



Providing Alternative Water Supplies for Fire Fighting

Purpose

This document is intended to provide assistance to builders, developers, and homeowners in meeting conditions of consent regarding Water Storage for Fire Fighting. It is a guide only and must be read in conjunction with the New Zealand Fire Service Fire Fighting Water Supplies Code of Practice (SNZPAS 4509;2008). It is also recommended that advice be sought from the Fire and Emergency New Zealand.

Introduction

Nationally, some councils, in consultation with Fire and Emergency New Zealand (FENZ), are requiring land/building owners to provide a Water Supply for Fire Fighting purposes for a new dwelling not covered by a reticulated water supply. While rural properties will have water tanks that may be accessed for fire fighting, there can be no guarantee that there is sufficient water in the tank to effectively deal with the fire. Having access to sufficient quantities of water in the early stages of fire suppression activities has a significant effect on the outcome.

What Information is Available

The Fire and Emergency New Zealand website provides a link to the relevant legislation;

Log onto the FENZ Website <https://fireandemergency.nz/>

Or find the code here: [Firefighting Water Supplies Code of Practice](#)

Means of Compliance

Means of Compliance includes, but is not limited to, the following;

We recommend you check the Invercargill City District Plan section 3.38 for detail of council requirements. The building footprint size provides for alternative water requirements.

A tank on the ground, fitted with a coupling approved by the Fire Region Manager. The coupling must be no closer than 6m to the risk and no further than **90m** from the risk. Hard standing must be provided to provide sufficient access so as the Fire Service Pump Inlet is within **5 m** of the coupling to the water source and a minimum of **6m** from the risk. The tank/tanks are to be arranged so that no less than 45 000 litres is available at all times.



Typical Suction Coupling

A tank above ground (flooded source). The tank will need to have the outlet at a sufficient height above the approved coupling so as to provide a minimum pressure at the pump of 100kpa at maximum design flow. In all cases this will be at least 10m. The coupling will need to be no closer than **6m** to the risk and no further than **90m** from the risk. Hard standing must be provided to within 25m. The tank/tanks are to be arranged so that no less than 45 000 litres is available at all times.

A tank buried in the ground with a manhole to provide access. The access point must be no closer than **6m** to the risk and no further than **90m** from the risk. Hard standing must be provided to provide sufficient access so as the Fire Service Pump Inlet is within **5 m** of the tank access point and at least 6m from the risk. Where the tank is partially buried and access is via a manhole, the man hole may be no higher than **1 meter** above the ground level. The tank/tanks are to be arranged so that no less than 45 000 litres is available at all times.

Note; Where plastic tanks are used, consideration must be given to the effects of radiant heat when sighting the tank

An open water source (suction source) such as a pond, stream or pool. These may either have a fixed suction pick up fitted with an approved coupling or allow direct access for Fire Service Suction Hose. Hard standing must be provided to provide sufficient access so as the Fire Service Pump Inlet is within **5 m** of the water source or permanent coupling and at least **6m** from the risk. Access to the water source may be no closer than 6m from the risk and no further than 90m from the risk.

The quantity of water required may be reduced with consideration towards installing a **sprinkler system**. A reserve of 7000 litres of water is sufficient for the operation of a sprinkler system. This total cost of installation can compare favorably with tank supply requirements for a building without a sprinkler. It is the best for protection of your property.

Domestic Sprinkler System

Firefighters may take longer to reach rural locations, so home sprinklers can be a particularly useful safety device in these areas.

If your house is in a rural area, you may need to install a pump to increase water pressure to the sprinkler heads.

Sprinklers are designed to activate when a fire is becoming life threatening. They require the temperatures of a fire to activate them. The best time to install sprinklers is when you're building a new house or substantially renovating an existing one. However, installing sprinklers into existing homes (retro-fitting) is also becoming an increasingly affordable option.

You can choose from ceiling or wall-mounted sprinkler heads. These come in a wide range of styles so you can match them to your interior design. You can also opt for concealed sprinklers.



Standard Sprinkler

An exposed head that is fitted on a ceiling. An escutcheon (the plate around the sprinkler) can be fitted to create a better looking finish.

Concealed Sprinkler

The sprinkler is concealed above the ceiling, and only a round disc can be seen. This is a more attractive finish. In the case of a fire, the cover plate drops off at 57C and the sprinkler drops down. The head activated at 68C or higher. Finished in white, special colours may be obtained on request.



