, add additional spaces or attach an additional page.

BOREHOLE AND SOIL EXCAVATION INFORMATION

Number	Total Depth (feet)	Depth to Groundwater (feet)	Description of Soils and Groundwater
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

NOTE: Add spaces or attach an extra sheet if necessary.
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Attach scaled site facility map and all laboratory analytical reports. Send completed, signed report to the STP District Office, or the Wyoming Department of Environmental Quality, Solid & Hazardous Waste Division, Storage Tank Program, Herschler Building-4W, Cheyenne, Wyoming 82002.

TANK OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this report and all attached documents, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete.

Name of Owner (Printed)

Signature

Date

FOR WDEQ STP DISTRICT OFFICE USE ONLY:

MSA Acceptable? ___ Yes ___ No

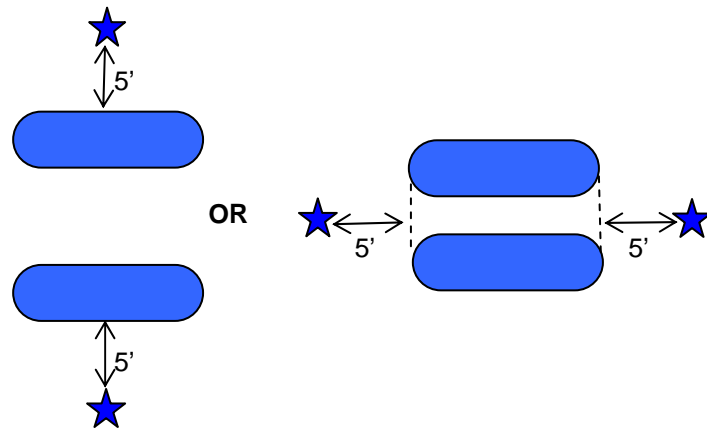
Date Replied to Owner/Operator: _____

STP Review by: _____

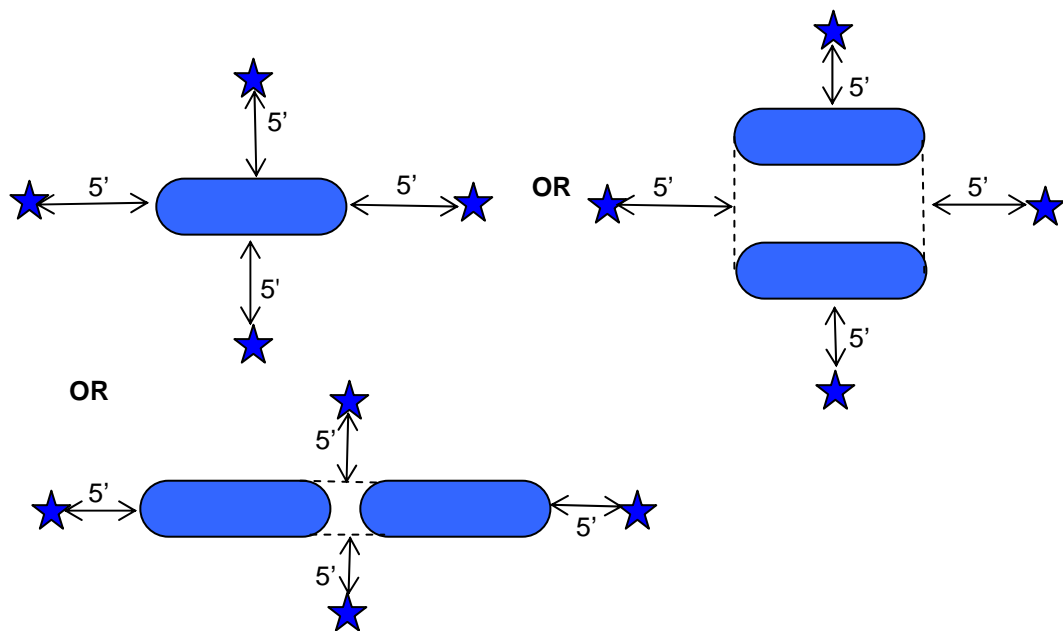
Date: _____

**FIGURE 1
SOIL BOREHOLE OR EXCAVATION
LOCATION REQUIREMENTS**

A. One or two storage tanks with < 1,100 gallons total storage capacity in the same storage tank basin or secondary containment structure requires two boreholes or excavations (one on each side **or** one on each end). Same configuration as shown below for one tank.

