National Aeronautics and Space Administration

Integrated Contingency Plan

National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

www.nasa.gov **December 2019**

INTEGRATED CONTINGENCY PLAN
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA 23337

Updated for NASA by:

LJT & Associates
9881 Broken Land Parkway, Suite 400
Columbia, Maryland 21046

December 2019

IN CASE OF A SPILL, FIRE OR EXPLOSION AT THIS FACILITY,
CALL 911 IF ON-SITE, OR
CALL 757-824-1333 IF OFF-SITE

EMERGENCY PHONE NUMBERS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
GODDARD SPACE FLIGHT CENTER (GSFC)
WALLOPS FLIGHT FACILITY (WFF)
34200 FULTON STREET, WALLOPS ISLAND, VIRGINIA 23337

On-Site Phone Numbers:
Emergency Coordinators:

Member	Facility Phone	After Hours Phone	Radio Page
Captain On-Duty	911	911	Fire Dispatch
Fire Station #1	911	911	Fire Dispatch
Fire Station #2	911	911	Fire Dispatch
Brenden Kettner (Emergency Coordinator)	Ext. 1985	(757) 894-7235	Fire Dispatch

Environmental Coordinators:

Code 250 Members	Facility Phone	Mobile Phone	Home Address
Theodore J. Meyer, Associate Chief Medical & Environmental Division	Ext. 1987	(443) 366-2268	30170 Providence Drive Salisbury MD 21804
Doug Bruner, Environmental Engineer	Ext. 2441	(651) 276-9864	206 W. Martin Street Snow Hill, MD 21863

Off-Site Phone Numbers:

National Response Center	**800-424-8802**
U.S. Environmental Protection Agency Region 3 Office	**215-814-5000** **800-438-2474**
Virginia Department of Environmental Quality Tidewater Regional Office – Main Number	**757-518-2000**
Virginia Department of Emergency Management (24 hours)	**800-468-8892**
Eastern Shore Hazardous Material Response Team	**911**
Virginia Hazardous Material Coordinator	**757-363-3891**

Key Facility and Tenant Organization Contacts:

Gregg Frostrom – NOAA	**757-824-7346**
Navy SCSC – John Haag	**757-824-7700**
US Coast Guard Chincoteague Officer in Charge	**757-366-2874**
Wallops Wastewater Treatment Plant	**757-824-1083**
Wallops Airfield Operations Manager	**757-824-1250**
Chincoteague Bay Field Station	**757-824-5636**

PREFACE

This Integrated Contingency Plan (ICP) has been updated for the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's (GSFC) Wallops Flight Facility (WFF). The purpose of this ICP is to describe measures implemented by NASA to prevent oil spills from occurring and to prepare NASA to respond in a safe, effective, and timely manner to mitigate the impacts of a discharge. This includes minimizing hazards to human health and the environment from any accidental release of oil or hazardous substance to the air, soil, surface water, storm water, or sanitary sewer system at WFF.

This ICP includes and satisfies the following requirements:

Spill Prevention, Control and Countermeasure (SPCC) Plan in accordance with the Oil Pollution Prevention & Response requirements in the Code of Federal Regulations (CFR) Title 40, Part 112.

Oil Discharge Contingency Plan (ODCP) in accordance with Virginia Administrative Code 9 VAC 25-91-10 et seq, Section 170.

Hazardous Waste Contingency Plan (HWCP) in accordance with 40 CFR 262.17 (a)(6), which references Subpart M.

This ICP is applicable to:

1. Hazardous substance or sewage releases on WFF property.

2. Fires, explosions, or releases at the WFF hazardous waste accumulation areas at Buildings B-29, N-223, and U-81 as well as tenant hazardous waste accumulation areas at Building V-10, MARS Pad 0-A, and other areas where hazardous waste is generated or accumulated on site.

3. Prevention, containment, and remediation of releases of oils to the environment and WFF storm water management system.

4. Prevention and control of potential releases of oils from all aboveground storage tanks (ASTs), underground storage tanks (USTs), bulk storage containers, and all other oil-containing equipment on WFF property.

This Plan meets the requirements of 40 CFR Part 112 and supersedes the August 2018 ICP developed to meet provisions in effect since 1974 with any effective amendments prior to January 14, 2010. In addition to fulfilling requirements of 40 CFR Part 112, this ICP is used as a reference for oil storage information and testing records, as a tool to communicate practices to employees on preventing and responding to discharges, as a guide to facility inspections, and as a resource during emergency response. A separate contingency plan for the Open Burning Area is available in Appendix II.F of the WFF Hazardous Waste Management Permit.

To ensure proper facility-wide spill response, this ICP also includes all USTs located at

WFF. The USTs are regulated under 40 CFR Part 280.

NASA management has determined that this facility does not pose a risk of substantial harm under 40 CFR Part 112, as recorded in the Certification of the Applicability of the Substantial Harm Criteria in Appendix A of this Plan.

In compliance with the Oil Pollution Prevention and Response regulations, the procedures included in this ICP establish guidelines to curtail the occurrence of oil spills, describe engineering controls installed to prevent spills, and clearly outline the plans of action to be taken in response to spills (i.e., countermeasures). The ICP addresses activities associated with the handling, transfer, removal, storage, disposal, and use of oil at various locations at WFF. In addition, this ICP details spill reporting requirements and outlines actions necessary for WFF to comply with federal and state requirements.

This ICP provides guidance on key actions that facility personnel must perform to comply with the SPCC rule:

- Complete monthly and annual site inspections as outlined in the Facility Inspection, Tests, and Records section of this Plan (Section 7.0) using the inspection checklists in Appendix M of this Plan.

- Perform preventive maintenance of equipment, secondary containment systems, and discharge prevention systems described in this Plan, as needed, to keep them in proper operating conditions.

- Conduct annual employee training as outlined in the Discharge Response, Equipment and Training section of this Plan (Section 4.0).

- If either of the following occurs, submit the SPCC Plan to the United States Environmental Protection Agency (EPA) Regional Administrator (RA), along with other information, as detailed in Section 4.0 of this Plan:

    - The facility discharges more than 1,000 gallons of oil into or upon the navigable waters of the United States or adjoining shorelines in a single spill event; or

    - The facility discharges oil in a quantity greater than 42 gallons in each of two (2) spill events within any 12-month period.

- Review the Plan on an annual basis. Update the Plan to reflect any "administrative changes" that are applicable, such as personnel changes or revisions to contact information, such as phone numbers. Administrative changes must be documented in the Plan Review Log, in Section 1.0 of this Plan, but do not have to be certified by a Professional Engineer (PE).

- Review the SPCC Plan at least once every five (5) years and amend it to include more effective prevention and control technology, if such technology will significantly reduce the likelihood of a spill event and has been proven effective in the field at the time of the review. Plan amendments, other than administrative

changes discussed above, must be recertified by a PE on the certification page in Section 1.0 of this Plan.

- Amend the SPCC Plan within six (6) months whenever there is a change in facility design, construction, operation, or maintenance that materially affects the facility's spill potential. The revised Plan must be recertified by a PE.

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REGULATORY CROSS REFERENCE GUIDE
40 CFR 112

The table below summarizes the 40 CFR 112 SPCC regulations and where they are presented in the NASA WFF Integrated Contingency Plan. The applicable 40 CFR 112 regulations are referenced throughout the Plan. Only those sections of 40 CFR 112 that pertain to this facility are included in this cross reference.[1]

SPCC REGULATORY CROSS REFERENCE GUIDANCE			
Regulatory Section	**Comments**	**NASA WFF ICP Section**	**Page**
112.1	Applicability	1.0	1
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112.7	Full approval of management with authority to commit resources and implement Plan	1.2	2
112.7	Prepare in accordance with good engineering practices	1.3	2
112.7	Plan sequence	As per this Cross Reference	
112.7	Description of procedures, methods or equipment not yet fully operational	1.6	7
112.7(a)(1)	Discussion of compliance with applicable requirements	As per applicable sections	
112.7(a)(2)	Any reasons for nonconformance with all applicable requirements or equivalent	Not Applicable	
112.7(a)(3)	Description of physical layout of Facility and diagram of storage	2.1; Appendix B	8
112.7(a)(3)(i)	Type of oil and capacity	2.2	12
112.7(a)(3)(ii)	Discharge prevention measures including procedures for routine handling of products (loading, unloading and facility transfers, etc.).	3.0	21
112.7(a)(3)(iii)	Discharge or drainage controls such as secondary containment around containers and other structures, equipment, and procedures for the control of a discharge	2.2; 3.7	13, 26
112.7(a)(3)(iv)	Countermeasures for discharge discovery	2.2, 3.0, 4.0, 5.0	11, 21, 31-38
112.7(a)(3)(v)	Disposal methods for recovered materials	4.3	34
112.7(a)(3)(vi)	Contact list and phone numbers for response personnel, contractors and agencies	Front of document; 4.3 Appendix K	i, 33

[1] Specifically, Sections 112.6 Qualified Facilities Plan Requirements, 112.7(h) Facility tank truck loading/unloading racks, 112.7(i) Brittle Fracture, and 112.8(c)(7) Heating Coils of the SPCC requirements do not apply to any equipment, containers or operations at this facility.

SPCC REGULATORY CROSS REFERENCE GUIDANCE			
Regulatory Section	**Comments**	**NASA WFF ICP Section**	**Page**
112.7(a)(4)	Information and procedures for reporting a discharge	4.2	33
112.7(a)(5)	Organize procedures in the Plan for ready use in an emergency	4.0	31
112.7(b)	Plan includes information on each major type of potential failure that could be discharged from the Facility	3.4, 6.0, Appendix D	22, 39
112.7(c)(1)	Provisions for appropriate containment and/or diversionary structures to prevent a discharge	2.2, 3.4	11, 22
112.7(d)	Meets requirements in case of impracticability of structures or equipment per 112.7(c)	2.2, 3.4	11, 22
112.7(e)	Inspections, test and records	7.0, Appendix M	49
112.7(f)(1)	Personnel training	4.6, Appendix L	35
112.7(f)(2)	Designated Facility person who is accountable to management	1.0	1
112.7(f)(3)	Scheduled briefings on discharge prevention	4.6	35
112.7(g)	Security	3.6	26
112.7(j)	Comply with these standards as well as applicable state requirements	As per applicable sections	
112.7(k)	Qualified Oil-Filled Operational Equipment	2.3, Appendix C	18
112.8(b)	Facility Drainage	3.3, 3.4	21, 22
112.8(c)	Bulk Storage Containers	2.2	11
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112.20(f)(1)	Facility Response Plans-Certification of the Applicability of the Substantial Harm Criteria	Appendix A	App. A

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VAC 25-91-10 et. seq., Section 170

The Federal and state guidelines for the preparation of the ODCP have been reviewed and compared to the NASA WFF ICP document. The table below identifies the location in the document for each of the items required by the Virginia Department of Environmental Quality (DEQ).