New sprinkler heads are designed to work on very low pressure (around 50-75Pa).

With a sprinkler-controlled fire, the total water usage would be around 340-720 litres. A non-sprinkler-controlled fire would use approx 27,500 litres of water.

An uncontrolled fire doubles in size every 30 seconds and would take approx 30 minutes for the fire to be subdued. Therefore, with a sprinkler system installed, damage will be kept to a minimum.

Check [4517:2010 Fire Sprinkler Systems for Houses](#) to check any work done meets national installation standards.

Sprinkler installation for a new home costs are comparable to the installation of large quantity tanks for water.

Do sprinklers activate accidentally?

They can be accidentally broken or damaged by a physical blow so caution is advised when working around them. Concealed are less likely to sustain damage. The chances of a sprinkler head falsely activating, are about 1 in 16million

Speak to your local Fire Risk Managers to find out more.

Other Points to Consider

Landscaping and future development. Consideration needs to be given to any future development on your section. Simply putting up a fence may severely impact on Fire Fighters ability to access water. What implication will trees have to large vehicle access as they grow?

Vehicle Access. Currently, FENZ Fire Appliances require a corridor of around 4m square on a surface capable of withstanding a 20t Fire Appliance. At the water source, there will also need to be sufficient space to conduct Fire Fighting activities. For Hard standing see point 6.4 of SNZ PAS 4509;2008

Visibility. Tanks and their access points or approved couplings need to be visible by use of Signs, Marker Posts, or other suitable identifiers.

We are also happy to consider shared water supplies between adjacent neighboring properties. The criteria still requires the supply to meet the quantities within the Code of Practice and should be within 90 metres of the building however, agreement to maintain a water supply and cost sharing of that source may be taken into consideration.

The conditions of the consent need to be maintained at all times. FENZ advice is free and we are more than happy to help you to design a system that works for all parties. Please contact the Invercargill Fire Station on 03 218 4114.