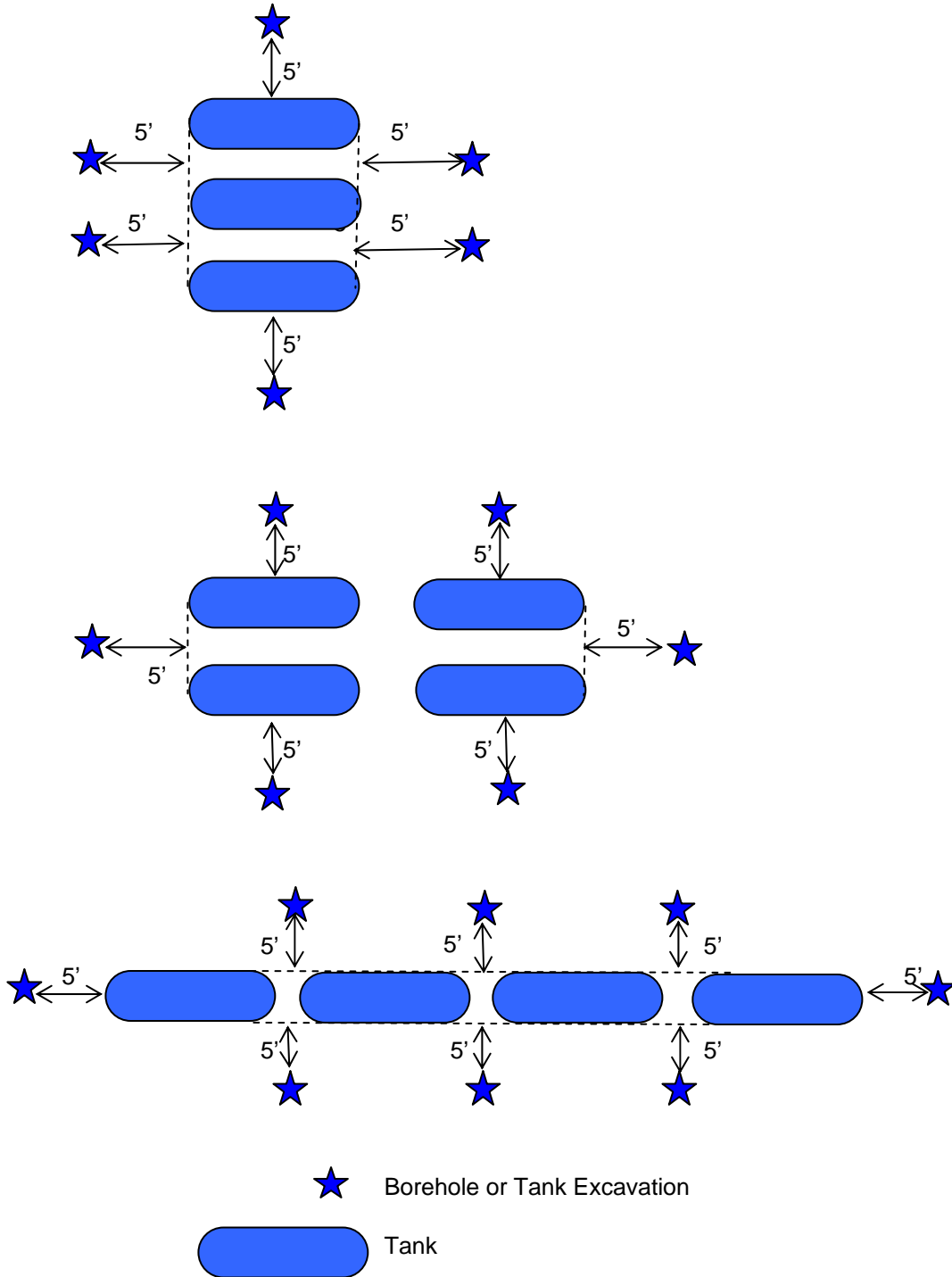


B. One or two storage tanks with $\geq 1,100$ gallons total storage capacity in the same storage tank basin or secondary containment structure requires four boreholes or excavations (one on each side **and** one on each end).



**FIGURE 1 SOIL BOREHOLE OR EXCAVATION
LOCATION REQUIREMENTS (Continued)**

C. Three or more storage tanks with $\geq 5,000$ gallons total storage capacity in the same storage tank basin or secondary containment structure.



Call STP district office for borehole or excavation location approval for configurations different from those shown.