ODCP REGULATORY CROSS REFERENCE GUIDANCE		
DEQ Guideline Section	**NASA WFF ICP Section**	**Page**
1. Name of the facility, geographic location	Section 2.0 Facility Description and Bulk Storage Container Information	8
2. Name of the operator of the facility including address and phone number	Page i, Section 1.0	i, 1
3. A physical description of the facility including a map of the facility showing, if applicable, oil storage areas	Section 2.0 Facility Description and Bulk Storage Container Information SPCC, Appendix B - Maps	8
4. A copy of the Material Safety Data Sheets (MSDS) or their equivalent for each oil or groups of oil	SPCC Appendix N - SDS	App. N
5. The maximum storage or handling capacity of the facility and the individual tank capacities	Section 2.2, Appendix C and D	11
6. A complete listing, including 24-hour phone numbers, of all federal, state and local agencies	Page i	i
7. The position title of the individual(s) responsible for making the required notifications and a copy of the notification check off list	Page i Position title of the individual responsible… Page i Notification List	i
8. The position title, address, and phone number of the individual(s) authorized to act on behalf of the operator to implement containment	Page i	i
9. The position title of the individual(s) designated by the operator to ensure compliance with applicable federal, state and local requirements	Page i	i
10. Identification and insurance by contract or other means acceptable of the availability of private personnel and equipment; a listing of contractor or cooperative capabilities, including an inventory of the equipment	SPCC Appendix K – Spill Response Contractors	Appendix K
11. Assessment of the worst case discharge including measures to limit outflow of oil, response strategy and operational plan	Section 6.0 Worst Case Scenario	39
12. Inventory of facility containment equipment including specification of quantity, type and location	SPCC Appendix G– Inventory of Spill Response Supplies and Equipment	Appendix G
13.(a) In addition to the above requirements set forth in this subsection, the operator of a facility with an aggregate aboveground storage or handling capacity greater than 1,000,000 gallons of oil…	Not applicable to this facility.	-

ODCP REGULATORY CROSS REFERENCE GUIDANCE		
DEQ Guideline Section	**NASA WFF ICP Section**	**Page**
13.(b) For the purposes of satisfying the requirement to identify and locate natural resources at risk set forth in this subsection, the operator of a pipeline shall…	Not applicable to this facility.	-
14. Identification and location of any municipal services (water, sewage), at risk	Section 2.0 Facility Description and Bulk Storage Container Information Section 2.1.5 Utilities	8 10
15. If applicable, this plan shall include the facility's responsibility for responding to a spill from a vessel moored at the facility	Not applicable to this facility.	-
16. A description of training, equipment testing and periodic unannounced oil discharge drills	Section 4.0 Discharge Response Equipment and Training	31
17. The facility's oil inventory control procedures. Facilities shall ensure that this control procedure is capable of providing for the detection of a discharge of oil	Section 3.7 Product Transfer Operations Section 7.0 Facility Inspections, Tests, And Records	26 49
18. Establishment of a system for early detection of a discharge to groundwater	Section 3.7 Product Transfer Operations Section 7.0 Facility Inspections, Tests, And Records	26 49
19. The procedures to be followed, upon detection of a discharge of oil	Section 5.0 Spill Countermeasures	37
20. The facility's preventive maintenance procedures applicable to the critical equipment of an oil storage and transfer system	Section 7.0 Facility Inspections, Tests, And Records	49
21. A description of the security procedures used by facility personnel to avoid intentional or unintentional damage to the facility	Section 3.6, Site Security	26
22. A post discharge review procedure to assess the discharge response in its entirety.	Section 5.0, Spill Countermeasures	37

REGULATORY CROSS REFERENCE GUIDE

40 CFR 265, Subparts C and D

The applicable regulations for a Hazardous Waste Contingency Plan (HWCP) are found in 40 CFR 265 Subparts C and D. The table below identifies the location in the document for each of the items required by the Virginia DEQ.

HWCP REGULATORY CROSS REFERENCE GUIDANCE			
Regulatory Section	**NASA WFF ICP Section**	**Comments**	**Page**
§265.52(a)	Inside cover	Actions of facility personnel	i
§265.52(b)	SPCC	Revised version of SPCC allowed	iv
52(c) which refers to §265.37	Section 4.4; Appendix K	Arrangements with local police, fire departments and others	34, Appendix K
§265.52(d)	Inside cover	Who is emergency coordinator	i
§265.52(e)	Appendix G; Section 2.1.5	List of emergency equipment on site	Appendix G
§265.52(f)	Appendix B and E	Evacuation plan	Appendix B and E
§265.53	Section 1.4	Placement of copies of contingency plan	3
§265.54	Section 1.5	Occasions for amendment of the contingency plan	3
§265.55	Inside cover	Emergency coordinator	i
§265.56(a)	Section 4.0, Appendices H and I	Internal and external notifications	31-36, App. H and I
§265.56(b)	Sections 4.1.1 and 4.1.2	Characteristics of release	31, 32
§265.56(c)	Section 5.0	Assessment of hazards	37
§265.56(d)	Inside Cover	External notifications	i
§265.56(e)	Section 4.3	Segregation of hazardous materials from incident	34
§265.56(f)	Section 7.0	Safety of operational equipment	49-53
§265.56(g)	Section 4.0	Clean up of hazardous waste	31-32
§265.56(h)	Appendix J	Clean up of emergency equipment and others	Appendix J
§265.56(i)	Appendix I	Initial follow-up reports	Appendix I
§265.56(j)	Appendix I	Full follow-up reports	Appendix I

INTEGRATED CONTINGENCY PLAN

NASA GODDARD SPACE FLIGHT CENTER
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

1.0 PLAN ADMINISTRATION [40 CFR Part 112.1, 112.3 (b)(d)(e), 112.5, 112.7]

1.1 Overview

Name of Facility: NASA Goddard Space Flight Center
Wallops Flight Facility

Type of Facility: Federal - Aerospace Research and Development

Location of Facility: NASA Goddard Space Flight Center
34200 Fulton Street
Wallops Flight Facility
Wallops Island, Virginia 23337

Name/Address of Owner: NASA Goddard Space Flight Center
34200 Fulton Street
Wallops Flight Facility
Wallops Island, Virginia 23337

Emergency Spill Number: Facility Emergency Coordinator
911 On-Site (757) 824-1333 (Mobile Phone or Off-Site)
Brenden Kettner
WFF Emergency Manager
Code 240, Protective Services Division
(757) 824-1985

Doug Bruner
Environmental Engineer
Code 250.W, Environmental Office
(757) 824-2441

Discharge History: The facility has not had a discharge of a reportable quantity of oil in amounts considered harmful in the previous 12 months (more than 1,000 gallons [3,785 liters] of oil in a single discharge or more than 42 gallons [190 liters] in each of two [2] discharges within a 12-month period) from a tank or oil-filled operational equipment.

1.2 Management Approval and Designated Person (40 CFR 112.7):

NASA is committed to preventing oil discharges to navigable waters and the environment and to maintaining the highest standards for spill prevention control and countermeasures through implementation, regular reviews and amendments to the Plan. This ICP has the full approval of NASA management. NASA has committed the necessary resources to implement the measures described in this Plan.

SIGNATURE:

NAME/ TITLE: David A. Reth
Director of Management Operations

WORK TELEPHONE: **301-286-8214**
24-Hr TELEPHONE

Authorized Facility Representative:

The Facility Environmental Manager is the designated person accountable for oil spill prevention at the facility and has the authority to commit the necessary resources to implement this Plan.

SIGNATURE:

NAME/ TITLE: Theodore J. Meyer
Associate Chief,
Medical & Environmental Management Division

WORK TELEPHONE: **757-824-1987**
24-Hr TELEPHONE: **443-366-2283**

1.3 Professional Engineer Certification [40 CFR 112.3(d)(1)]:

The undersigned Registered Professional Engineer (PE) is familiar with the requirements of Part 112 of Title 40 of the Code of Federal Regulations (40 CFR Part 112), and my agent has visited and examined the facility. The undersigned Registered PE attests that this ICP has been prepared in accordance with good engineering practice including consideration of applicable industry standards and the requirements of 40 CFR Part 112; that procedures for required inspections and testing have been established; and that this Plan is adequate for the facility [40 CFR 112.3(d)].

This certification in no way relieves the owner or operator of the facility of their duty to prepare and fully implement this ICP in accordance with the requirements of 40 CFR Part 112. This Plan is valid only to the extent that the facility owner or operator maintains, tests, and inspects equipment, containment, and other devices as prescribed in this Plan.

NAME: Paul Bull

SIGNATURE:

P.E. REGISTRATION NO.: 032982

DATE: 12-17-19 STATE: VA

(Seal)

1.4 Location of ICP [40 CFR 112.3(e)]

Copies of this Plan will be maintained in the WFF Environmental Office, both WFF fire stations, Buildings B-29, N-223, U-81, electronically on the WFF Environmental Office website, and by applicable partners. In addition, copies have been sent to mutual aid facilities described in Section 4.4 of this Plan.

1.5 Plan Review [40 CFR 112.3 and 112.5]

The Facility Environmental Manager is responsible for initiating and coordinating revisions to the ICP Plan. Changes noted with an asterisk (*) as described in Sections 1.5.1 through 1.5.3 must be made immediately.

NASA must incorporate the needed ICP revisions (not described with an asterisk below) as soon as possible, but no later than six (6) months after the change occurs. The Plan must be implemented as soon as possible following any technical amendment, but *no later than six (6) months* from the date of the amendment.

1.5.1 Technical Amendments

In accordance with 40 CFR 112.5(a), NASA periodically reviews and evaluates this ICP for any change in the facility design, construction, operation, or maintenance that materially affects the facility's potential for an oil discharge, including, but not limited to:

- commissioning of containers;
- reconstruction, replacement, or installation of piping systems;
- construction or demolition that might alter secondary containment structures;
- change in design, construction, operation, maintenance, or other circumstances in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency; or
- changes of product or service, revisions to standard operation, modification of testing/inspection procedures, and use of new or modified industry standards or maintenance procedures.

Amendments to the ICP made to address changes of facility configuration are referred to as technical amendments, and must be certified by a PE.

1.5.2 Non-Technical Amendments

Non-technical amendments can be done (and must be documented) by the Facility Environmental Coordinator. Non-technical amendments include the following:

- change in the name or contact information (i.e., telephone numbers) of individuals responsible for the implementation of this Plan;
- change in the name or contact information of spill response or cleanup contractors; or
- change in the list of emergency equipment.

1.5.3 Amendments as a Result of an Emergency

The Plan must be reviewed and immediately amended if it fails to adequately prevent or mitigate the effects of a spill or fails in any other emergency. (Note: 40 CFR 265.54 is more stringent than 40 CFR 112.5(b))

1.5.4 Scheduled Plan Reviews

Annually, the Plan shall be reviewed to check for any "administrative changes" that are applicable, such as personnel changes or revisions to contact information, such as phone numbers. Administrative changes must be documented in the Plan Review Log.

The 2019 ICP review occurred in October 2019. The Oil Discharge Contingency Plan (ODCP) was approved by Virginia DEQ and became effective August 7, 2016. This ICP incorporates the ODCP by reference.

The ODCP renewal date will always follow the same August 7, 2021, 2026, 2031, five-year path even if a revised ICP is submitted a few years prior to the renewal date. If an ICP has been recently submitted, only a new signature on the renewal application is required. Revisions to meet ODCP regulations must occur within 90 days of the renewal date.

Revisions to the Plan, if needed, are made within six (6) months of the 5-year review. A registered PE certifies any technical amendment to the Plan, as described above, in accordance with 40 CFR 112.3(d). This ICP is dated October 31, 2019. After submitting this plan to Virginia DEQ, the next renewal application and updated plan should be submitted by August 7, 2021.

1.5.5 Record of Plan Review

Scheduled reviews and Plan amendments are recorded in the Plan Review Log. This log must be completed even if no amendment is made to the Plan as a result of the review. Unless a technical or administrative change prompts an earlier review of the Plan, the next scheduled review of this ICP must occur within one (1) year of the date on the front of this document and in the subsequent years that follow.

PLAN REVIEW LOG

	As Facility Environmental Coordinator, I have completed a review and evaluation of this ICP Plan:	Date	The Plan will be amended	The Plan will not be amended
PRINT NAME				
SIGNATURE			TITLE	

	As Facility Environmental Coordinator, I have completed a review and evaluation of this ICP Plan:	Date	The Plan will be amended	The Plan will not be amended
PRINT NAME				
SIGNATURE			TITLE	

	As Facility Environmental Coordinator, I have completed a review and evaluation of this ICP Plan:	Date	The Plan will be amended	The Plan will not be amended
PRINT NAME				
SIGNATURE			TITLE	

	As Facility Environmental Coordinator, I have completed a review and evaluation of this ICP Plan:	Date	The Plan will be amended	The Plan will not be amended
PRINT NAME				
SIGNATURE			TITLE	

1.6 Facility Procedures and Methods [40 CFR 112.7]

Manufactured storage tanks at this facility will be evaluated by a certified individual [American Petroleum Institute (API) or Steel Tank Institute (STI), as applicable] during initial installation and no later than the time frame indicated in the applicable standard for certified inspection after the installation date. The inspector may recommend additional testing. If a tank is relocated on-site, manufacturer recommendations and applicable recertification procedures shall be followed. Shop-fabricated ASTs will be inspected using the guidance from STI SP-001. Section 7.0 of this Plan describes the inspection program to be implemented by the facility following a regular schedule, including the timeframes by which each of the bulk storage containers must be tested.

2.0 FACILITY DESCRIPTION AND BULK STORAGE CONTAINER INFORMATION
[40 CFR 112.7 (a)(3), 112.7 (c) and 112.8 (c)]

2.1 Facility Description [40 CFR 112.7(a)(3)]

2.1.1 Installation History

Wallops Flight Facility (WFF) was established in 1945 as a center for aeronautic research. The WFF is a national resource with the facilities, personnel, core competencies, and low cost of operations to provide world-class, end-to-end services for small- to medium-sized projects. It is a fully capable test range including launch facilities, a research airport, mobile range capabilities, range instrumentation engineering, range safety, flight hardware engineering, and mission operations. The strategic vision for WFF – "Wallops Flight Facility will be a national resource for enabling low-cost aerospace-based science and technology research" – has four (4) primary mission themes that align with and support NASA's goals. These mission themes, listed below, continue to expand existing WFF activities.

