

Appendix D. Tanker Truck Availability for Emergency Water Supply

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Technical Memorandum



Water Supply Forum – Regional Resiliency Project

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From: Andrew Graham and Dan Graves, HDR
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Subject: Tanker Truck Availability for Emergency Water Supply (Task 202.4)

1.0 Introduction

This technical memorandum was developed for the Water Supply Forum – Regional Resiliency Project's Task 200: Earthquake Risk Assessment. It summarizes information on tanker trucks collected under Subtask 202.4. These are tanker trucks that could be available regionally with the capability to transport water for post-event emergency response to meet essential needs. This memorandum also develops simple estimates of the volumes of water that may be necessary for emergency purposes following an earthquake event, and how many of the tanker trucks identified would be required to satisfy those demands. These estimates are based on broad assumptions and are best viewed as establishing a general range for consideration of how tanker trucks could fit into a response strategy. Locations of water refill stations in the vicinity of the hospitals and shelters should also be taken into account in the response strategy. More specific estimates should be developed for individual communities or utilities.

2.0 Tanker Truck Database Development

HDR collected a list of tanker trucks available in the region through two approaches:

1. Desktop research conducted by HDR identified bulk tanker truck delivery companies in Washington, Oregon, Northern California, and Idaho.
2. Seattle Public Utilities (Contact: Ned Worcester) gathered information on tanker truck companies available within the Northwest region.

A summary of resulting companies that have tanker trucks with the capability to transport potable water and food grade ingredients such as dairy, juice, wine, etc., was developed. Although food grade tanker trucks are typically considered non-potable, some companies have capabilities of disinfecting their food grade tanker trucks at their facility so that they can be used for potable water service as well.

HDR compiled the resulting information into a list of the companies with tanker truck capabilities with company locations, owner's contact information, and the potential capability for delivery of potable water and food grade ingredients. The companies were contacted to confirm availability of tanker trucks that are capable of delivering either potable water or food-grade ingredients.

The confirmed companies were then grouped into the following categories based on each company's total delivery capacity:

- small (<100,000 gallons)
- medium (100,000 to 1,000,000 gallons)
- large (> 1,000,000 gallons)

Table 1 lists the confirmed companies based on these categories.

Table 1. Regional Companies with Confirmed Tanker Truck Availability

Regional Water Resiliency Project - Task 202.4										
Small (<100,000 gal capacity)										
Location	Company	Phone	Potable Tankers			Food Grade Tankers			Total Capacity (gal)	
			Quantity	Capacity (gal)	Material	Quantity	Capacity (gal)	Material		
Bellingham, WA	Bayside Services	360-671-2527	1	3,000	?	0			3,000	
Stanwood, WA	Kenmar Water Trucks	360-652-3725	1	3,000	?	0			3,000	
Spokane, WA	Commercial Truck Service, Inc.	509-487-9171	1	4,000	?	0			4,000	
Sweet Home, OR	No Drought Potable Water Services	541-409-3556	1	3,300	Stainless Steel	0			6,100	
			1	2,800	Stainless Steel					
Idaho Falls, ID	Golden Crest	208-524-9002 208-313-6074	3	3,600	Stainless Steel	0			10,800	
McCall, ID	Have Water Will Travel	208-630-4837	1	3,750	Stainless Steel	0			4,800	
			1	1,050	Plastic					
Rathdrum, ID	Standish Water Trucks	208-687-1315	1	3,800	?	0			7,400	
			1	3,600	?					
Salmon, ID	Bird Tire	208-756-4327	2	3,900	Stainless Steel	0			7,800	
Bonney Lake, WA	Water Buffalo Inc.	253-863-8883				3	4,000	Epoxy lined		22,560
						1	2,560			
Modesto, CA	Vito Trucking, LLC	209-342-5104	7	6,500	Stainless Steel	0			45,500	
Santa Rosa, CA	Clifton Water Trucking	707-237-2659	1	3,700	Stainless Steel	0			3,700	
Total capacity (gal):									118,660	
Medium (100,000 to 1,000,000 gal capacity)										
Location	Company	Phone	Potable Tankers			Food Grade Tankers			Total Capacity (gal)	
			Quantity	Capacity (gal)	Material	Quantity	Capacity (gal)	Material		
Modesto, CA	G3 Enterprises	800-321-8747	0			45	6,300	Stainless Steel	283,500	
Santa Rosa, CA	Butch Cameron Trucking & Tank Rentals	707-546-0146	35	Varied						
Total capacity (gal):									283,500	
Large (>1,000,000 gal capacity)										
Location	Company	Phone	Potable Tankers			Food Grade Tankers			Total Capacity (gal)	
			Quantity	Capacity (gal)	Material	Quantity	Capacity (gal)	Material		
Lynden, Wa Sunnyside, WA Moses lake, WA Vancouver, WA	LTI Inc. (Lynden-Milky Way)	360-354-2101	0			500	9,000	Stainless Steel	6,526,250	
						215	8,000	Stainless Steel		
						50	6,125	Stainless Steel		
Burley, ID	Idaho Milk Transport	208-878-5000	0			300	6,000	Stainless Steel	1,800,000	
Total capacity (gal):									8,326,250	