EXAMPLES

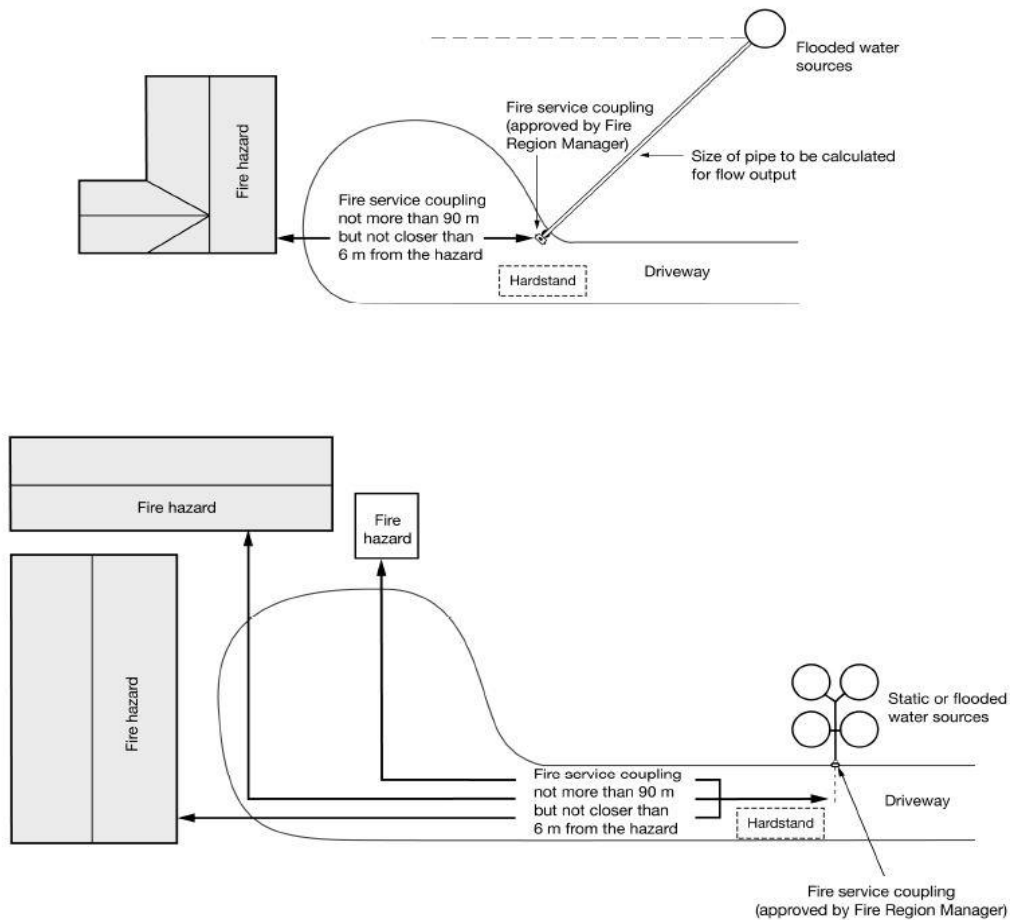


Figure B4 – Examples of how alternative water supplies can be delivered to within 90 m of a hazard

B4 Water pressure, flow, and volume for alternative firefighting water sources

For the purposes of calculation, the pressure at the Fire Service coupling must be assumed to be -60 kPa for suction sources, and must be hydraulically calculated to give a minimum pressure of 100 kPa at the pump inlet for flooded sources at maximum design flow.

The required flow from an alternative firefighting water source must be determined from table 2 or calculated from Appendix J, taking into account any available reticulated supplies.

The adequacy of the flow from the alternative firefighting water source must be demonstrated to the satisfaction of the Fire Region Manager of the urban fire district.

The minimum available water storage volume must comply with table 2 or be calculated using Appendix J and the calculated duration of the fire.

The diameter of the pipe that connects the tank or reservoir to the fire service coupling (attachment point) must be sized to ensure that 100 kPa of pressure is maintained at the Fire Service pump inlet.

The firefighting water supply may be water from any year-round source such as:

- (a) Dams;
- (b) Water tanks;
- (c) Man-made pools and lakes (where the available water can be calculated);
- (d) Industrial cooling water (in consultation with owner);
- (e) Natural pools and lakes able to sustain a continuous accessible depth of at least 1 m;
- (f) Flowing river or stream water able to sustain a continuous accessible depth of at least 1 m;
- (g) Seawater able to sustain a continuously accessible depth of at least 1 m;
- (h) Grey water and recovered firefighting water;
- (i) Wells and bores; and
- (j) Fixed standpipes into shallow ground water aquifers.

B5 Unacceptable quality of supply

Notwithstanding B4, the following are unacceptable:

- (a) Water with dispersed solids greater than 2 mm in diameter;
- (b) Chemically contaminated water with a pH outside the limits of pH 3 – 10.5 that is, strongly acidic or alkaline; and
- (c) Biologically-contaminated water that would pose a health hazard to firefighters.

E8 Example 3

A house (with a sprinkler system compliant with NZS 4517) is to be built out in the country, where there is no street reticulation.