1. To help achieve NASA`s strategic objectives for scientific and educational excellence through cost efficient integration, launch, and operations of suborbital and small orbital payloads.
2. To enable scientific, educational, and economic advancement by providing the facilities and expertise to enable frequent flight opportunities for a diverse customer base.
3. To serve as a key facility for operational test, integration, and certification of NASA and commercial next-generation, low-cost orbital launch technologies.
4. To pioneer productive and innovative government, industry, and academic partnerships.

2.1.2 Location

Wallops Flight Facility is located in Accomack County on the Eastern Shore of Virginia. Accomack County is bordered by Northampton County on the south, the state of Maryland on the north, the Atlantic Ocean on the east, and the Chesapeake Bay on the west. Accomack County is a part of the Delmarva Peninsula, which is also bordered on the east and west by the Atlantic Ocean and the Chesapeake Bay, respectively, and by the Delaware Bay and River on the north. A Facility Location Map is included in Appendix B.

The facility is composed of three (3) separate land areas in close proximity to each other including the Main Base, Mainland, and Wallops Island. The Main Base encompasses 2,000 acres (809 hectares) and includes runways, aircraft hangars, office buildings, dormitories, and industrial shops. Most administrative, technical, and facility support functions occur on the Main Base. The Main Base is bordered on the east by extensive marshland and creeks, which lead into Chincoteague Bay and Chincoteague Inlet. Little

Mosquito Creek and its tributaries define the north and west borders of the Main Base. State routes 175 and 798 border the Main Base on the south and southeast, respectively.

The Mainland facilities include radar, antennas, and transmitter systems and associated buildings. The 1,200 acres (486 hectares) of the Mainland area are bordered by extensive marshland to the east, and by farmland to the south, west, and north.

Wallops Island is a barrier island located along Virginia's coast. It encompasses approximately 3,400 acres (1,376 hectares) surrounded by water and is approximately 7 miles (11 kilometers) long by 1/2-mile (0.8 kilometers) wide. Testing and launch facilities, storage buildings, and office buildings, which are utilized by NASA and its partners, are located on Wallops Island. The Atlantic Ocean borders Wallops Island to the east and the Chincoteague Inlet delineates the northern border. Marshland, interlaced with small creeks, covers the entire western approach to Wallops Island. The north end of Assawoman Island abuts the southern tip of Wallops Island.

2.1.3 Topography

The topography at WFF is typical of the Mid-Atlantic coastal region, and is mostly flat without unusual features. Wallops Island is separated from the Mainland by various inlets, marshes, bays, creeks, and tidal estuaries. During storms, flood water from the Atlantic Ocean moves through these inlets and across the marshes to low-lying areas. The Main Base, Mainland, and Wallops Island lie within "the Tidewater region of the embayed section of the Atlantic Coastal Plain" Physiographic Province (United States Department of Agriculture, Soil Conservation Service [USDA: SCS] 1994:3). Three (3) major landforms are found in the WFF project area: mainland, tidal marsh, and barrier island.

The Mainland includes low and high terraces separated by a discontinuous escarpment at 25 feet (7.62 meters) above mean sea level (amsl). Low terraces are found west of Route 13 and on the extreme eastern edge of the Mainland. The low terrace "consists of broad to narrow flats bordered by tidal marshes on the east and a discontinuous escarpment on the west" (USDA, SCS 1994:3). The high terrace ranges in elevation from 25 to 50 feet (7.62 to 15.24 meters) amsl. The high terrace topography is more complex than the low terrace, and "is generally characterized by broad, nearly level terraces that are broken by narrow elliptical ridges (Carolina Bay features), gentle escarpments, tidal creek, and drainage ways" (USDA, SCS 1994:72). Extensive tidal marshes are located between the mainland and barrier islands. The marshes flood regularly with the tides, are drained by an extensive system of meandering creeks, and have immature soils. Barrier islands are roughly parallel to the mainland and are generally less than 10 feet (3 meters) amsl. Topography varies from nearly level to steep, and soils are immature and vary widely from very poorly to excessively drained (USDA, SCS 1994).

The majority of the WFF Main Base is located on a high terrace landform (25 to 40 feet [7.62 to 12.19 meters] amsl) with the northern and eastern portions located on low terrace (0 to 25 feet [0 to 7.62 meters] amsl) and tidal marsh. The Wallops Mainland is primarily located on low terrace and tidal marsh, and Wallops Island is a barrier island with

extensive tidal marshes between the island and the Wallops Mainland. Presently, the highest elevation on Wallops Island is approximately 15 feet (4.57 meters) amsl. However, topography on barrier islands changes due to dynamics of ocean currents, wind erosion, and severe weather conditions. Topographic maps of the facility are included in Appendix B.

2.1.4 Geology

Located within the Atlantic Coastal Plain Physiographic Province, WFF is underlain by approximately 7,000 ft. of sediment, which lies atop crystalline basement rock. The sedimentary section, ranging in age from Cretaceous to Quaternary, consists of a thick sequence of terrestrial, continental deposits overlain by a much thinner sequence of marine sediments. These sediments are generally unconsolidated and consist of clay, silt, sand, and gravel. The regional dip of the sediments is to the east, towards the ocean. The two uppermost stratigraphic deposits at WFF are the Yorktown Formation and the Columbia Group, which is not subdivided into formations. The Yorktown Formation is the uppermost unit in the Chesapeake Group and was deposited during the Pliocene epoch of the Tertiary Period. The Yorktown Formation generally consists of fine to coarse, glauconite quartz sand, which is greenish gray, clayey, silty, and in part, shelly. In addition, the facility is in Seismic Zone 1, with a minor Seismic probability. Virginia is located centrally on the North American Plate (where the Earth's crust is thicker than at the edges). Occurring earthquakes rarely measure above 4.5 on the Richter magnitude scale.

2.1.5 Average Weather

The annual average daily high temperature is 65°F (18°C); the average low is 48°F (9°C). The extreme low daily temperature is -4°F (-20°C) and the extreme high daily temperature is 101°F (38°C). The average annual rainfall is 39 inches (99 centimeters). The highest recorded wind speed is 78 mph (125 kph); however, the average wind speed is 20 mph (32 kph). The facility is susceptible to severe thunderstorms.

2.1.6 Utilities

Six (6) miles (9.5 kilometers) of state maintained road connect the Main Base and Mainland. The facility owns a paved road, bridge, and causeway, which connect the Mainland and Wallops Island. These structures provide the only land link to Wallops Island and are a critical part of the NASA infrastructure. Hard surface roads, maintained by facility personnel, connect the structures located within the Main Base, Wallops Island, and the Mainland.

The Wattsville Substation of A&N Electric Cooperative supplies electrical power to the facility. Separate lines connect to the Main Base and the Mainland/Wallops Island area. The Facilities Management Branch (FMB) operates backup power generators when either service is not sufficient or short-term power services throughout the facility are needed for special projects. These generators are located on the Main Base at Building D-8, and on the Mainland at Building U-12. In addition, the National Oceanic and Atmospheric

Administration (NOAA), a Wallops Flight Facility partner, has an auxiliary power source in the event of an outage.

All potable water on the facility is obtained from groundwater production wells on the Facility with depths of 150 feet (61 meters) to 250 feet (80 meters). Permitted system design capacity is 598,400 gpd. Groundwater withdrawal, usage, and quality are regulated by the DEQ and by the Virginia Department of Health. The water is used primarily for domestic purposes and fire protection. In addition to NASA, the Town of Chincoteague, Virginia, maintains potable water wells located on the facility property, which range in depth from 100 feet (32 meters) to 262 feet (84 meters).

The Main Base wells are connected to a raw water collection system that, after chlorination, feeds the 500,000-gallon (1.9 million liter) ground-level storage reservoir (D-45). Water from this reservoir is pumped into the distribution system. A 150,000-gallon (567,750 liter) elevated storage tank pressurizes the system, maintaining pressure and supplying short-term demand. Potable water for the Mainland and Wallops Island is supplied from two (2) wells with a permitted system design capacity of 216,000 gpd. An 80,000-gallon (302,000 liter) ground-level reservoir (U-49) on the Mainland is a fully operational storage facility. Two (2) 150,000-gallon (567,800 liter each) elevated storage tanks (X-45 and W-55) and a 100,000-gallon (378,500 liter) elevated storage tank (V-90) are on Wallops Island. Hydrant flow tests are performed annually by the fire department to ensure the water supply system is functioning properly.

The Main Base is served by a system of gravity sewers, pumping stations, and force mains connected to a Federally Owned Treatment Works (FOTW). The FOTW has a treatment capacity of 300,000 gallons per day (gpd) (1,135,624 liters per day) with current daily flows averaging 60,000 gpd. The Wallops Visitor Center is also connected to the FOTW. Sewage at Wallops Island is collected by gravity sewers, pumping stations and force mains. Sewage is then transported by a force main to the Main Base, (refer to Appendix B of this plan for schematics of the storm sewer system). Sewage from Mainland buildings discharges to septic tanks.

The WFF Fire Prevention and Protection program implements federal standards in the design, construction, and maintenance of all facilities and grounds. There are five (5) fire fighting vehicles which can hold a total capacity of 10,000 gallons (37,854 liters) of water and 1260 gallons (4,769 liters) of Aqueous Film Forming Foam. Two fully equipped hazardous materials spill response trailers can react to hazardous materials incidents on both the Wallops Main Base and Wallops Island. In addition to the fire suppression capabilities of the Fire Department, the majority of WFF buildings have automatic sprinkler systems as well as addressable fire alarm systems. Diesel engine powered fire pumps, located at Buildings D-4 (Main Base) and U-49 (Mainland), are used to maintain water pressure in the suppression system. Hangars D-1 and N-159 have a water deluge system. On Wallops Island, Pad 0A, the Mid-Atlantic Regional Spaceport (MARS), has a 300-foot tall, 250,000-gallon (946,353 liters) water tower to be used for water deluge during static fire testing and launches. In the future, all new buildings and many existing buildings lacking fire suppression systems will be provided with an automatic means of fire control as well as addressable fire alarm systems.

2.2 Bulk Storage Containers and Tanks [40 CFR 112.7(a)(3), 112.7(c), and 112.8(c)]

Wallops Flight Facility, and specified partners, own and operate 43 ASTs (Appendix D) and 7 USTs (Appendix C) of various sizes located throughout the facility. Four 20,000-gallon ASTs (302,833 liters) (D-9A, D-9B, U-12A-13, U-12B-13) are used to store #2 fuel oil for emergency generators. Due to the size of the facility and constant change in operations, the total gallons of oil frequently changes. The current maximum storage capacity of the ASTs is 236,800 gallons (896,386 liters) of petroleum (Appendix D).

The maximum storage capacity of the USTs is 27,000 gallons (102,206 liters) of #2 fuel oil and ultra-low sulfur diesel fuel. The USTs primarily store heating fuel for NOAA and Navy buildings. Animal fats and oils regulated under 40 CFR 112.12 are stored behind the Main Base Cafeteria, Building E-2, in an aboveground 300-gallon capacity container.

In addition to storage tanks, Wallops Flight Facility has oil-filled operational equipment including several transformers, elevators, and antennae containing 55 gallons or greater of mineral oil throughout the facility (Appendix C). The total capacity of this equipment is approximately 39,369 gallons (149,028 liters). NOAA transformers contain vegetable oil. The total capacity of the NOAA transformers is approximately 1,642 gallons (6,216 liters).

In addition to the oil storage systems maintained at the facility, outside construction contractors occasionally bring ASTs of varying capacities onto the facility for the duration of their contract. Prior to commencing work, these contractors are required to submit a Health and Safety Plan for approval by the WFF Safety Office. Contractors are typically encouraged to limit the use of contractor owned mobile ASTs on the facility. Contractors are required to notify WFF of ASTs brought to the facility with a capacity greater than 55 gallons (208 liters), and tanks of 660 gallons (2,500 liters) or greater must have FMB approval and include a storm water pollution prevention plan or other approved spill response plan. If the tank will be in use on WFF for more than 120 days, the contractor must provide proof that the tank is registered with the DEQ. Possible releases from these tanks must be addressed in the contractor's Hazardous Materials Spill Plan or contractor's other approved spill response plan. WFF requires that contractors provide 110 percent capacity with impermeable secondary containment for all ASTs brought onto the facility by the contractor.

