Montgomery County Fire and Rescue Service

Water Supply Operations in Non-Hydrant Areas

Presentation developed by…
Assistant Chief Steve Lohr & Captain Mark E. Davis

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Performance Objective

All MCFRS fire fighting personnel shall be able to explain the standard operating procedure for establishing a water supply in non-hydranted areas.

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Overview

- Background
- The Water Supply Problem
- Understanding the Needed Fire Flow
- Traditional Water Supply Operations
- The Updated FRC Policy

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Background

- In June 1998, the Fire and Rescue Commission established the ***Water Supply Work Group*** for the purpose of conducting a comprehensive study of the water supply concerns throughout Montgomery County.

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Background

- The report generated from that work group's efforts indicated the need for a standard operating procedure for water supply operations in non-hydrant areas.
- In December 1999, the Fire Administrator created the ***Water Supply Study Implementation Work Group*** (WSSIWG) whose purpose was to develop a comprehensive plan to implement the water supply recommendations.

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Background

- It was through a FRC sub-committee chaired by Chief Doug Edwards and DTC Steve Lohr that FRC 24-07 was amended and updated to standardize water supply operations in non-hydrant areas.
- This training packet addresses the amended SOP for water supply operations in non-hydranted areas (FRC 24-07AMII).

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The Past Problem

Prior to the 1990's , fires in rural Montgomery County involved small homes and farmhouses. An occasional barn fire occurred – but large, dollar-loss fires were rare in residential occupancies.

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The Current Problem

In recent years, we have seen expanded growth in the areas of Montgomery County without water supply. Unfortunately, much of that growth has occurred in our non-hydrant areas and has consisted of large, residential occupancies constructed of light-weight building materials.

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The Big Problem

This combination of no municipal water and light-weight construction has challenged MCFRS' ability to provide adequate fire fighting services in these newly developed areas.

Montgomery County's Diverse Water Supply

- Over 60% of Montgomery County's landmass does not have fire hydrants.
- Stations 4, 9, 13, 14, 17, 29, 31, 30, and 33 have significant portions of first-due area where tanker or drafting operations are needed to provide fire protection water.

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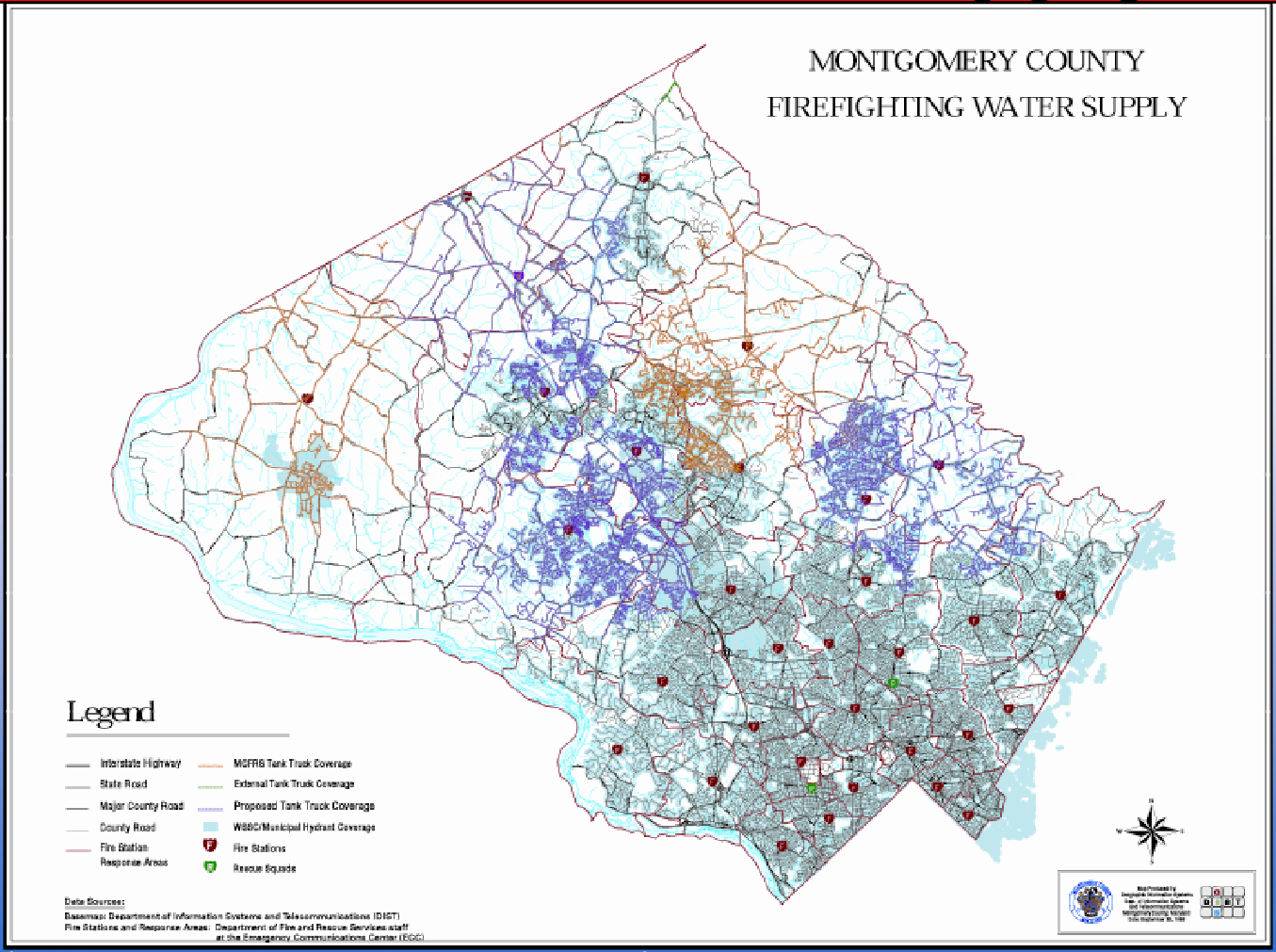
Montgomery County's Diverse Water Supply