Table 2 summarizes the total confirmed capacity of tanker trucks in each category.

Table 2. Summary of Tanker Truck Capacity in Northwest States

Category based on Capacity	Number of Companies	Confirmed Available Capacity, gallons
Small (<100,000 gallons)	11	118,660
Medium (100,000 and <1,000,000 gallons)	2	283,500
Large (> 1,000,000 gallons)	2	8,326,250
Total	15	8,728,410

3.0 Water Needs for Hospitals and Emergency Shelters

To develop a basis for determining how many tanker trucks may be required to meet emergency water demands in an earthquake disaster scenario, broad estimates of water needs for two services of concern, hospitals and emergency shelters, were developed.

Potential hospital demands were determined by multiplying the number of patients the hospital can serve at once (represented by the number of beds at the hospital) times a range of water demands in gallons per day (gpd) per person. The number of beds at each hospital was multiplied by 2 to include outpatients who will be coming and going in the days following an earthquake as well as inpatients staying continuously. The range of quantities of water per patient was estimated as 10 gpd to 20 gpd; these quantities were selected as estimates of fundamental life-sustaining water needs and exclude any extra non-essential services. Hospital employees were also included in the total water requirement. Three employees were assumed per patient. An estimate of how much water one employee may need for essential life-sustaining needs only is 3 gpd.

Regarding water delivery to emergency shelters, this analysis assumes that shelters accommodating 10,000 people would be set up in each jurisdiction (total shelter capacity of 40,000 people throughout the WSF region). Shelter volunteers were also included in the total water requirements. One shelter volunteer was assumed per 50 shelter residents (200 volunteers per shelter). Shelter residents and volunteers were allocated 3 gpd for essential life-sustaining needs only, similar to hospital employees. This results in 122,400 gpd total for all shelters across the WSF region.

Table 3 summarizes the high- and low-end total water demands for emergency services (hospitals and shelters combined) that may be required immediately following an earthquake. The low end estimate represents the 10 gpd per patient assumption; the high end estimate represents the 20 gpd per patient assumption. Table 4 lists the hospitals used in this estimate, by Forum utility or jurisdiction.

The low and high end estimates of hospital needs are on the order of 5 to 8 percent of typical winter hospital demands in the region. This analysis is not intended to limit the quantity delivered, but simply to establish a range that may be needed to temporarily meet basic needs using tanker truck deliveries during a short period following an earthquake, until piped, potable water supplies can be restored to critical facilities.

Table 3. Short-term Emergency Water Need Estimates to Support Estimate of Tanker Trucks Required

	Number of Hospital Patients or Shelter Residents ⁽¹⁾	Number of Hospital Employees or Shelter Volunteers ⁽²⁾	GPD (Low End)	GPD (High End)
Hospitals				
Seattle	5,652	16,956	107,388	163,908
Everett	936	2,808	17,784	27,144
Tacoma	1,820	5,460	34,580	52,780
Cascade	1,674	5,022	31,806	48,546
Hospital Subtotal	10,082	30,246	191,558	292,378
Shelters (Forum Region)	40,000	800	122,400	122,400
Total:	50,082	31,046	313,958	414,778

⁽¹⁾ Number of patients estimated as number of hospital beds times 2. This is intended to account for outpatients as well as inpatients. See Table 4 for list of hospitals included, and number of beds at each hospital. For purposes of this estimate, emergency shelters are assumed to have 10,000 residents each, times four across the Forum region. Distributing the shelter population across more sites would not change the quantity of water needed.