A summary of the types of oils stored at WFF, including NASA and tenant/partner quantities, is summarized in Table 2.2-1 as follows:

TABLE 2.2-1
WFF OIL STORAGE SUMMARY FOR CONTAINERS 55 GALLONS OR GREATER

Oil Commodity	Storage Type					Total Storage Capacity (gallons)
	AST	UST	Mobile	Equipment	Drum	
#2 Fuel Oil	√	√	√			153,178
Animal Fats	√				√	355
Diesel Fuel	√		√			13,450
Gasoline	√		√			11,000
Hydrashield FR-395-2 Mineral Oil				√		1,343
AGIP OSO Elevator Hydraulic Fluid				√		2,708
Envirotemp FR3				√		1,892
Hydraulic Oil					√	825
DTE Heavy Gear Oil				√		385
Brayco 717 Hydraulic Fluid				√		65
Brayco Micronic 781-2 Hydraulic Fluid				√		90
Jet-A Fuel (N/U/HW)	√		√			73,005
JP-8						0
Lacquer Thinner					√	55
Mineral Oil				√		35,381
Mineral Spirits (N/HW)					√	55
Motor Oil (N/U)				√	√	1,990
RP-1 Kerosene (N/U)	√					30,000
TOTAL						327,028

N/U/HW = New, Used, and Hazardous Waste
JP-8 is stored onsite only when needed for specific projects

A physical description of the type of each tank and product transfer information concerning the ASTs is as follows:

TABLE 2.2-2 AST TANK CONSTRUCTION AND PRODUCT TRANSFER INFORMATON				
Tank Category	**A**		**B**	
Primary Construction	Single-Wall Steel		Double-Wall Steel	
Secondary Construction	Concrete Walled Dike Area		Steel integral with Primary Steel	
Tanks/Locations	**Tank ID**	**Building**	**Tank ID**	**Building**
	D-9A	D-8	D-1	D-1
	D-9B	D-8	D-2-17	D-1
	WI-V3-AST-01	V-3	D-04-14	D-4
	MARS-33	Pad 0-A	D-8 Day Tank	D-8
	MARS Hydraulic Reservoir	Pad 0-A	D-50B	D-50
			E-2	E-2
			F-26-1A	F-26
			F-26-1B	F-26
			F-36	F-36
			MPS-1	E-132
			MPS-2	E-132
			MPS-3	E-132
			MPS-4	E-132
			U-12A-13	U-12
			U-12B-13	U-12
			U-30-15	U-30
			U-48-15	U-48
			U-65-15	U-65
			V-62	V-62
			W-20A-10	W-20A
			X-16	X-16
			Z-62	Z-62
			WI-R1-AST-01	Cropper Center
			WI-R30-AST-01	R-30
			WI-R40-AST-01	R-40
			WI-V3-AST-01	V-3
			WI-V10-AST-01	V-10
			WI-V18-AST-01	V-18
			WI-V21-AST-01	V-10
			WI-V24-AST-01	V-24
			WI-V24-AST-03	V-24
			NOAA-3	CDA
			NOAA-4	CDA
			NOAA-BT1	CDA

TABLE 2.2-2 AST TANK CONSTRUCTION AND PRODUCT TRANSFER INFORMATON				
Tank Category	**A**		**B**	
Primary Construction	Single-Wall Steel		Double-Wall Steel	
Secondary Construction	Concrete Walled Dike Area		Steel integral with Primary Steel	
			NOAA-BT2	CDA
			NOAA-BT3	CDA
			NOAA-BT4	CDA
			NOAA Day Tank-14	CDA
			USCG Housing	USCG
Construction Standard	The ASTs are built to the UL-142 standard which specifies interior (weight-bearing) supports and continuous welds for the tank interior. The single-wall, all-steel construction of the ASTs also provides impact resistance and ballistics resistance. The steel of the single-wall ASTs is compatible with the product stored and conditions of storage (i.e., pressure, temperature, etc.).		The ASTs are either double-wall steel tanks built to UL-142 standard or double-wall steel tanks built to UL-2085 which specifies interior (weight-bearing) supports and continuous welds for the tank interior. The UL-2085 tanks are constructed two ways - double-wall steel with concrete slurry between the two walls or with a concrete outside shell (Convault). The double-wall construction of the AST also provides impact resistance and ballistics resistance. The steel inner tank of the double-wall AST is compatible with the product stored and conditions of storage (i.e., pressure, temperature, etc.). The steel outer tank or liner provides secondary containment for the inner tank.	
Secondary Containment	A release of product from the tanks would be captured in the concrete containment dike that surrounds the ASTs.		A release of product from the tanks would be captured in the tank's secondary containment.	
Release Detection	Visual inspections are performed of the secondary containment areas.		The ASTs are equipped with either electronic tank sensors or a manual float sensor that will indicate if a release has occurred to the interstitial portion of the secondary containment. A few of the tanks that are double-wall do not have sensors	

TABLE 2.2-2 AST TANK CONSTRUCTION AND PRODUCT TRANSFER INFORMATON		
Tank Category	**A**	**B**
Primary Construction	Single-Wall Steel	Double-Wall Steel
Secondary Construction	Concrete Walled Dike Area	Steel integral with Primary Steel
		or floats and visual inspections are performed.
Protection	The ASTs are located either within a building or located outside within the concrete dike which provides protection from vehicle traffic.	The ASTs are either protected from vehicular traffic by bollard poles, in concrete containment, or located in areas that do not have vehicular traffic.
Product Transfer	The ASTs have two (2) means of product transfer: delivery of product to the tank or supplying product to the boilers or generators. During the product delivery, at a minimum, the delivery truck driver has access to the tank gauge. In addition, some of the tanks are equipped with either an overfill prevention valve or a high level alarm. All fills are made through a fill riser with a spill basket around the fill to catch any spills. Product transfer to the boiler/ generators is performed in aboveground piping with an anti-siphon valve with visual inspections. Underground piping is within a chase pipe with annual integrity testing.	The ASTs have two (2) means of product transfer: delivery of product to the tank or supplying product to the boilers, generators, aircraft, or vehicles. During the product delivery, at a minimum, the delivery truck driver has access to the tank gauge. In addition, some of the tanks are equipped with either an overfill prevention valve or high level alarm. All fills are made through a fill riser with a spill bucket around the fill to catch any spills. Product transfer to the boiler/ generators is performed in aboveground piping with an anti-siphon valve with visual inspections. Underground piping is within a chase pipe with annual integrity testing. Any lines that supply product under pressure are equipped with an automatic line leak detector to detect a leak.
Drainage	The secondary containment that is subject to precipitation are visually inspected after rain events and the containment area is pumped out with	Double-wall tanks normally do not require drainage of the secondary unless condensation builds up or a leak occurs. Electronic monitoring,

TABLE 2.2-2 AST TANK CONSTRUCTION AND PRODUCT TRANSFER INFORMATON		
Tank Category	**A**	**B**
Primary Construction	Single-Wall Steel	Double-Wall Steel
Secondary Construction	Concrete Walled Dike Area	Steel integral with Primary Steel
	a vacuum truck.	visual inspections, and float sensors are used to monitor the secondary containment.

Tenant/partners own and operate oil storage both on WFF property and adjacent to the Main Base fence line. Tenant/partner oil storage tanks and or operational equipment have been included in the plan to help NASA maintain better control of oil storage that may affect NASA's environment and to aid in emergency response efforts. Each Tenant/partner has registered their own oil storage tanks and is responsible for regulatory compliance as well as costs associated with spill cleanups.

Navy oil quantities stored off-site and independent of WFF's inventory are listed in Table C-9 in Appendix C. Site maps depicting the locations of the oil storage tanks have been included in Appendix B.

Tables located in Appendix C summarize the total oil storage capacity at the facility, including storage by partners.

A summary of the AST tank data and potential discharge information can be found in Appendix D.

2.2.1 Overfill Prevention Systems [40 CFR 112.8(c)(8)]

All tanks are equipped with a direct-reading level gauge. Additionally, some tanks are equipped with high level alarms set at 90 percent of the rated capacity or an automatic shutoff device set at 95 percent of the rated capacity.

The smaller tanks are equipped with liquid level gauges. Liquid level sensing devices are checked during monthly tank inspections following manufacturer recommendations. Venting capacity is suitable for the fill and withdrawal rates.

Facility personnel coordinate all filling operations and monitor the product level inventory in the tanks.

2.2.2 Visible Discharges [40 CFR 112.8(c)(10)]

Visible discharges from any container or appurtenance - including seams, gaskets, piping, pumps, valves, rivets, and bolts - are quickly corrected upon discovery.

Oil is promptly removed from any diked areas and disposed of according to the waste disposal method described in Section 4.3 of this Plan.

2.2.3 Mobile and Portable Containers [40 CFR 112.8(c)(11)]

2.2.3.1 Portable Containers

Small portable oil storage containers, such as 55-gallon drums, are stored inside the maintenance areas or storage areas where secondary containment is provided by spill containment pallets or other engineered designed system. Any discharged material is quickly contained and cleaned up using sorbent pads and appropriate cleaning products. The location and quantity of portable containers is listed in Appendix C.

2.2.3.2 Mobile Refuelers

Mobile tankers transfer fuel from the D-1 and D-2-17 ASTs to aircraft around Hangars D-1 and N-159. The tankers are stored at the Mobile Tanker Storage Area. Mobile refuelers are listed in Table C-7 in Appendix C.

Stormwater from the D-1 fuel storage area flows through an oil/water separator prior to treatment at the FOTW. The separator has a capacity of 6,000 gallons (22,712 liters) of water and 4000 gallons (15,142 liters) of oil. The separator is inspected and maintained by the WFF FMB personnel.

2.3 Qualified Oil-Filled Operational Equipment [40 CFR 112.7(k)]

Oil-filled operational equipment contains oil that is used solely to support the function of the apparatus. Examples of oil-filled operational equipment include hydraulic systems, transformers, and lubricating systems. As stipulated in 40 CFR 112.7(k)(1), there have been no discharges as described in 40 CFR 112.1(b) from any oil-filled operational equipment at WFF and therefore, the alternative requirements to general secondary containment of 40 CFR 112.7(k)(2) have been applied at WFF, designating the oil-filled operational equipment as qualified oil-filled operational equipment.

WFF operations and maintenance personnel inspect the qualified oil-filled operational equipment on a routine schedule and document the inspections. Oil-filled transformers located throughout the Facility are monitored on a rolling quarterly inspection schedule for any signs of leakage, damage, or deterioration. In addition, elevators (hydraulic systems) at WFF are regularly maintained and routinely inspected.

If any of the qualified oil-filled operational equipment are found in need of repair or there is any evidence of a release, the equipment will be taken out of service until the problem is corrected. Spill kits are available throughout the Facility to be used by personnel immediately if a transformer or other qualified oil-filled operational equipment is found to be leaking. The qualified oil-filled operational equipment at WFF are listed in Appendix C, and inspection forms are located in Appendix M.

WFF has evaluated external oil-filled transformers based on an assessment checklist, which provides a net ranking from several criteria including transformer oil capacity, surrounding terrain, and distance to storm drains or water bodies. The net total risk rankings determine if active containment measures are adequate or if passive secondary containment structures are recommended. The assessment form is located in Appendix M. Based on the oil-filled transformer assessment, passive secondary containment measures are not required for transformers based on the ranking criteria. However, to increase protectiveness, passive diversionary structures consisting of crushed rock/wooden berms have been installed on some transformers. WFF determined the highest environmental risk factor is the proximity to storm drains or water bodies. Therefore, those transformers located within 25 feet of a storm drain or water body which do not have passive secondary containment measures installed are inspected more frequently.

The FMB notifies the Environmental Office when new transformers are brought onto the facility.

2.4 Central Hazardous Waste Accumulation Areas [40 CFR 262.34 (a)]

NASA maintains three (3) separate Central Accumulation Areas (Building B-29, N-223, and U-81) operating under two (2) EPA Generator Identification Numbers to manage NASA hazardous waste. The EPA Generator Identification Number for the Main Base is VA8800010763, and VA7800020888 for the Mainland/Wallops Island. Wallops Flight Facility is classified as a large quantity generator for both permits since NASA can generate greater than 2,200 pounds (1,000 kg) of hazardous waste and/or 2.2 pounds (1 kg) of acute hazardous waste per month at each location. Hazardous waste at the Central Accumulation Areas can be stored on-site for up to 90 days from the date of initial accumulation.

WFF generates a variety of hazardous wastes, but most are the result of consumer packaged chemicals that have expired. Other typical hazardous wastes include methyl ethyl ketone, 1,1,1-trichloroethylene, acetone, alcohol, jet fuel, lead solder paste rags, paint thinner, and sulfuric acid. An inventory of the hazardous waste stored in Buildings B-29, N-223, and U-81 is kept in the Environmental Office. Safety Data Sheets (SDS) for the virgin form of these wastes are available in the work areas that generate the wastes (Appendix N).