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The Needed Fire Flow

Before we can be effective in fire fighting operations, we must understand the fire flow that is needed to successfully combat a structure Fire.

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The Needed Fire Flow

- There are several recognized formulas for calculating the needed fire flow.
- The two most commonly used by command officers are the Iowa State Formula and the National Fire Academy Formula.

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Iowa State Formula

- Common for fire ground operations and is used to estimate fire flow needs.
- Based on the amount of water needed to deplete the oxygen in a confined area when the water is vaporized into steam by the fire's heat.
- The formula requires the correct and efficient application of water.

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National Fire Academy Formula

- This formula has become more popular in training courses concerning water supply preplanning and water supply analysis.
- The formula takes into consideration not only the fire building but also the exposures and makes adjustments for percentage of fire involvement.

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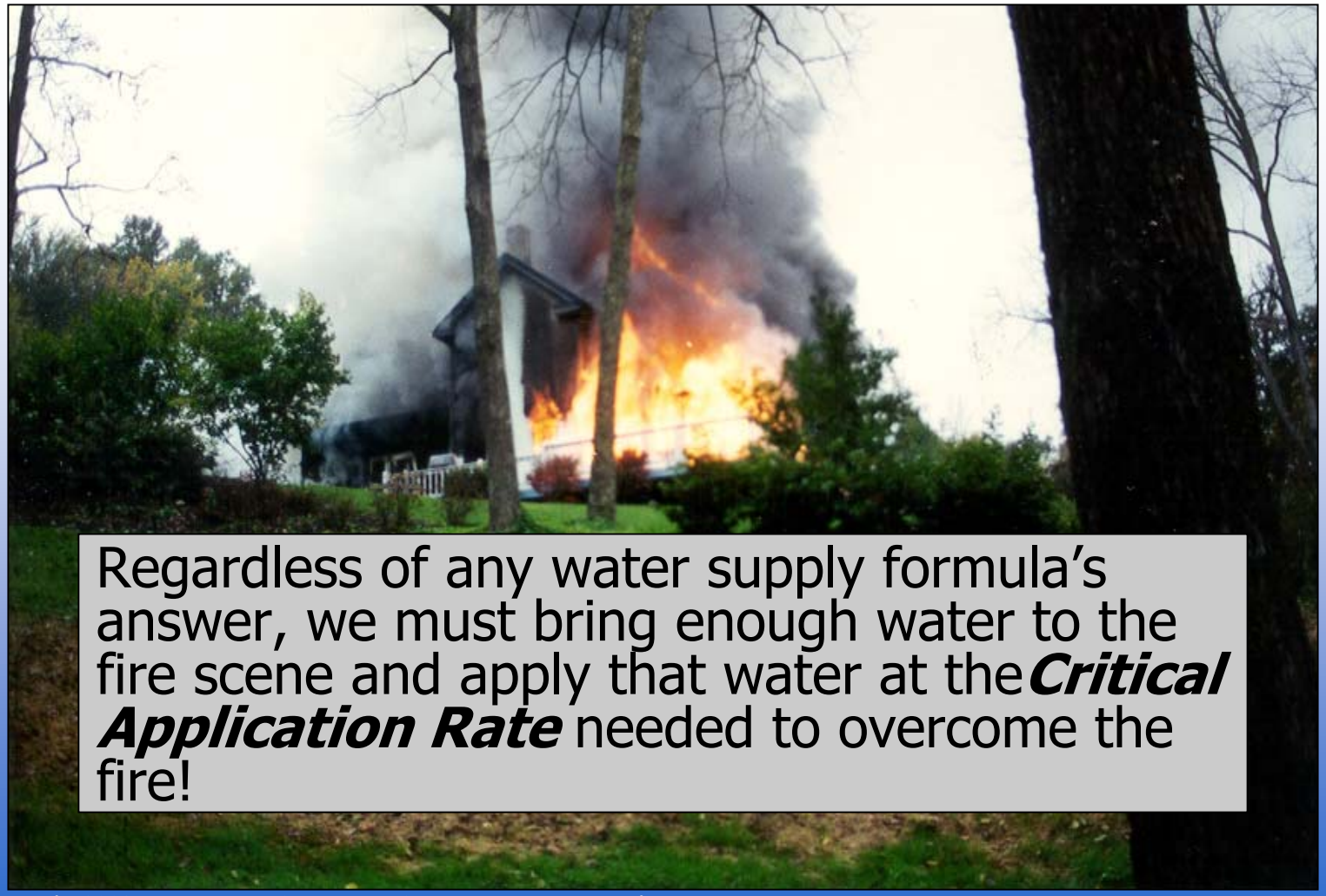
Needed Fire Flow