Step 1 = FW1 (sprinkler protected house) of proposed floor area 300 m²

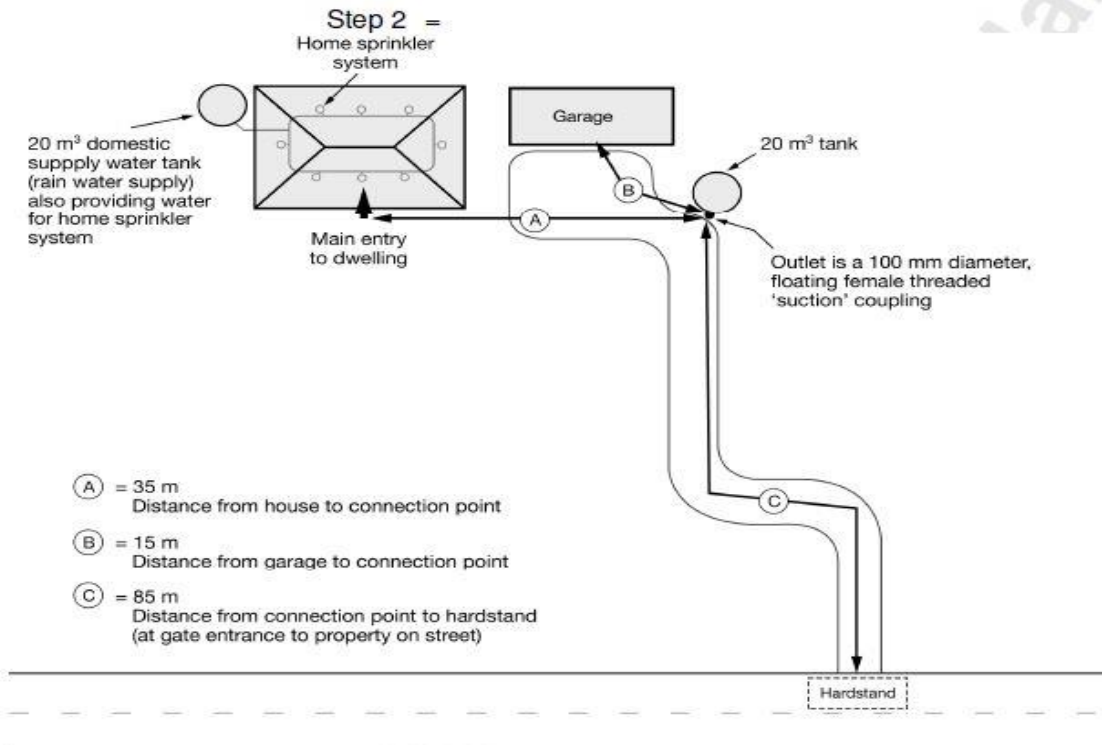


Figure E3 – Firefighting water supply requirements for a sprinklered house with no access to a reticulated water supply

Step 3 = Not applicable

Step 4 = Firefighting water proposed to be 20 m³ tank beside garage, which exceeds the required 7 m³ amount, and is within 90 m of the structures. However there is no Fire Service vehicular access to it, with the closest hardstand 85 m away and A + C = 120 m from the entrance to the furthest away structure. This distance should be within 90 m, however in discussion with the Fire Region Manager the use of portable pumps from the fire appliance are agreed to as is the extra distance.

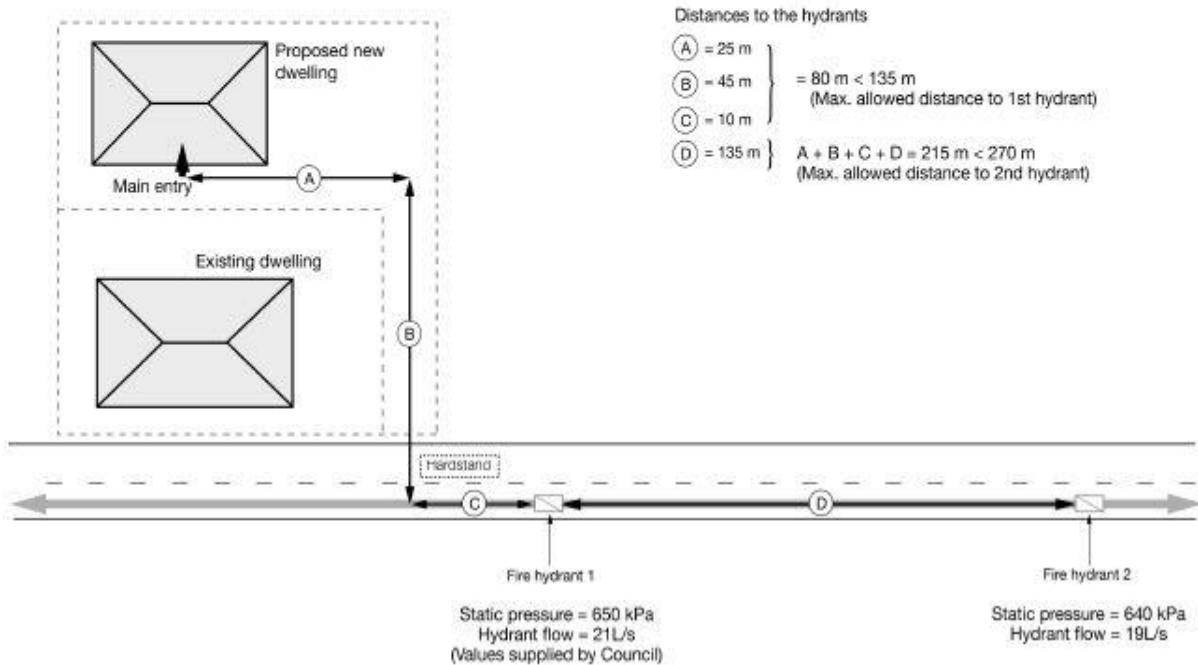
Step 5 = Couplings suitable for a New Zealand Fire Service portable pump installed in both 20 m³ tanks compliant with SNZ PAS 4505.