Building B-29 is the primary accumulation area designated for the storage of hazardous wastes that are generated on the Main Base. Building B-29 is located in the vicinity of the following buildings:

- Building B-30, the hazardous materials storage facility, to the west, southwest;
- Building B-31, grounds maintenance, to the north, northeast; and
- Building B-129, the Main Base Fire Station, to the northeast.

Building B-29 is locked when personnel are not present. The building consists of the following areas:

- An open bay, which provides eight waste cubicles separated by 56-inch (142-centimeter) high concrete walls. The bay also provides a staging area and an aisle between the waste cubicles.
- A storage room for equipment, supplies, and sorbent spill materials.
- An office with a telephone, a restroom, and a utility panel closet.
- A concrete loading dock and ramp equipped with a manual dock leveler.
- An outside covered storage area surrounded by a chain link fence.

In addition, the design of the accumulation area includes the following features:

- Fire alarm system connected to the Main Base Fire Station;
- Explosion relief venting and skylights;
- Electrical ground system;
- Eye wash station and emergency shower;
- Sprinkler fire suppression system designed to release 0.35 gpm/ft^2 (1,425 lpm/m^2);
- Fire extinguisher located in the receiving area;
- Floor sloped in the waste cubicles toward a 4-foot (1.2-meter) wide containment sump and grate, which is adjacent to the exterior wall of the cubicles; and
- Trench drain surrounding the perimeter of the receiving area.

Building N-223, on the southern portion of the Main Base, houses one of the Central Hazardous Waste Accumulation Areas. Currently, only used oil is stored in Building N-223. It is adjacent to the surplus/disposal facility, Building N-222. Building N-223 is surrounded by chain-link fencing and is secured during non-working hours. It is an open-air facility with a roof. Features include an eyewash station, emergency shower, fire extinguisher, a containment sump, and an emergency spill kit.

Hazardous waste generated on the Mainland and Wallops Island is stored at Mainland/Wallops Island Central Accumulation Area, Building U-81. Like Building N-223, Building U-81 is an open-air facility with a roof surrounded by chain-link fencing. It is secured at all times. Features include an eyewash station, emergency shower, fire extinguisher, emergency spill kit, and a containment sump and grate.

Neither Building U-81 nor Building N-223 have telephones. The closest telephones to Building U-81 and Building N-223 are located at Building U-70 and Building N-222, respectively. Personnel are required to carry hand held radios or cell phones while working in these areas.

Diagrams depicting the layout of these buildings and their evacuation routes are found in Appendix E.

The U. S. Navy Surface Combat Systems Center, as a small quantity generator under EPA Generator Identification Number VAR000518837, operates a Central Accumulation Area in Building V-10/V-20 for hazardous waste generated in buildings V-10/20/21, V-3, and V-24. The U. S. Navy Surface Combat Systems Center, under EPA Generator Identification Number VAR000518829, operates as a small quantity generator for

buildings R-2, R-30, and R-20 without an accumulation area.

The Mid-Atlantic Regional Spaceport, also a small quantity generator, under EPA Generator Identification Number VAR000518845, operates a Hazardous Waste Central Accumulation Area at Pad 0-A.

3.0 DISCHARGE PREVENTION
[40 CFR 112.7 (a)(2) & (3), 112.7 (b), (c), (d), (g), (h), (i), & (j) AND 112.8 (b) & (d)]

3.1 Compliance with Applicable Requirements [40 CFR 112.7(a)(2)]

All aspects of the oil storage and transfer operations regulated by the SPCC rules are in compliance with applicable requirements of the SPCC regulations without exception.

Non-destructive integrity evaluation is not performed on any of the ASTs or the 55-gallon storage drums. Tanks are either double-wall in construction or single-wall within a dike and are elevated off the concrete secondary containment. The tanks are inspected regularly in accordance with Steel Tank Institute (STI) SP-001, *Standard for the Inspection of Aboveground Storage Tanks*, tank inspection standard as described in this Plan. For applicable double-walled tanks, leakage from the primary container would be detected through monitoring of the interstitial space. Any leakage from the secondary shell would be detected visually during scheduled visual inspections by facility personnel.

Storage drums are elevated on spill containment pallets or in designated secondary containment buildings with all sides visible. Any leak would be readily detected by facility personnel before a discharge could occur to navigable waters or adjoining shorelines. The drum storage areas are inspected monthly. This is in accordance with accepted industry practice for drum storage and provides an effective means of verifying container integrity, as noted by EPA in the preamble to the SPCC rule at 67 FR 47120.

3.2 Facility Layout Diagrams [40 CFR 112.7(a)(3)]

Maps and diagrams illustrating the layout of the facility and the location of storage tanks are included in Appendix B. Drainage maps showing the Wallops Flight Facility Storm Water Management System have been included in Appendix B. Maps comparing building locations for drums have also been included in Appendix B of this plan. Drum locations can be determined by using the building location maps in Appendix B and Table C-5 in Appendix C. The diagrams also show the locations of storm water drain inlets and the direction of surface water runoff. As required under 40 CFR 112.7(a)(3), the facility diagrams indicate the locations of ASTs, USTs, drums, transformers and other devices that contain 55 gallons (208 liters) or more of oil. Appendix O includes diagrams for NASA ASTs equipped with underground and/or aboveground pipes.

3.3 Facility Drainage [40 CFR 112.8(b)]

The Main Base has both natural drainage patterns and storm water drains to intercept and divert flow. The natural drainage pattern on the northern portion of the Main Base drains to Mosquito Creek and eventually flows to the Atlantic Ocean. The eastern and southeastern portions of the Main Base have a natural drainage pattern that flows to Simoneaston Bay, then into Cockle Creek, Shelly Bay, and Chincoteague Bay, before draining to the Atlantic Ocean. The natural drainage pattern on the western and southwestern portion of the Main Base is toward Wattsville Branch, and then to Mosquito Creek, and on to the Atlantic Ocean. Storm water drains on the Main Base intercept

natural drainage ditches and divert the flow to numerous discharge locations. Storm water drains are located throughout the developed portion of the Main Base. The majority of storm waters discharge into the surrounding waterways, and eventually the Atlantic Ocean. Refer to Appendix B Drainage Features maps. To maintain compliance with the WFF VPDES Permit, the Environmental Office conducts inspections of storm water outfalls, storm water inlets, and high risk areas on-site quarterly and annually.

On the Mainland, the eastern sloping grade forms a natural drainage pattern that flows toward Hog Creek, and then to Oyster Bay, Bogues Bay, Cats Creek, Ballast Narrows, Chincoteague Inlet, and finally the Atlantic Ocean. Surface water on Wallops Island flows west through numerous tidal tributaries and subsequently flows to the Atlantic Ocean. Additionally, Wallops Island has storm drains and ditches that divert the water flow to several individual discharge locations.

The collection of water in dikes, vaults, and berms located throughout WFF is visually checked before being discharged. The record of the discharge is entered on the Controlled Drainage Discharge Log (Appendix F).

3.4 Potential Discharge Volume and Direction of Flow [40 CFR 112.7(b)]

To verify that all potential sources of releases have been evaluated and are addressed in this Plan, the following tables outline the source and volume of a potential spill and the means of release prevention being utilized for each type of storage system at the facility. The aboveground storage tanks and containers onsite have been divided into groups based on the type of tank and the construction of the primary and secondary containment.

TABLE 3.4-1
SINGLE-WALL STEEL ASTS IN A CONCRETE DIKE, OR PORTABLE SPILL BERM STORING FUEL OIL, DIESEL, KEROSENE, AND JET FUEL TANK SIZE RANGES FROM 70 GALLONS TO 30,000 GALLONS (TANK NUMBERS LISTED IN TABLE 2.2-2, CATEGORY A)

Source	Major Type of Failure	Maximum Volume Released (GAL)	Maximum Discharge Rate	Direction of Flow	Release Prevention
Tank (AST)	Joint/Seam Failure of the Primary Tank	70 to 30,000 based on total capacity	Gradual to Instantaneous	Into the tank secondary containment	Containment dike; visually monitored
Overfill	Overfill during a delivery	120 to 300	300 gal/min	Into secondary containment	Containment dike; gauges; secondary is visually monitored during deliveries
Underground Product Piping (when applicable)	Leak in the Line	20	20 gal/hr	Drain back into containment piping sleeve	Piping sleeve, annual line testing, and anti-siphon valve on the line, where applicable.
Transfer Hose Disconnect	Residual product in hose	1 to 15	15 gal/min	Tank fill spill bucket	Spill kit absorbents

TABLE 3.4-1 SINGLE-WALL STEEL ASTS IN A CONCRETE DIKE, OR PORTABLE SPILL BERM STORING FUEL OIL, DIESEL, KEROSENE, AND JET FUEL TANK SIZE RANGES FROM 70 GALLONS TO 30,000 GALLONS (TANK NUMBERS LISTED IN TABLE 2.2-2, CATEGORY A)					
Source	**Major Type of Failure**	**Maximum Volume Released (GAL)**	**Maximum Discharge Rate**	**Direction of Flow**	**Release Prevention**
Product Delivery	Hose Rupture	1 to 100	100 gal/min	Onto concrete or surrounding surfaces	Spill kits; spill mats over drains, if present; areas are sufficiently impermeable to contain a spill until cleanup occurs
Delivery Truck	Tank Compartment Failure	2,000 – 8,000	Instantaneous	Onto concrete or surrounding surfaces	Spill mats over drains if present; pavement that is sufficiently impervious to contain a spill until cleanup occurs; on-base Haz-Mat response team

TABLE 3.4-2 DOUBLE-WALL STEEL ASTS STORING FUEL OIL, GASOLINE, AND DIESEL TANK SIZE RANGES FROM 200 GALLONS TO 30,000 GALLONS (TANK NUMBERS LISTED IN TABLE 2.2-2, CATEGORY B)					
Source	**Major Type of Failure**	**Maximum Volume Released (GAL)**	**Maximum Discharge Rate**	**Direction of Flow**	**Release Prevention**
Tank (AST)	Joint/Seam Failure of the Primary Tank	200 to 30,000	Gradual to Instantaneous	Tank Secondary Containment	Secondary Containment; visual or electronic monitoring, as applicable
Overfill	Overfill during filling	120 to 300	300 gal/min	Tank Secondary Containment Dike	Liquid Level Gauges are visually monitored and spill bucket installed on the fill riser pipe. Some tanks are equipped with overfill prevention valves.
Transfer Hose Disconnect	Residual Product in Hose	1 to 15	15 gal/min	Tank fill spill bucket	Spill Kit absorbents

TABLE 3.4-2 DOUBLE-WALL STEEL ASTS STORING FUEL OIL, GASOLINE, AND DIESEL TANK SIZE RANGES FROM 200 GALLONS TO 30,000 GALLONS (TANK NUMBERS LISTED IN TABLE 2.2-2, CATEGORY B)					
Source	**Major Type of Failure**	**Maximum Volume Released (GAL)**	**Maximum Discharge Rate**	**Direction of Flow**	**Release Prevention**
Product Delivery	Hose Rupture	1 to 100	100 gal/min	Onto concrete or surrounding surfaces	Spill kits, spill mats over drains if present, contain spill until cleanup occurs
Delivery Truck	Tank Compartment Failure	2,000 – 8,000	Instantaneous	Onto concrete or surrounding surfaces	Spill mats over drains if present; pavement that is sufficiently impervious to contain a spill until cleanup occurs; on-base Haz-Mat response team

TABLE 3.4-3 ONE (1) 300-GALLON DOUBLE-WALL STEEL CONTAINER STORING WASTE VEGETABLE (FOOD) OIL (LOCATION: MAIN BASE CAFETERIA)					
Source	**Major Type of Failure**	**Maximum Volume Released (GAL)**	**Maximum Discharge Rate**	**Direction of Flow**	**Release Prevention**
Container	Joint/Seam Failure of the Primary Tank	300	Gradual to Instantaneous	Tank Secondary Containment	Secondary Containment space is visually monitored
Overfill	Overfill during product transfer	1 to 5	5 gal/min	Tank Secondary Containment	Visually monitored; product is only poured into containers in small quantities
Transfer Hose Disconnect (During Container pump-out)	Residual Product in Hose	1 to 10	10 gal/min	Tank Secondary Containment Dike	Spill Kit; sufficiently impermeable surface to contain a spill until cleanup occurs
Food Oil Truck for Oil Removal	Tank Compartment Failure	500 - 2,000	Instantaneous	Paved Parking Area surrounding the building	Spill mats over drains if present; pavement that is sufficiently impervious to contain a spill until cleanup occurs; on-base Haz-Mat response team

TABLE 3.4-4 VARIOUS DRUM STORAGE STORING VARIOUS OILS THROUGHOUT THE FACILITY					
Source	**Major Type of Failure**	**Maximum Volume Released (GAL)**	**Maximum Discharge Rate**	**Direction of Flow**	**Release Prevention**
Drum	Seam failure of the drum	55	Instantaneous	Onto floor of Maintenance Garage or drum storage area	Spill Kit absorbents; spill pallets; and the concrete floor is sufficiently impermeable to contain a spill until cleanup occurs.
Removal of Drum from Containment	Drum Tip Over	55	Instantaneous	Onto floor of Maintenance Garage or drum storage area	Spill Kit absorbents; spill pallets; and the concrete floor is sufficiently impermeable to contain a spill until cleanup occurs.