Regardless of any water supply formula's answer, we must bring enough water to the fire scene and apply that water at the ***Critical Application Rate*** needed to overcome the fire!

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Critical Application Rate

The critical application rate is the water delivery rate (gpm) needed to absorb all of the BTU's that are being given-off by the fire.

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Critical Application Rate

If a fire needs 450 gpm applied in order for it to go out, then two, 1-3/4-inch lines at 150 gpm each are not going to extinguish that fire any time soon. We must overwhelm the fire's BTU output in order to be successful!

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Critical Application Rate

Too often in the rural setting we are afraid to apply water in large quantities because we fear running out of water. A 500 gpm fire needs 500 gpm in one punch to put it out – not 250 gpm for 2-minutes in order to save water. Saving water will only extend the burn time!

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Traditional Water Supply

Delivering large volumes of water in Montgomery County's non-hydrant areas has traditionally been labor intensive and often difficult to achieve quickly.

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Traditional Water Supply

- Why do we often struggle with water supply operations in non-hydrant areas?
  - Most of our fires are room and contents – the fire does not extend much beyond the compartment of origin.
  - When the fire extends beyond the compartment, then the operation becomes more complex and requires…
    - The Whole Team to fight the fire
    - Additional water beyond the first-engine's booster tank
    - Standardized hose and water supply appliances
    - Available and accessible water supply sources
- Remember: That The Fire Doesn't Know There Are No Hydrants!

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Traditional Water Supply

- Similar to a professional sports team's much coveted playbook – a FD water supply operation is a choreographed play selection.
- In MCFRS, we have a well-practiced play that works in hydrant areas.

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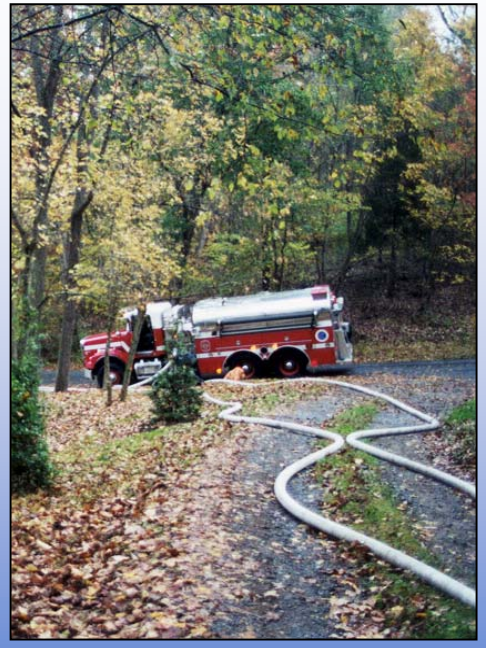
Traditional Water Supply

- We need a play that works in non-hydrant areas.
- The new SOP provides such a play.



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Developing The S-O-P

- Different strategies were reviewed…
  - The blitz attack, hose relay, nurse tanker, tanker shuttle, and combination.
- Tactics needed to implement those strategies were reviewed…
  - Multiple pumper hose relay, drafting operations, static water sources, folding tank operations, tanker fill site operations, and tanker dump site operations.

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The Problem…

How do we support a large flow initial attack of 500 gpm while building a multi-pumper relay or a tanker shuttle?