E6 Example 1

A house (without a sprinkler system) is to be built at the back of a subdivided section. Reticulated water is available from a street main, which has fire hydrants.

Step 1 = FW2, non-sprinkler protected house (of proposed floor area = 200 m²)

Step 2 =



E7 Example 2

A house (without a sprinkler system) is to be built out in the country, where there is no street reticulation.

Step 1 = FW2 (non-sprinkler protected house of proposed floor area 300 m²)

Step 2 =

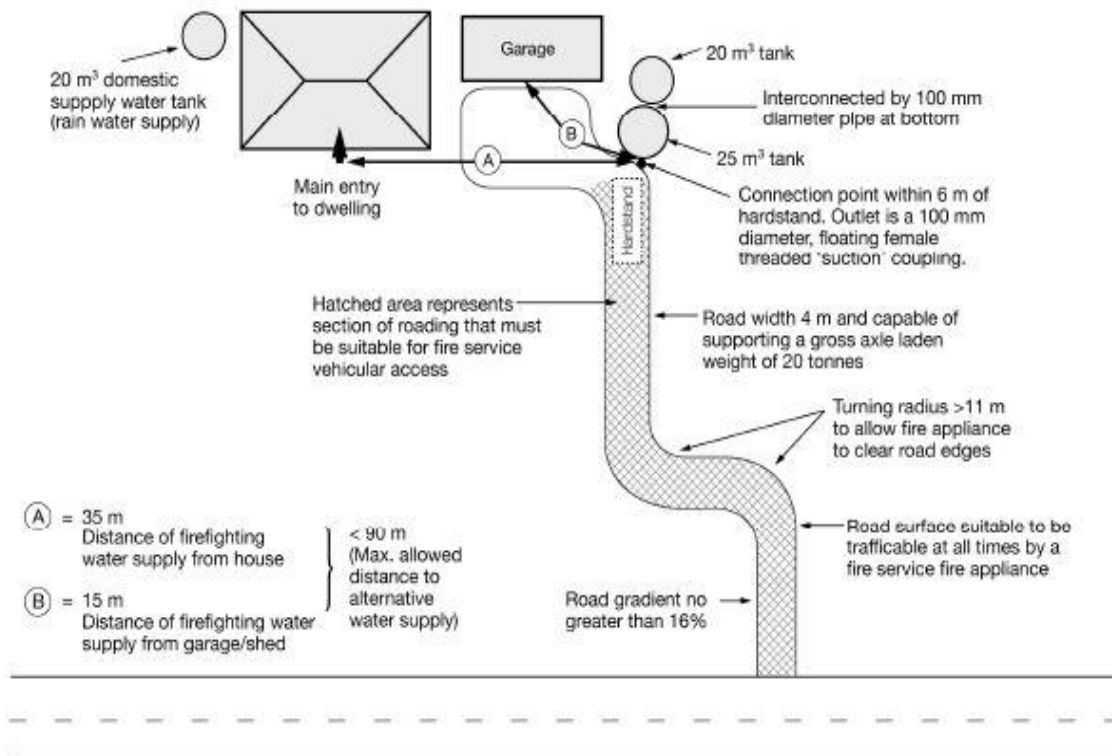


Figure E2 – Firefighting water supply requirements for an unsprinklered house with no access to a reticulated water supply

Step 3 = Not applicable

Step 4 = See plan. Conditions meet requirements as neither distance A or B exceed 90 m.

Step 5 = See plan. 'Suction coupling' compliant with SNZ PAS 4505 to be installed.

$$\begin{aligned}\text{Total firefighting water supply} &= 20 \text{ m}^3 + 25 \text{ m}^3 \\ &= 45 \text{ m}^3 \\ &= \text{FW 2}\end{aligned}$$