TABLE 3.4-5 OIL-FILLED TRANSFORMERS VARYING AMOUNTS THROUGHOUT THE FACILITY					
Source	**Major Type of Failure**	**Maximum Volume Released (GAL)**	**Maximum Discharge Rate**	**Direction of Flow**	**Release Prevention**
Transformer	Bushing leak	55 - 821	Gradual	Within the transformer	Visual monitoring
Transformer	Damage from mowers or vehicles	55 - 821	Gradual	Within the transformer or on ground surrounding transformer	Visual monitoring

3.5 Practicability of Secondary Containment [40 CFR 112.7(d) and 112.7(k)]

WFF management has determined that secondary containment is practicable at the facility for the ASTs, drum storage areas, and throughout the Mobile Tanker Storage Area.

Secondary containment for oil-filled operational equipment at WFF is provided in accordance with the alternative general secondary containment requirements of 40 CFR 112.7(k). As required under both 40 CFR 112.7(d) and 40 CFR 112.7(k)(2), the facility has an oil spill contingency plan and will commit resources required to expeditiously

control and remove any harmful quantifies of oil in the event of a release. The active measures using a combination of routine visual inspections and staged spill response supplies have been determined to be sufficient to respond to and contain a potential spill. The following factors were also considered in the determination:

- The potential for a release is minimal since oil in the transformers is sealed in a closed loop system. Additional oil is never added to or removed from the system.
- Spill kit material is available throughout the facility if a transformer is found to be leaking.
- Transformers hold varying small quantities of oil.

Handling of potential releases under 40 CFR 112.1(b) and 40 CFR 112.7 (k) from oil-filled operational equipment is addressed in Section 2.3.

3.6 Site Security [40 CFR 112.7(g)]

WFF is a federal facility with an on-site security force made up of both civilian and military forces. The Main Base is surrounded by a chain link security fence topped with barbed wire. A roving security force for both the Main Base and Mainland/Wallops Island locations routinely patrol the facility. The Protective Services Office provides both institutional and program security. Twenty-four hour (24 hr.) guard service is provided at the NASA Main Base entrance. A guard post at the Main Gate entrance controls access. A second guard post is located at the common entrance to the Mainland and Wallops Island. Access to NOAA is gained through an automated gate system. When the National Security level is heightened, a security guard is posted at the NOAA entrance. Navy maintains security posts at entrances to their properties. In the event of an emergency, the WFF Protective Services Office will assist the Emergency Coordinator in any evacuation procedures, site access, and security measures.

The tank areas are patrolled daily by WFF Protective Services personnel. These personnel have been trained to recognize spills or potential problems with the tank systems.

All oil storage is located in areas where access is limited to government employees, contractors, and registered visitors. Drainage valves, for all secondary containment structures around the oil storage tanks, and fill ports remain closed and locked when not in use.

3.7 Product Transfer Operations [40 CFR 112.7(a)(3)(ii)

3.7.1 Product Transfer Procedures

Vehicle Fueling Station - 10,000-Gallon ASTs (Gasoline and Diesel)

Gasoline and diesel are transferred into the two 10,000-gallon ASTs through a flexible hose that runs between the delivery truck and the fill attached to the tank. The fill is located within a spill containment box and is equipped with a quick-disconnect fitting. The

truck would be located on the paved area adjacent to the ASTs, which is sufficiently impervious to contain a release until cleanup can occur. Detailed procedures for deliveries are provided in Section 3.7.2.

A pump located on the tank top transfers gasoline or diesel from the ASTs to the metered dispensers where nozzle-equipped flexible hoses are used to transfer product to the vehicles. The pump, dispensers, and nozzle-equipped flexible hose are approved devices for vehicle fueling. The product piping between the tanks and the dispensers is equipped with an operating valve and a solenoid valve (so that product cannot drain from the tank by gravity if there is a line failure or when dispensers are not in use).

The following procedures are followed by NASA personnel whenever fueling a vehicle:

- No Smoking.
- Turn off engine.
- Turn off cell phone and other electronic devices.
- Discharge static electricity before fueling (before fueling, touch any metal on the vehicle away from the vehicle's fuel filler with bare hand. This will discharge the static electricity on the body. Do not re-enter a vehicle while gasoline is pumping. This can re-charge the body with static electricity).
- Fire: if a fire starts, do not remove the nozzle. Back away immediately and use the emergency stop button (ESTOP) to stop pumping fuel.
- Do not leave pump unattended when pumping.

The surface beneath the AST, fuel dispensing equipment, and vehicle fueling area is protected by the impervious surface of the concrete foundation pad and adjacent asphalt pavement. A major release of product would pool on the pavement which is sufficiently impermeable to contain a release until cleanup occurs.

If there is a problem with fueling at the dispenser island that results in a spill or fire, the ESTOP will shut down all power to the dispenser island. The ESTOP is located on the outside wall of the adjacent building.

A fully-equipped spill kit is maintained in the area of the ASTs and the fuel dispensers.

Mobile tankers transfer fuel from the D-1 aboveground storage tanks or mobile tank trailers to aircraft around Hangars D-1 and N-159. The tankers are stored at the Mobile Tanker Storage Area where stormwater is diverted through an oil/water separator prior to treatment at the Federally Owned Treatment Works. The separator has a capacity of 6,000 gallons (22,712 liters) of water and 4,000 gallons (15,142 liters) of oil, and is inspected and maintained by the WFF Facilities Management Branch personnel.

Emergency response protocols for oil releases, hazardous substance spills, fires, and explosions from product transfers are found in Section 4.0 of this Plan. The procedures are implemented to reduce the potential for the release of petroleum and other contaminants to the environment and ensure that the facility performs and documents the necessary activities required for compliance.

3.7.2 Product Delivery Procedures

Contracted distributors fill the fuel oil storage systems under supervision of the facility owner/operator. To minimize releases, NASA requires that all fueling contractors exercise caution during fuel transfer operations. In accordance with U. S. Department of Transportation regulations, all fuel transporters must maintain an emergency spill containment kit on the transport vehicle and should call 911 or (757) 824-1333 from a mobile phone in the event of a spill and for disposal of clean-up materials. Fueling contractors are responsible for containment, cleanup, and disposal of any releases that may occur during fuel transfer operations.

As an additional preventive measure, spill kits are located in the area of AST or UST storage areas. Spill kits are also located adjacent to drum storage and mobile storage staging areas.

The fuel transporter is in control of petroleum liquid transfers at the site. NASA has instructed the delivery companies regarding the importance of following safe handling practices during all transfers and requires that the driver do everything possible to prevent spills and overfills from occurring during deliveries or pick-ups. Each tank truck must be equipped with sorbent materials to aid in the immediate cleanup of spilled product during product transfers.

Deliveries of petroleum products by a tank truck occur only under the supervision of NASA personnel, and the WFF Fire Department should be alerted before any large fuel deliveries or transfers. The WFF #2 Diesel Fuel Delivery Guidance for fuel delivery (Appendix Q) is followed to ensure a systematic process is maintained during each fuel delivery.

A spill in the unloading area of the ASTs would flow in the approximate directions, as shown in Appendix B. To prevent product from reaching drainage structures or navigable waters, absorbent materials or other spill control equipment is available in all of the storage areas to contain a spill or release until cleanup occurs.

All deliveries are supervised by NASA personnel. To prevent spills from occurring during unloading, the following spill prevention contingency procedures are used. These procedures are also posted in the gasoline delivery area.

Before Unloading/Loading, the TRANSFER OPERATOR SHALL:

- Extinguish all flames and sources of ignition.
- Turn off truck engine and lights and set the parking brake.
- Exit the vehicle and remain attentive. Watch for onsite vehicle traffic.
- Read any "Driver Warning" signs posted by NASA.
- Chock truck wheels.
- Set out reflective cones or otherwise barricade the area to restrict unauthorized access to 20 feet (20') from the unloading area.
- Close outlet valves (unless used for bottom loading).

- Assure ground/bond between the truck and the tank.
- Remove ungrounded objects from the unloading/loading areas.
- Check the area for ungrounded objects.
- Locate and be familiar with the overfill alarm and tank gauge.
- Identify the correct fuel fill areas with the type of product in each fill.
- Confirm the tank can accept the volume to be delivered by gauging the tank first. The maximum limit is 90 percent (%) of the total tank size - as an example, use the following formula:

  Maximum amount of fuel that can be delivered into the tank =
  Tank capacity x 90% - product currently in tank

- Place drain covers on any storm water drain openings.
- Confirm that the spill containment area drain valves are closed.
- Inspect fill area for obvious signs of leakage or non-functioning equipment.
- Alert NASA personnel if leaky equipment is found or suspected.

During Unloading/Loading, the TRANSFER OPERATOR SHALL:

- Ensure that the fill hose is securely connected to the tank fill.
- Start to fill slowly and continue filling at a pressure that will not "lock-up" the overfill prevention valve. This procedure applies to times when the operator switches to another tanker compartment as well.
- Remain present and attentive at all times.
- Do not fill the tank above a level that will result in overflow after thermal expansion.
- Stop filling once tank reaches 90 percent capacity.
- Remain vigilant for spills or other problems. Note and report all spills to NASA personnel.

After Unloading/Loading, the TRANSFER OPERATOR SHALL:

- Wait at least one (1) minute before lowering any metal or conductive objects (gauge tapes, samplers, thermometers, etc.) into the tank. (This allows static charges to dissipate.)
- Close all unloading valves on the truck and disconnect delivery hoses. Note: Drain residual fuel into a bucket or other containment device to avoid spilling this product from the delivery hose. Return residual fuel to the tanker and inspect the area for any signs of spillage. Take remedial action, if necessary.
- Close all tank fill openings tightly.

Before Truck Departure, the TRANSFER OPERATOR SHALL:

- Check all truck drains, outlets, and connections for leakage to prevent petroleum loss in transit.
- Check unloading area for spills and apply absorbent materials, if necessary.
- Clean up any spills, including free product in the spill containment area.
- Remove and properly store all spill mats or booms, if applicable.
- Measure and record accurate readings for product and water in each tank after fuel deliveries.

Upon Truck Departure, Facility PERSONNEL SHALL:

- Check all valves, caps, drains, and connections for closures and leakage. Relock them, if necessary.
- Conduct a final check of unloading area for spills.

To prevent spills from occurring during unloading, the following spill prevention contingency procedures are used. These procedures are posted in the fuel and oil delivery/pickup areas.

- Delivery drivers are advised not to initiate fuel or oil transfers prior to checking with facility personnel.
- Shut down engine unless used for transfer pumping operation.
- Set brakes and chock wheels prior to and for the duration of all fuel and oil transfers.
- Perform bonding/grounding prior to fuel and oil transfers, if necessary.
- No smoking during fuel and oil transfers.
- Use drip pails below hose connections during fuel and oil transfers.
- Confirm that the tank being filled can accept delivered volume.
- Remain within 25 feet and maintain an unobstructed view of cargo tank and hose at all times during fuel and oil transfers.
- Inspect vehicle drains and outlets for leakage prior to loading and prior to vehicle departure; make necessary adjustments or repairs prior to departure.
- Verify complete disconnect of hoses and bonding / grounding prior to removal of wheel chocks.
- Delivery drivers are advised to check with facility personnel prior to departing.

3.8 Conformance with State and Local Applicable Requirements [40 CFR 112.7(j)]

All applicable bulk storage containers (i.e., greater than 660 gallons [2,500 liters] capacity) at this facility are registered with the state. WFF follows both federal and state regulations based on the stricter requirements of each regulation.

4.0 DISCHARGE RESPONSE, EQUIPMENT AND TRAINING [40 CFR 112.7(a)(3)(ii), (iv) and (v) and 112.7(f)]

4.1 Response to Discharges [40 CFR 112.7(b)]

For the purpose of establishing appropriate response procedures, this ICP classifies discharges as either "minor" (non-emergency) or "major," (emergency) depending on the volume and characteristics of the material released.