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The Solution…

- We need a minimum flow rate of *500 gpm for 30-minutes*.
- We need an S-O-P that will "beat the clock" – because time is what often kills our rural water supply operations.
- We can initiate an attack, we just run out of time getting additional water to the attack engine.

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S-O-P Goals

- The Safety of Crews Would Never Be Dependant Upon a Single Line
- Support The Initial Attack While Building The Water Supply
- Establish The Confidence Of All Employees – FF's and Command
- Adequately Flexible To Work In Unusual Situations
- Standard Fill Site Model
- Standard Dump Site Model

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The S-O-P must…

- Have benefits that outweigh the risks.
- Support a 3-line initial attack, or a single, master stream
- Not place fire fighters in offensive positions at defensive fires.

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The S-O-P must…

- Mirror the existing Safe Structural Fire Fighting Duties and Responsibilities For Hydrant Areas
- Comply with the 2-in/2-out standard.
- Work with our normal 3-person staffing levels.

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Fundamentals of the New S-O-P

- Rapid (Quickly Deployed)
- Efficient (Maximum GPM/Firefighter)
- Expandable (Can Grow As Needed)
- Uninterrupted Flow (Continuous Flow For The Duration of The Incident)
- Remember…

…500 gpm for 30 minutes!

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How Do We Get It Done ?

- Our SOP's are Based Upon the Order of Dispatch, Not Order of Arrival!
  - Responding units know their responsibilities and do not change those unless absolutely necessary.
- The first arriving Unit Officer must "call the play" and everyone must listen!

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How Do We Get It Done ?

- Past – By the seat of our pants, different in each area of the county
- Presently – Tanker shuttles as available and the use of a Water Supply Task Force
- Future – ***Water Delivery System*** that will support 500 GPM for 30 Minutes

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What is New in the S-O-P

- The structure fire assignment for non-hydrant areas is now 5 engines, 2 trucks, 1 rescue squad, two tankers, an EMS unit, 2 LFRD command officers and a DFRS District Chief.
- The first two arriving engines and the first tanker are deployed immediately to the fire scene which should provide about 5,000 gallons of water to support the initial attack (9 to 10 minutes).
- Other Responding Units Establish The Water Supply

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What is New in the S-O-P

- Other arriving units help establish the water supply.
- Engines **must** use a **clappered siamese** at the end of their hose layout to facilitate pumping the initial supply line.
- A fifth engine is added to the initial dispatch and is given the assignment of establishing a tanker fill site.
- The second arriving command officer will generally assume the role of the Water Supply Group Officer.
- The Water Supply Task Force is reduced by one engine and one command officer to now include two tankers, one engine, and one command officer.

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The Clappered Siamese

- Why Clappered?
- It Doesn't Require People To Open and Close
- You Won't Lose The Water Once The Line Is Filled
- Easy To Make and Break Connections

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Assignments and Responsibilities

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The 1st Engine

- Lay one, 4-inch or two, 3-inch supply lines.
- Drop a clappered siamese at the layout point.
- Position to allow room for the 2nd Engine and the 1st Tanker
- Advance a Handline and Initiate Attack

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The 1st Tanker and 2nd Engine

- Both units give up tank water to the attack engine as needed.
- 2nd Engine's crew meets Standby Team requirement
- 1st Tanker breaks and connects supply to intake and feeds attack engine via a discharge.
- 1st Tanker now becomes a nurse tanker.

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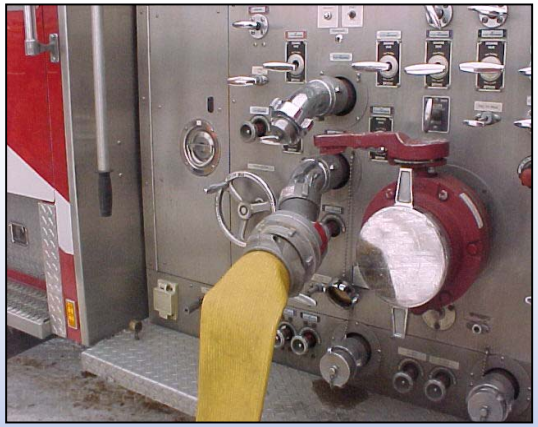
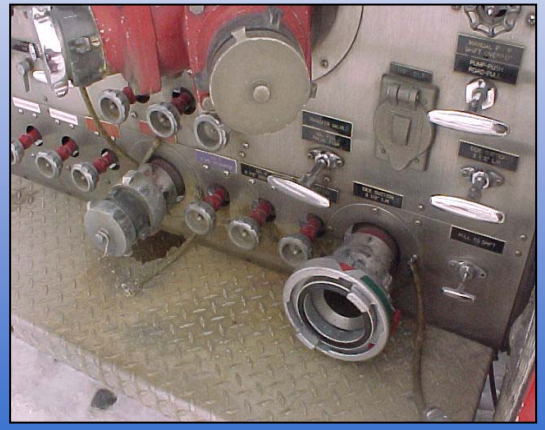
The 1st Tanker and 2nd Engine

- 2nd Engine's driver assists the other drivers as needed.
- Both rigs are sacrificed back the driveway, lane, etc. in order to provide fire fighting crews an initial 9 to 10-minute water supply.