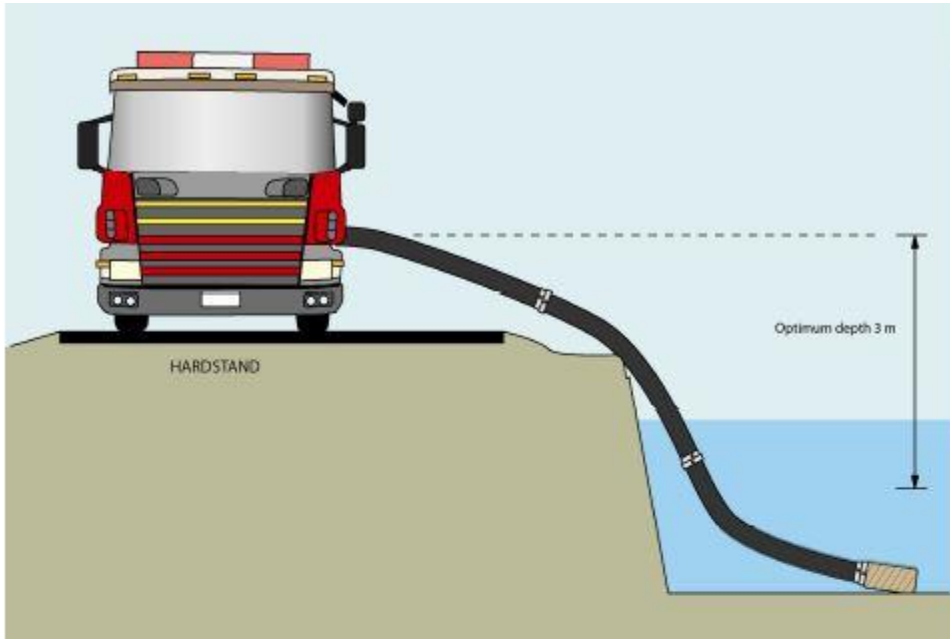


Figure B1 – Suction sources

The following figures show the greater the vertical lift to be overcome, the less water is delivered to the incident:

- (a) 3.0 m lift – rated capacity of the pump;
- (b) 4.5 m lift – 1/7 loss of capacity;
- (c) 6.0 m lift – 1/3 loss of capacity;
- (d) 7.0 m lift – 1/2 loss of capacity; and
- (e) 7.5 m lift – 2/3 loss of capacity.

Alternatively, a fixed static pick-up pump fitted with a fire service coupling complying with the approved Standards in Appendix F, F3 may be permanently fitted to the source (see figure B2). In this case the vertical depth down from the appliance pump inlet to the water surface may be increased to 7.5 m. This reduces the time needed to make connections for draughting and allows water to be draughted down to the maximum practical depth.

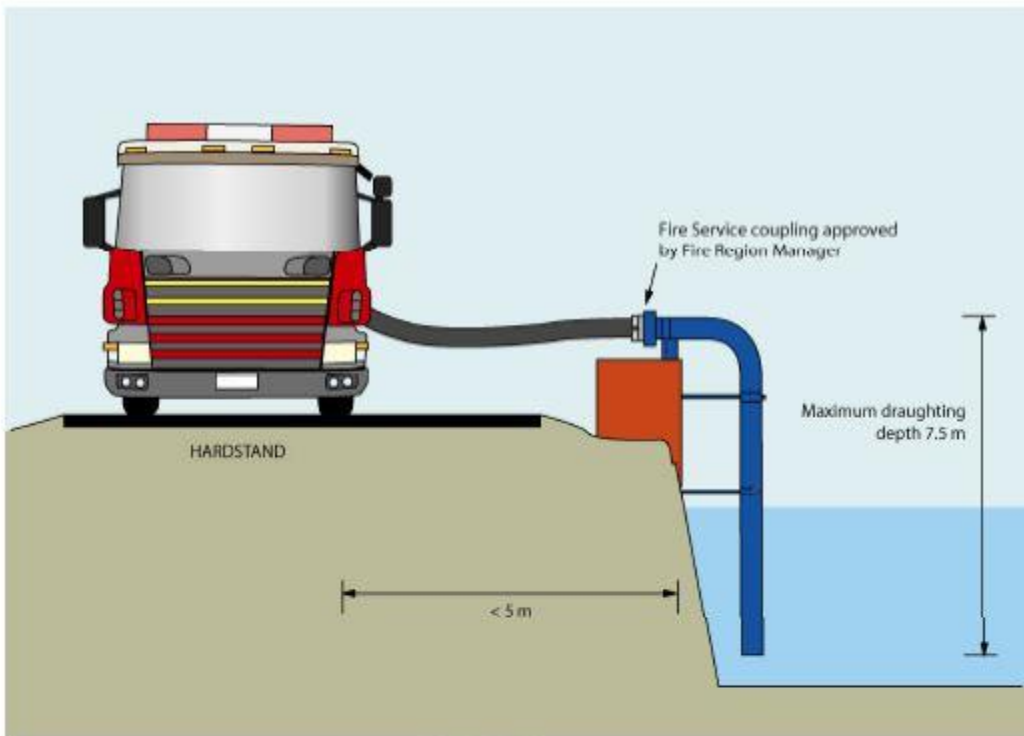


Figure B2 – Suction sources – fixed, static pick-up

There must be a hardstand for a fire appliance so that the appliance pump inlet is within 5 m of the water supply, or the permanent fire service coupling, if fitted. The premises must be within 90 m of the water supply, or the permanent fire service coupling, if fitted.