⁽²⁾ Number of employees assumed to be three employees per patient at hospitals under emergency conditions. Emergency shelters assumed to have one volunteer per 50 residents.

Table 4. Number of Beds Used to Estimate Hospital Needs

	Number of Beds
Everett	
Providence Regional Medical Center	468
Seattle	
Swedish	697
UW Medical Center	450
Harborview	413
Swedish Cherry Hill	385
Virginia Mason	336
Northwest	281
Seattle Children's	250
Group Health	14
Seattle Total	2,781
Cascade	
Overlake (Bellevue)	347
Swedish/Issaquah	120
Evergreen (Kirkland)	275
Fairfax (Kirkland)	95
Cascade Total	837
Tacoma	
Tacoma General	437
St. Joseph	343
Multicare Allenmore	130
Tacoma Subtotal	910
Regional Total:	4,996

Source : "List of hospitals in Washington (state)" from online web page:
[https://en.wikipedia.org/wiki/List_of_hospitals_in_Washington_\(state\)](https://en.wikipedia.org/wiki/List_of_hospitals_in_Washington_(state))

4.0 Sufficiency of Tanker Trucks to Meet Hospital and Emergency Shelter Needs

The water needs developed in the Section 3 were compared with the capacity of tanker trucks identified in Section 2.

Most of the total available capacity is from companies grouped under the “Large Capacity” category (>1,000,000 gallons). The 2 largest tanker truck volumes available are 9,000 gallons and 8,000 gallons. Additionally, nearly 80% of the confirmed available capacity listed in the “Large Capacity” category comes from one company called LTI Inc. (Lynden-Milky Way). LTI Inc. has its Washington terminals at Lynden, Sunnyside, Moses Lake, and Vancouver. Sunnyside is currently their largest terminal.

To supply emergency water to hospitals at a rate of 10 gpd per patient, at least twenty-one 9,000-gallon trucks, or twenty-four 8,000-gallon trucks would be necessary. At a rate of 20 gpd per patient, at least thirty-two 9,000-gallon trucks or thirty-seven 8,000-gallon trucks would be required. These numbers assume a single trip per day is made by each truck.

For shelters, four 9,000-gallon trucks, or four 8,000 gallon trucks would be required to serve each shelter. Based on the tanker truck volumes in table 2, approximately 8 to 10 lower-volume (~3,000 gallons) tanker trucks would be necessary to supply a shelter.

It is important to consider that tanker trucks take time to reach their destinations, and may be delayed due to damaged transportation infrastructure. Once arrived, methods of dispensing water may be slow due to congestion at the point of off-loading. Pre-planning points-of-distribution, as well as coordinating priority uses and receiver personnel could relieve some congestion during off-loading. It is also assumed water will need to be transferred to small vessels such as portable bladder tanks for distribution at the receiving end; and manual methods may be needed to transfer water to multiple floors of a large hospital facility.

5.0 Conclusions

The central Puget Sound region has limited availability of companies with tanker trucks that can deliver potable water. However, the necessary water demands of emergency services can be met for the first few days following the event if some tanker trucks can mobilize quickly. Companies in the “Large Capacity” category, such as LTI Inc. have systems in place for establishing on-call contracts. For example, LTI Inc. currently has a contract with the Washington Department of Natural Resources for on-call as-needed tanker truck supply. In any scenario, if it is desirable to contract entirely with in-state suppliers, then aid would need to be provided at least in part by LTI; all the other in-state tanker truck providers combined cannot fulfill the needs of the Water Supply Forum region. It is recommended that the Forum contact such companies within the Northwest Region and consider establishing contracts for emergency response.

This analysis is only an initial exercise, designed to establish a broad understanding of water demands that could be served by tankers in an emergency situation for consideration in the Forum’s overall regional resiliency strategy. Additional critical facilities could be identified, such as nursing homes, corrections centers, and other sites containing vulnerable residents. This memo is not designed to be all inclusive in this regard, and the utilities may need to work with local governments to expand these estimates to account for other sites needing tanker truck services. More specific requirements could be developed on a community-specific basis in conjunction to local emergency response planning and associated table-top exercises.