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The 3rd Engine

- Positions to pick-up the clappered siamese and gives up its tank water as needed.
- Facilitates movement of additional apparatus and the set-up of portable dump tanks.
- Operates as a supply engine by drafting or by laying additional hose to complete a relay operation.
- Crew – Helps with the initial set-up and connection to the siamese and then proceeds to the fire scene. Advances an attack line to the floor above the fire.

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The 4th Engine

- Locates in an uncommitted position.
- Prepares to give tank water to attack engine via siamese if dump tank operations are not yet ready.
- Assists with drafting operations or complete hose lay for the relay.
- Crew – Backs up 1st Engine

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The 5th Engine

- Establishes the first fill site at a hydrant or static water source.
- Coordinates fill activities with the Water Supply Group Officer
- Crew operates the fill site.

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The 1st Tanker

- Splits available coupling at E1 or the clappered siamese
- Gives up tank water to E1
- Maintains a full tank as excess water becomes available.
- The nurse tanker now becomes the "safety net."

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The 2nd Tanker

- Drops the portable dump tank for E3.
- Pumps the siamese until the dump site is up and running.
- Heads to the fill site and begins the shuttle operation.

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The 1st Truck

- Positions on Side A
- Performs standard truck duties.
- Prepares for elevated master stream if defensive mode is needed.

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The 2nd Truck

- Stays on the main road unless otherwise directed.
- Crew walks to the fire scene and performs normally assigned duties.

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The Rescue Squad

- Side A Unless Otherwise Directed
- Does Not Block Incoming Water Supply Apparatus
- Systematic Search/Utilities

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The 1st Command Officer

- Assumes Command Of The Incident
- Delegates Water Supply Ops
- Grows The Command Post as Required By IMS

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The 2nd Command Officer

- Water Supply Group Officer
- Positions Where The Action Is…
- End Of The Hose Layout
- Becomes The "Traffic Cop"…Director

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Additional Tankers and Engines

- Support The Siamese
- Support The Dump Tanks
- Complete The Hose Relay

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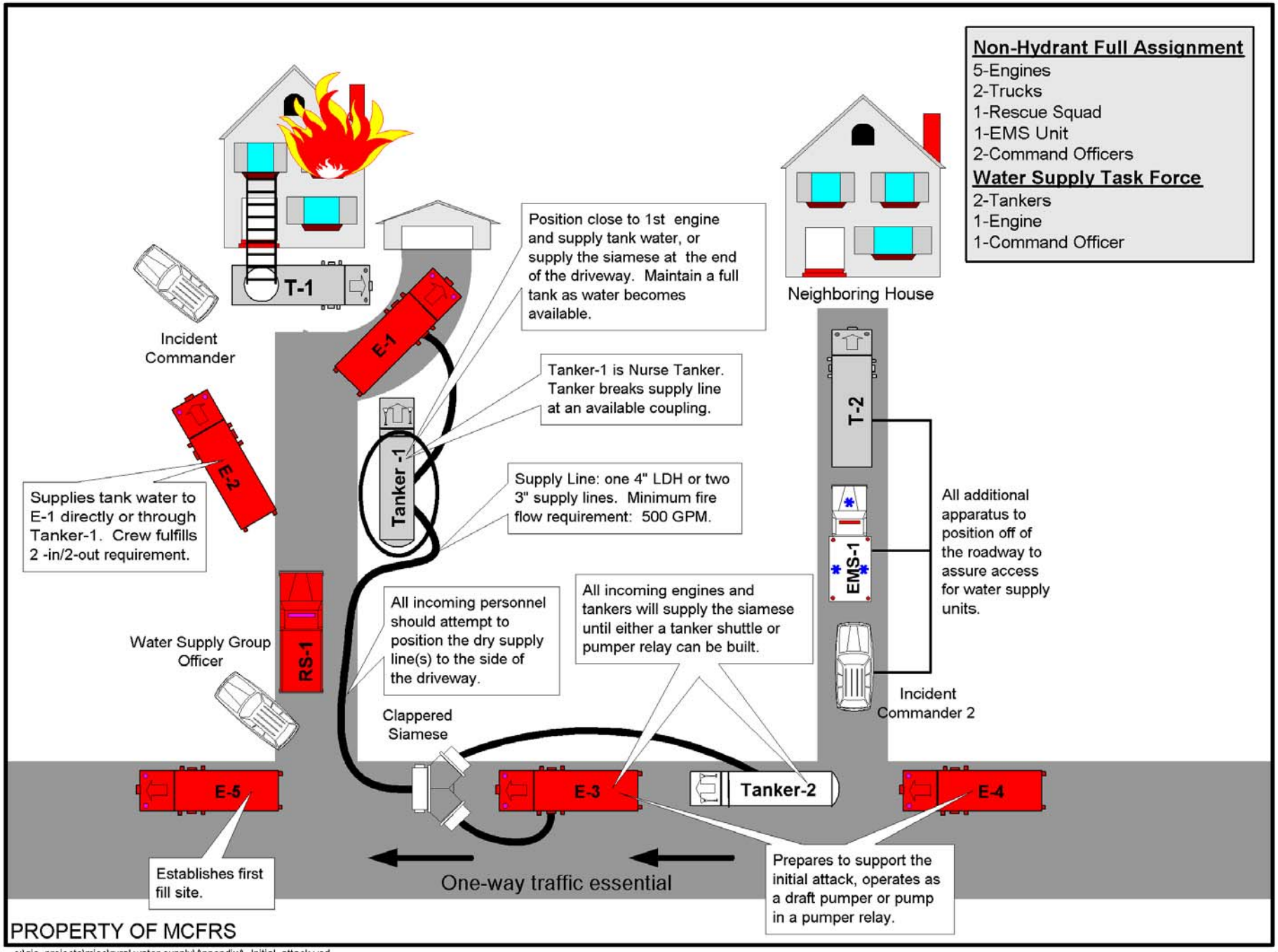
Appendix A: Initial Attack Operations