A list of Emergency Contacts is provided in the front of this document. The facility emergency telephone number 911 or (757) 824-1333 (mobile device) is posted at prominent locations throughout the site. Various supplies of discharge response material are kept in areas where oil is stored.

Spill kits are located throughout the facility, with dedicated spill kits at each AST. The inventory of response supplies and equipment stored at the fire departments and Buildings B-29, N-223, and U-81 is provided in Appendix G of this Plan. The inventory is maintained and replenished as needed.

A sample WFF Incident Plan Briefing is included in Appendix H. Briefing reports are incident management tools located at the Environmental Office and WFF Fire Stations. Each incident briefing report suggests the type and placement of response supplies to prevent a release from reaching a drainage feature.

4.1.1 Response to a Minor (Non-Emergency) Discharge [40 CFR 112.7(b)]

A "minor" discharge is defined as one that poses no significant harm or threat to human health and safety or to the environment. Minor discharges are generally those where:

- The quantity of product discharged is small (e.g., may involve less than 25 gallons [95 liters] of oil);
- Discharged material is easily stopped and controlled at the time of the discharge;
- Discharge is localized near the source;
- Discharged material is not likely to reach surface water;
- There is little risk to human health or safety; and
- There is little risk of fire or explosion.

Minor discharges can usually be cleaned up by WFF personnel. The following guidelines apply:

- Immediately notify the WFF Fire Department. If an internal fire alarm is available, activate the alarm; otherwise, spread the alarm verbally. The Fire Department will identify the character, source, amount, and area of extent of any released materials and the possible hazards, if any, to human health and the environment.
- Under the direction of the Fire Department, eliminate potential spark sources. If safe to do so, identify and shut down the source of the discharge to stop the flow and contain the discharge with response materials and equipment. Place

discharge debris in properly labeled waste containers in the Satellite Accumulation Area (SAA) of Building B-129 (Main Base minor discharges) or Building V-27 (Wallops Island minor discharges), if collected volume is under allowable amount.
- The Fire Department will notify the Environmental Coordinator.
- The Fire Department will complete applicable portions of the incident report form (Appendix I), file one copy, and forward a copy to the WFF Environmental Office.
- If there is a reportable discharge to the environment, the Environmental Coordinator will make the appropriate notifications.

4.1.2 Response to a Major (Emergency) Discharge [40 CFR 112.7(b)]

A "major" discharge is defined as one that cannot be safely controlled or cleaned up by facility personnel, such as when:

- The discharge is large enough to spread beyond the immediate discharge area;
- The discharged material enters water or has the potential to enter the water;
- The discharge has spread beyond WFF boundaries;
- The discharge requires special equipment or training to clean up;
- The discharged material poses a hazard to human health or safety; or
- There is a fire or explosion or the danger that one may occur.

In the event of a major discharge, the following guidelines apply:
- If WFF personnel are required to leave the Facility, evacuation routes are presented in Appendix E.
- Notify the Fire Department. If an internal fire alarm is available, activate the alarm; otherwise, spread the alarm verbally. The Fire Department will identify the character, source, amount, and area of extent of any released materials to determine the possible hazards, if any, to human health and the environment.
- The Fire Department will notify the Environmental Coordinator. The Environmental Coordinator will not respond until they are contacted by the Fire Department.
- Appropriate emergency response procedures will be implemented and may involve contacting outside spill response contractors.
- The Fire Department shall take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, reoccur, or spread. These measures shall include, where applicable, stopping processes and operations, monitoring for leaks, pressure buildups, etc., in those stopped operations, collecting and containing released substances, and removing or isolating containers. Wastewater treatment plant operators should be notified if a spill occurs that could impact the wastewater treatment plant.
- The Fire Department will complete applicable portions of the incident report form (Appendix I), file one copy, and forward a copy to the WFF Environmental Office.
- If there is a reportable discharge to the environment, the Environmental Coordinator will make the appropriate notifications.
- The Fire Department and the Environmental Office will ensure that all wastes are containerized and that all Fire Department emergency equipment is decontaminated as described in Appendix J.

4.2 Discharge Notification [40 CFR 112.7(a)(4)]

Contact information for reporting a discharge to the appropriate authorities is listed in the front of this ICP. The Facility emergency telephone number is posted at prominent locations throughout the site.

If the spill is greater than 25 gallons of petroleum or any size that affects or threatens to affect navigable waters or adjoining shorelines (i.e., one that creates a film, discoloration, sheen, emulsion, sludge or contains sewage), it must be reported **within 2 hours** to the National Response Center and the Tidewater Regional Office of the Virginia DEQ during business hours or the Virginia Department of Emergency Management during non-business hours.

If a release, fire, or explosion occurs that threatens human health or the environment outside the facility, or if a release exceeds the reportable quantity of a hazardous material (i.e., CERCLA, EPCRA), it must be reported **immediately** to the National Response Center and the Tidewater Regional Office of the Virginia DEQ during business hours or the Virginia Department of Emergency Management during non-business hours.

The Environmental Office will give the following information to all parties:

- Name, location, organization, and telephone number;
- Name and address of the party responsible for the incident;
- Date and time of the incident;
- Location of the incident;
- Source and cause of the release or discharge;
- Types of material(s) released or discharged;
- Quantity of material(s) released or discharged;
- Danger or threat posed by the release or discharge;
- Number and types of injuries (if any);
- Media affected or threatened by the discharge (i.e., water, land, air);
- Weather conditions at the incident location; and
- Any other information that may help emergency personnel respond to the incident.

A follow-up report known as a “5-Day Letter” must be submitted to the Virginia DEQ Tidewater Regional Office within **five (5) calendar days** of the reported release. If an incident occurs in Buildings B-29, N-233 or U-81 that requires implementation of the SPCC Plan, a written report must be submitted to the DEQ and to the EPA Regional Administrator within 15 calendar days of the incident. This report must be filed before operations may be resumed. A sample for either letter can be found in Appendix I. The addresses of these agencies are also included in Appendix I.

In addition to the above reporting, 40 CFR 112.4 requires that information be submitted to the EPA Regional Administrator and the appropriate state agency in charge of oil pollution control activities (see contact information in the front of this Plan) whenever the facility discharges (as defined in 40 CFR 112.1(b)) *more than 1,000 gallons (3,785 liters) of oil in a single event*, or discharges (as defined in 40 CFR 112.1(b)) *more than 42 gallons*

(160 liters) of oil in each of two (2) discharge incidents within a 12-month period. The following information must be submitted to the EPA Regional Administrator and the Virginia DEQ within 60 days:

- Name of the facility;
- Name of the owner/operator;
- Location of the facility;
- Maximum storage or handling capacity and normal daily throughput;
- Corrective action and countermeasures taken, including a description of equipment repairs and replacements;
- Description of facility, including maps, flow diagrams, and topographical maps;
- Cause of the discharge(s) to navigable waters and adjoining shorelines, including a failure analysis of the system and subsystem in which the failure occurred;
- Additional preventive measures taken or contemplated to minimize possibility of recurrence; and
- Other pertinent information requested by the Regional Administrator.

4.3 Waste Disposal [40 CFR 112.7(v)]

Wastes resulting from a discharge response will be containerized in impervious bags, drums, or buckets. The Environmental Coordinator will ensure characterization of the waste for proper disposal and storage compatibility. The Environmental Coordinator will ensure that all hazardous waste is removed from the facility within 90 days.

4.4 Mutual Aid, Agreements, Cleanup Contractors and Equipment Suppliers [40 CFR 112.7(vi)]

The WFF Fire Department has established a mutual aid agreement for such emergency services as firefighting, rescue, HazMat response, and emergency medical services (including basic life support and advanced life support) with the Accomack County Fire and Rescue Commission. This agreement also covers the Virginia Department of Emergency Services response.

The Security Office has entered into verbal agreements of mutual aid with the Town of Chincoteague Police Department, the Accomack County Sheriff's Department, and the Virginia State Police. The Health Unit retains an agreement with the Maryland State Police Aviation Division for Med-Evac helicopter services from WFF; however, the Med-Evac helicopters will not transport patients who have been exposed to hazardous materials.

An agreement with the Peninsula Regional Medical Center, Salisbury, Maryland states that they are "well prepared to handle any and all hazardous material exposure of Wallops employees."

Copies of any written agreements are included in Appendix K and are also available for review at the Wallops Fire Department. Contact information for specialized spill response and cleanup contractors is also provided in Appendix K. These contractors are available

on a 24-hour basis and have the necessary equipment to respond to a discharge of oil or hazardous waste once notified by the Authorized Facility Representative.

4.5 Discharge Prevention Procedures [40 CFR 112.7(f)]

A spill or release in any area of the facility will be cleaned up with the use of absorbents and contained using disposable containment materials such as absorbent pigs and berms. WFF personnel are trained in the proper use and deployment of appropriate sorbent materials during a spill event.

Sorbent pads, booms, and mats are stored directly adjacent to tank fills, dispensers, and storage areas of petroleum-based liquids. An adequate supply of sorbent material to respond to a spill of 65 gallons (245 liters) is available. If necessary, commercially available spill kits can also provide the appropriate inventory of materials. Sorbent materials are appropriate for the collection of oil. Spill equipment inventory may include:

- Absorbent mats, booms, pads, and disposal drums/bags;
- Speedy-Dry, Oil-Dri, or other granular absorbent material; and
- Shovels, boots, gloves, and eye protection.

In the event of an oil leak or spill away from fuel delivery areas, such as a vehicle crossing the property, absorbent material and spill mats are maintained on-site. Spills at each area on the facility may be handled differently depending on the location of drainage ditches and storm water sewer inlets.

Sewage spills may be cleaned up with a vacuum truck and then dry-powder or granular lime should be applied to the area.

To prevent the release from reaching navigable waters, discharges are monitored and controlled (see Appendix F for the discharge log); sorbent materials will be applied immediately to block unrestricted flow of product at the drain inlet and contain spilled product. At a minimum, monthly visual observation of the fuel storage areas are made to check for leaks and spills.

4.6 Personnel Training [40 CFR 112.7(f)]

Facility personnel involved in oil transfer, storage or handling operations undergo annual training in proper management of oil, including the elements of this ICP. A sample training certificate is included in Appendix L.

In addition, WFF Fire Department personnel are certified in Hazardous Material Operations through the Commonwealth of Virginia Department of Fire Programs in compliance with National Fire Prevention Association NFPA 472-3-1 through 6, HazMat Competencies.

Members of the Environmental Office are certified through 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training as required by the

Occupational Safety and Health Act (OSHA) under 29 CFR 1910.120. The Environmental Office and the Fire Department periodically conduct field training and equipment testing. Field training includes instituting emergency spill procedures on simulated releases as well as locating and properly using spill response kits.

WFF provides personnel for the remediation of minor storage tank leaks. Spill response personnel are properly trained and certified in Hazardous Materials (HAZMAT), including participation in annual 8-hour refresher HAZWOPER skills training.

In accordance with the SPCC requirements of 9 VAC 25-91-130, tank inspectors are trained in:

- Basic hazard recognition, personal protection, and facility operation;
- Procedures for conducting daily visual and weekly facility inspections;
- Procedures to follow upon recognition of a hazard or potential hazard; and
- Procedures for evaluating the condition of the aboveground storage tanks.

All oil-handling personnel are properly instructed/trained in the following areas:

- Overview of operation and maintenance of equipment to prevent oil discharges;
- Applicable pollution control laws, rules, and regulations;
- Use of applicable spill control equipment and materials;
- Proper use of personal protective equipment (PPE); and
- Inspection procedures.

Annual training for oil-handling personnel includes a review of existing procedures and an update on any new precautionary measures as required by the SPCC regulations. A log of Personnel Training is maintained by all appropriate training offices.

5.0 SPILL COUNTERMEASURES [40 CFR 112.7(a)(3)(iv)]

Wallops Flight Facility has established countermeasures to be implemented during spill events. These countermeasures are to be executed in the event that established engineering and operational controls fail. They include containment of spills, mitigation of the effects of spills which pose a threat to the waters of the Commonwealth of Virginia, and restoration of affected areas.

Spill response procedures describing the actions to be taken and the personnel to be contacted in the event of a spill (depending on the magnitude of the spill and the time of day during which it occurs) are located in Section 4.0.