The fire service coupling to the suction source must be at the discretion of the Fire Region Manager of the urban fire district, complying with the approved Standards in Appendix F, F3. The fire service coupling must be located so that it is not compromised in the event of a fire.

See figure B4 for examples of how alternative water supplies can be delivered to within 90 m of a hazard.

B3 Flooded sources

A flooded source is a tank or supply more than 10 m above road level fitted with a fire service coupling, see figure B3.

There must be a hardstand for a fire appliance as close as reasonably practicable to the fire service coupling, but this distance should not exceed 25 m. The fire service coupling must be within 90 m of the premises (see figure B4).

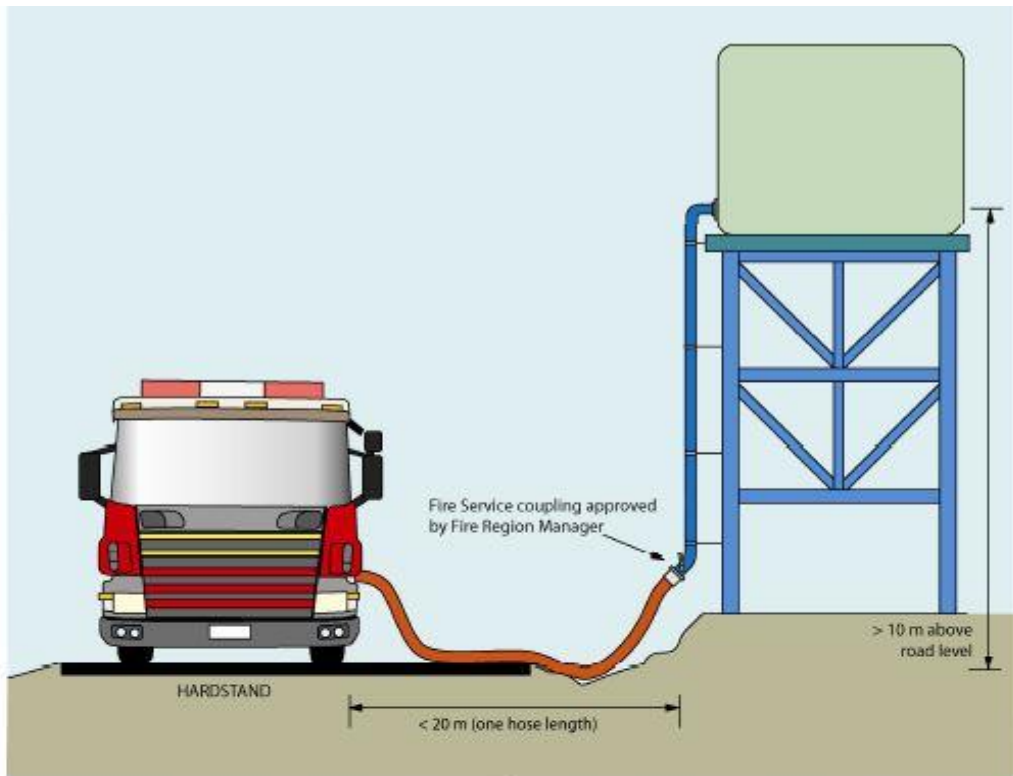


Figure B3 – Flooded sources – water supply above road level

The fire service coupling to a flooded source must be either a female instantaneous coupling or a fire hydrant coupling complying with the approved Standards in Appendix F, F3. The fire service coupling must be located so that it is not compromised in the event of a fire. The pipe work leaving the tank and just prior to terminating at the Fire Service coupling must be properly supported and bracketed. Where a supply tank is intended to be used as a supply for firefighting water, the tank manufacturer or the manufacturer's instructions should be consulted for the fitting requirements of fire service couplings and any associate pipework.

NOTE – Prior to committing to an installation, consult with the tank manufacturer on any restrictions to the size, and type of fitting, and that these are appropriate for the tank construction.