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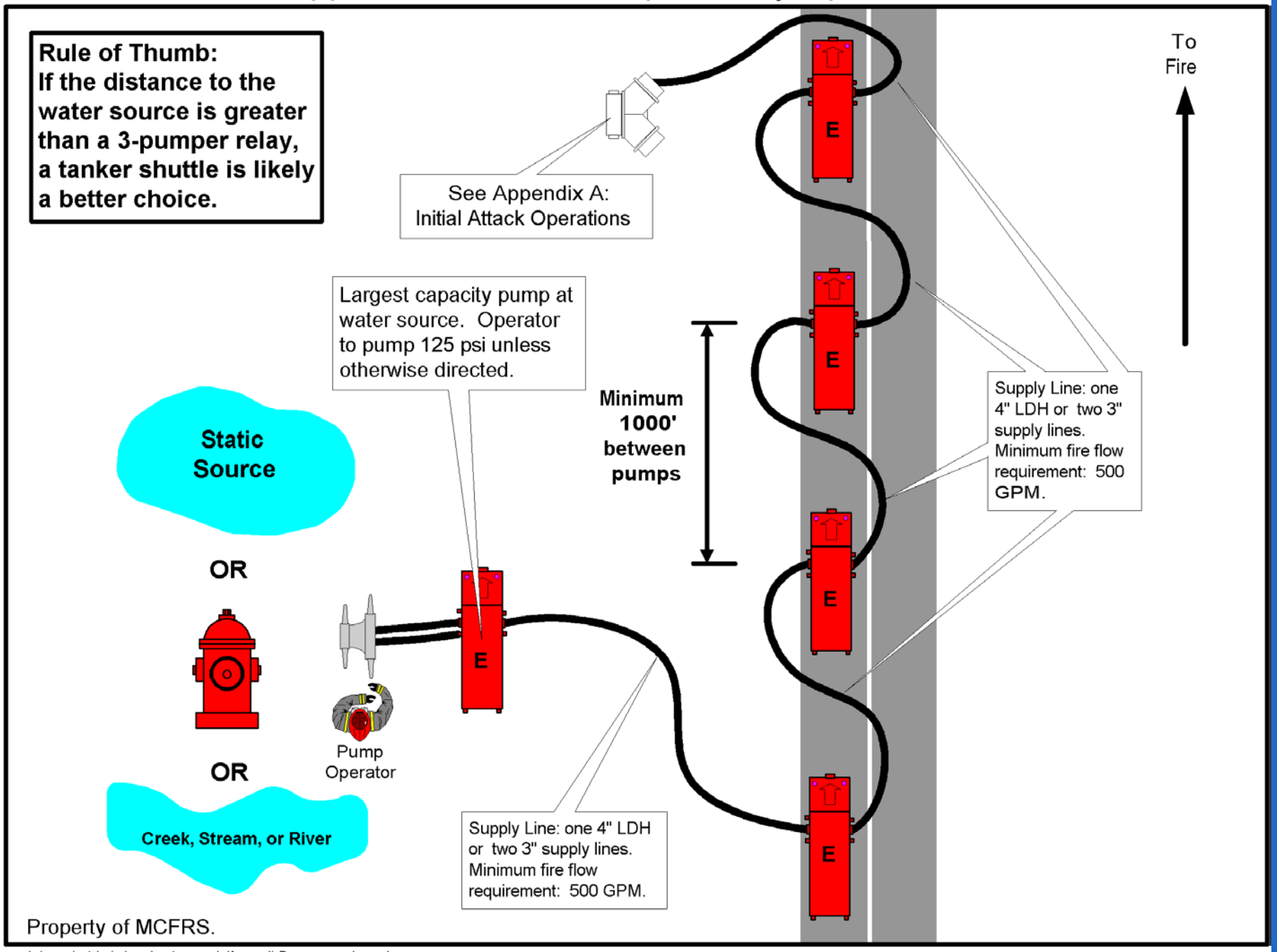
Appendix B: Multi-Pumper Relay Operations



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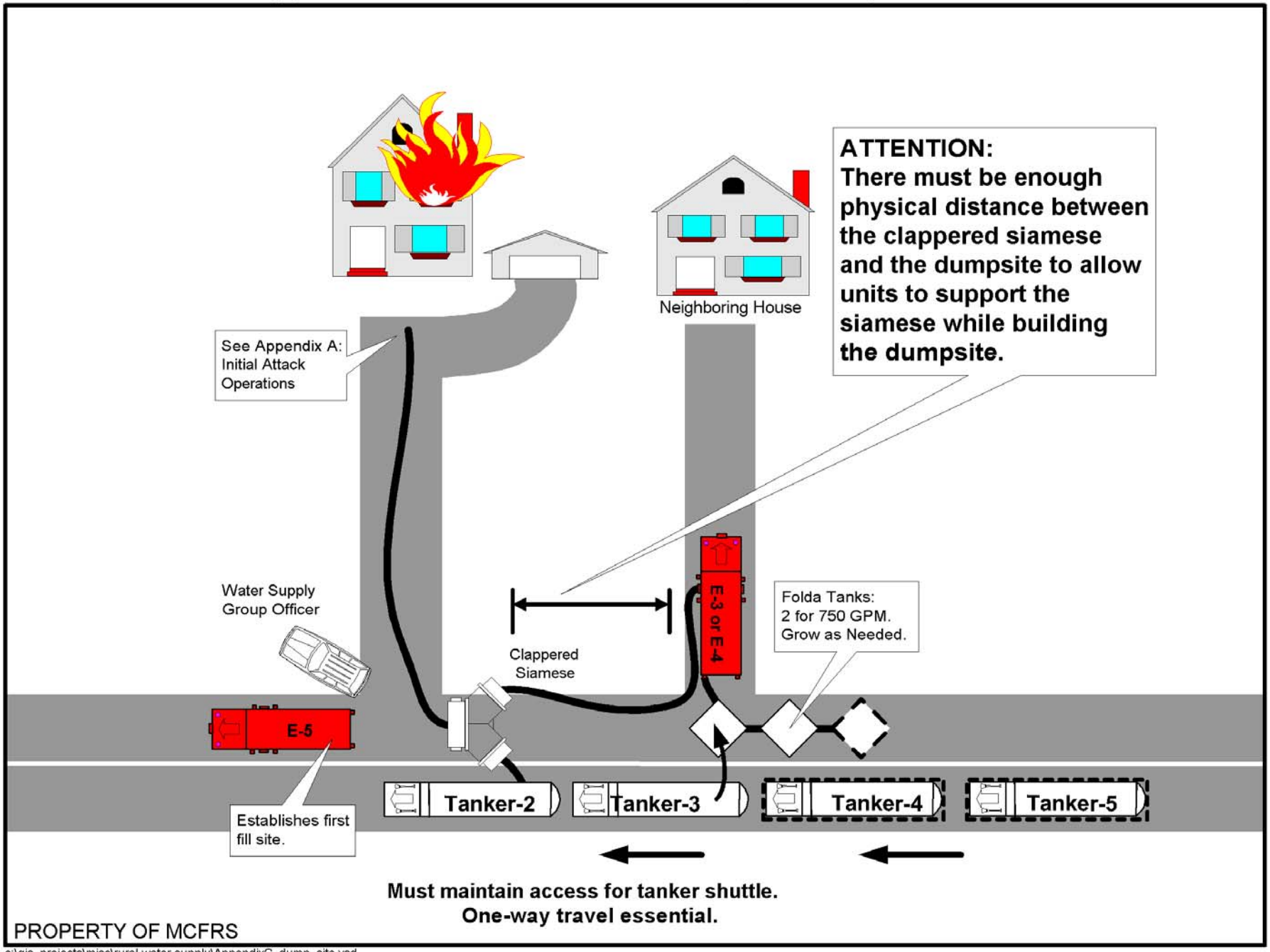
Appendix C:Tanker Shuttle Dump Site Operations



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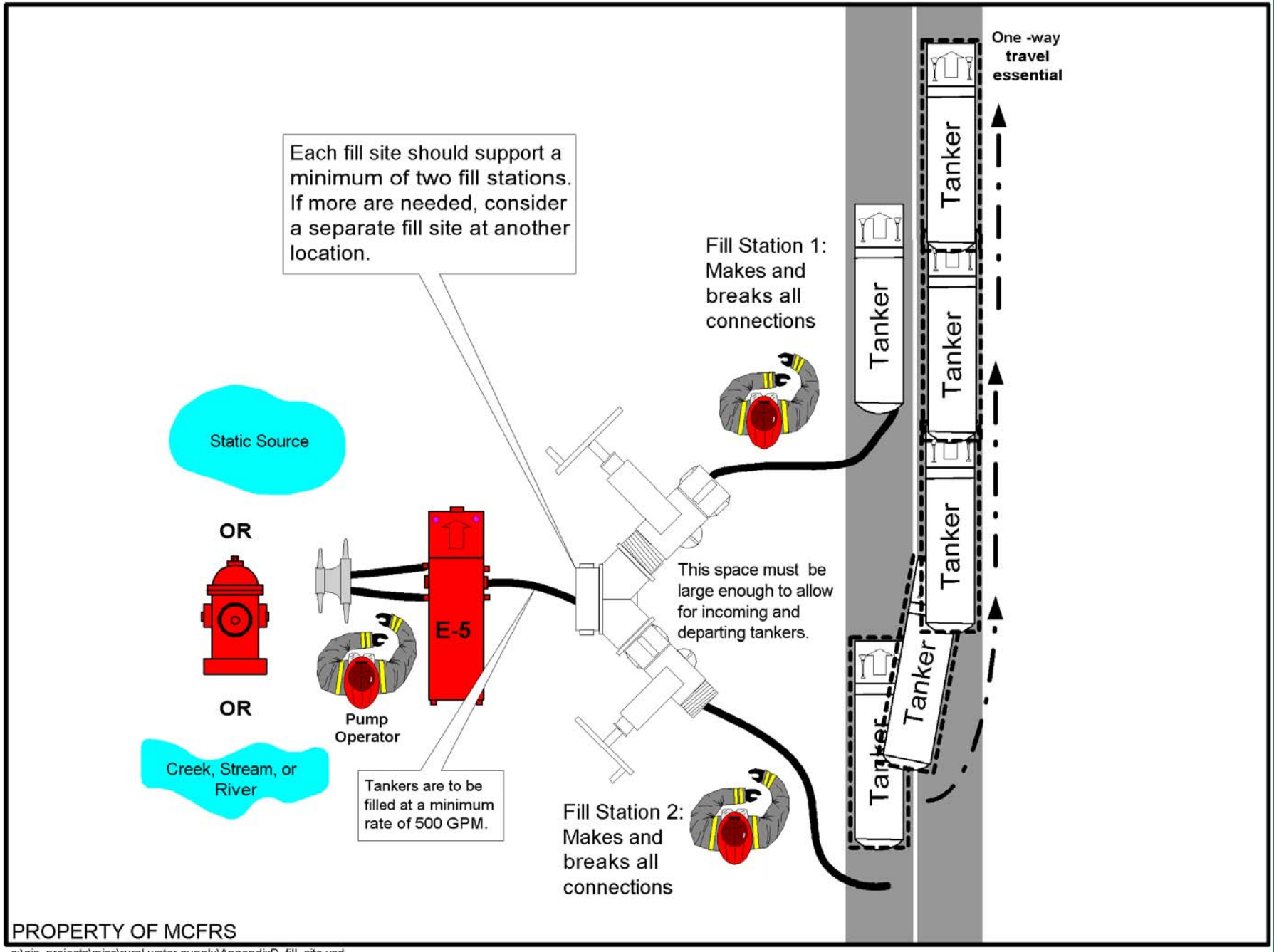
Appendix D: Fill Site Operations



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Review

- Background
- The Water Supply Problem
- Understanding the Needed Fire Flow
- Traditional Water Supply Operations
- The Updated FRC Policy
- Practice-Practice-Practice

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Consider This…

"Tactics routinely used in the past for certain fires have either been replaced or relegated to positions of lower importance due to advances in equipment and our understanding of fire behavior and building construction…"

Chief John Norman, FDNY-1997

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It Can Be Done!

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