5.1 Emergency Response

Wallops Flight Facility has in-house resources to initiate containment and cleanup efforts for small-scale oil or hazardous substance releases. When a release occurs, the Fire Department responds to emergencies and commences standard emergency response protocols. The Fire Department evacuates personnel from the affected area and evaluates the situation for potential fire hazards. Finally, the Fire Department begins containment and cleanup efforts. The general flow direction of a spill is determined based on the topography of the area. The Fire Department uses containment devices to inhibit petroleum from entering storm drains or surface water. Devices at their disposal include storm drain dikes (magnetic and liquid impervious barriers), petroleum absorbing materials, drain plugs and drain mats, sorbent socks and booms, backhoes, and hand shovels. If necessary, any or all of these may be used to create an impervious berm.

If fuel or oil enters a storm drain, the Fire Department is capable of setting up underflow dams, filter dams, and floating skimmers at the storm drain outfall to prohibit further migration of petroleum downstream. The Fire Department will contact the Environmental Coordinator immediately for assistance in coordinating containment and cleanup activities. The Environmental Coordinator will notify the appropriate federal, state, and local authorities within the required timeframes (Section 4.2).

The Environmental Coordinator provides technical assistance in matters of environmental protection and regulatory notification issues. In the event that the Fire Department is unable to effectively control a release, the facility will retain the services of a qualified response contractor. The Environmental Office currently has letters of intent to respond from several spill response contractors who are approved by the Commonwealth of Virginia.

5.2 Containment of Spills and Mitigation of Effects

Countermeasures to contain and divert spills from entering waters of the Commonwealth of Virginia include the following:

- Elimination of the source of the spill (i.e., shutting valves, banding piping, plugging ruptured tanks, etc.);
- Strategic placement of sorbent materials around or on top of spilled material;
- Placement of booms around proximate storm drain inlets and sanitary sewer manholes; and
- Construction of earthen dikes in the immediate area or downstream of the spill.

Additional countermeasures include placement of floating booms near outfall and inlet structures to prevent spills that have entered the facility storm water system from migrating off the facility property.

Section 4.0 describes the actions necessary to respond, contain, and localize an oil or hazardous substance release until the affected site can be decontaminated. If a spill is beyond the control of the Fire Department, outside contract support will be secured by the facility (Section 4.4).

5.3 Restoration of Affected Areas

To the extent practicable, the Fire Department and facility equipment will be utilized to restore (to comparable condition) any off-site property adversely affected by releases that originated from WFF. Restoration includes removal and subsequent replacement of contaminated soil, replanting of vegetation, restoration of stream banks, etc. When necessary, the facility will use external contractors to remediate large spills. A list of spill response contractors is included in Appendix K.

For spills which remain on facility property, WFF will restore affected areas to a degree deemed appropriate by the facility and the Virginia DEQ. All emergency equipment will be decontaminated and fit for use before normal operations resume. Decontamination procedures can be found in Appendix J.

All remediation and decontamination must be documented before normal operations may resume. The user/owner (i.e., the organization, partner, or subcontractor) of the specific petroleum storage tank is responsible for the cleanup of a release and coordinating with the Environmental Office for reportable quantity spills.

6.0 WORST CASE SCENARIO [9 VAC 25-91-170] and SPILL EXERCISES

The worst-case scenario for a facility, as defined in 9 VAC 25-91-170, Oil Discharge Contingency Plan, is "the instantaneous release of the volume of the largest tank on the facility (125 percent of the volume of the largest tank for facilities with multiple tanks within a single containment dike) during adverse weather conditions." Additionally, historical data indicate that in the event of a catastrophic release of oil from an AST, the product will escape the secondary containment due to the wave-like action of the product when the tank fails. In determining the worst-case spill for a multi-tank containment area, the following equation is recommended by the Virginia DEQ:

Worst case discharge = (volume of the largest tank x 1.25) x 0.22 (the "slosh factor")

Based on the different missions and layout of two (2) different operational areas (Main Base and Wallops Island) at the NASA facility, it was decided to detail more than one potential Worst Case Scenario for the facility.

Three scenarios are addressed in the Plan; these scenarios were chosen to try to cover both spills from the largest volume of single-wall tanks at each area of the facility, and to also address the airfield refueling operations on base.

40 CFR 112.7 requires that all ASTs or containers of oil 55 gallons or more be provided with sized containment to prevent potential releases from reaching navigable waters. If the secondary containment structure is exposed to precipitation, then the capacity of the containment area must include the total oil volume of each tank combined with the freeboard from the anticipated rainfall. As a guidance, the EPA suggests that the amount of precipitation be based on a 24-hour, 25-year storm event.

For those single-walled ASTs that are enclosed within a concrete secondary containment structure that may be exposed to precipitation, Table 6.1 provides the measurements of the containment area and the calculation of the effective containment volume based on a 24-hour 25-year storm event. Storm event data was retrieved from the National Oceanic and Atmospheric Administration (NOAA) Hydrometeorological Design Center's precipitation frequency maps for the United States. As Table 6.1-1 indicates, adequate secondary containment volume is present for all single-walled ASTs in exterior containment structures.

All AST secondary containment structures exposed to precipitation were measured to calculate total storage capacity. Any structures, piping, foundations, additional tanks, or other impediments to storage within each secondary containment were measured and that volume was subtracted from the respective secondary containment's total volume.

6.1 Facility Calculations

6.1.1 Scenario #1 Main Base: D-9A or D-9B

D-9A and D-9B on the Main Base are the only two single-wall ASTs within a concrete

secondary containment. Each tank has a 20,000-gallon capacity and shares the same containment area.

The D-9A/D-9B AST spill scenario was the instantaneous release of the volume of either of these tanks, each having a total capacity of 20,000 gallons (75,708 liters) of #2 fuel oil. A concrete secondary containment dike surrounds both D-9A and D-9B. The volume of the dike is approximately 64,227 gallons (243,126 liters), which is greater than the 110 percent containment criteria of 44,000 gallons (166,558 liters). If both tanks were to rupture simultaneously, the dike area would be sufficient to contain the total volume released. All AST secondary containment structures at the facility were engineered in a similar fashion. However, utilizing the calculation for the "slosh factor," 11,000 gallons (41,640 liters) of #2 fuel oil could potentially spill over the secondary containment dike if both tanks rupture:

Worst case discharge = (1 tank x 20,000 gallons [75,708 liters] x 1.25) x 0.22
Worst case discharge = ***5,500 gallons (20,820 liters)***

Additional volumes would be displaced under adverse weather conditions (10-year, 24-hour rain event). This volume was calculated using 6 inches (15.25 centimeters) of rainfall:

Cubic feet displaced = 53 feet x 53 feet x 0.5 feet = 1404.5 cubic feet (40 cubic meters)
Cubic feet displaced = 1404.5 = ***10,500 gallons (39,747 liters)***

The D-9A/D-9B AST system is situated approximately 120 feet (36.5 meters) north and slightly elevated from a storm water inlet.

6.1.2 Scenario #2 Island Facility: 30,000-Gallon Kerosene AST and Piping, Mid-Atlantic Regional Space Port (MARS)

The Worst Case Scenario #2 was a potential release from the 30,000-gallon single-wall steel kerosene AST and/or associated equipment and piping. This scenario was selected because of the risk of a release of the largest volume of petroleum product from a tank system closest to open water. The MARS AST is the largest AST on Wallops Island and sits within a concrete secondary containment.

The AST, piping, and pumps are located within 100 yards of the Atlantic Ocean to the east and Hog Creek to the west. The kerosene AST is used during fueling operations of expendable launch vehicles.

The MARS AST spill scenario was the instantaneous release of the volume of the, 30,000 gallons (113,562 liters) kerosene AST. A concrete secondary containment dike surrounds the AST. The volume of the dike is approximately 43,000 gallons (162,773 liters), which is greater than the 110 percent containment criteria of 33,000 gallons (124,919 liters). If the tank were to rupture, the dike area would be sufficient to contain the total volume released from the AST. However, utilizing the calculation for the "slosh factor," 8,250 gallons (31,230 liters) of kerosene could potentially spill over the secondary

containment dike if the tank ruptured:

Worst case discharge = (1 tank x 30,000 gallons [113,562 liters] x 1.25) x 0.22
Worst case discharge = ***8,250 gallons (31,230 liters)***

Additional volumes would be displaced under adverse weather conditions (10-year, 24-hour rain event). This volume was calculated using 6 inches (15.25 centimeters) of rainfall:

Cubic feet displaced = (60 feet x 16 feet) + (47 feet x 13.5 feet) x 0.5 feet = 797.25 cubic feet (22.50 cubic meters)
Cubic feet displaced = 797.25 = ***5,964 gallons (22,576 liters)***

The MARS AST system is situated approximately 100 feet (30.08 meters) west and slightly elevated from a storm water inlet and wetlands.

In determining the worst-case spill for the tank area, it was assumed that a release would occur and not be contained due to a failure of the pumping system or tank fitting on the pressurized tank system allowing the product to spray under pressure outside the containment area.

The area around the kerosene AST was designed to drain to a retention basin located just south of the tank farm. The retention basin has a controlled discharge that can be controlled by MARS personnel to capture a large release.

6.1.2.1 Scenario #2 On-site Drill (Kerosene AST Leak)

The concept of the drill scenario was to simulate a leak and to look at the potential pathways at the site. Since the tank system was new and not yet fully constructed, a drill was conducted on May 17, 2011 to look at possible spill scenarios to determine where additional spills could occur with the tank system and what equipment may be needed to clean up a spill. During the drill, the following areas were reviewed to determine potential leak scenarios:

- Leaks from the truck loading area
- Tank system leaks while the tank is under pressure
- Leaks from the pump set next to the tank
- Leaks from the pump sets away from the tank
- Leaks along the piping run
- Catastrophic failure of the tank system

The simulation performed included the following aspects:

- An adjacent fire hydrant was utilized to provide the means of simulating a leak that would reach outside the containment area. The hydrant was opened and a stream of water was created to simulate a leak under pressure spraying outside of the containment area.

- For the drill, a flow of at least 20 gpm was used to provide a potential spill area.

- Since the area was still under construction, some judgment was needed to ensure that the drill and the water did not interfere with operations or create a drainage problem. Based on the flow of water, the drill participants looked at the following scenarios and the impact to the size of and control of the spill:

    - The effects of weather conditions
    - Potential location of leaks
    - Potential flow direction(s)
    - Time to shut down the leak(s)
    - Time to contain the leak(s)
    - Ways to contain the leak before it reaches a waterway

Table 6.1-1. Single Wall Tank Secondary Containment Area Calculations

Tank No.	Tank Contents	Secondary Containment Type	Secondary Containment Dimensions			Gross Containment Capacity	Largest Tank Volume	Exterior Rainfall Freeboard	Other Tank Volumes within Containment *	Volume Displaced by other Structures	Net Secondary Containment	Adequate Secondary Containment	Notes
			Length (Feet)	Width (Feet)	Height (Feet)	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons	Yes/No	
D-9A/B	#2 Fuel Oil	Open Bermed Area	53.08	53.08	3.00	63,224.4	20,148.0	10,765.7	2,100.0	1,216.3	49,142.4	Yes	1,216.3 gallons displaced by 8 concrete pedestals measuring 24"x13"x113". 2,100 gallons displaced by potrion of other tank within containment
WI-V3-AST-01	#2 Fuel Oil	Open Steel Basin (Inside building)	2.00	4.50	2.50	168.3	120.0	0.0	0.0	2.0	166.3	Yes	2 gallons displaced by 4 pipe supports measuring 30" x 0.18"
MARS Hydraulic Reservoir	Hydrashield FR-395-2 Mineral Oil	Open Steel Basin (Inside building)	38.00	18.00	4.00	20,513.3 **	1,337.0	0.0	0.0	0.0	20,513.3	Yes	Secondary containment not exposed to rainfall. No structures within containment to displace volume. ** Calculation includes 20"x20"x28" recessed sump in secondary containment.
MARS - 33	RP-1	Open Bermed Area	57.06	33.00	3.80	53,521.8	30,000.0	7,194.9	0.0	1,182.1	45,144.8	Yes	1,182.8 gallons displaced by (5) concrete supports measuring 12"x12"x45.6", (2) concrete supports measuring 12"x24"x45.6", and (2) concrete support pedestals measuring 144"x24"31"

Rainfall freeboard for 25-year, 24-hour storm event : 6.13 inches Based on NOAA data at http://hdsc.nws.noaa.gov/hdsc/pfds/index.html

* - Volume is calculated only for the portion of the additional tank that is below the level of the retaining wall.

6.1.2.2 Scenario #2 After Drill Review and Discussion

Immediately after the exercise, participants conducted a tabletop meeting to go over the first impression of the drill and the potential scenarios. The initial discussions included a look at the following:

- Does the physical tank system structure and containment provide adequate protection to contain a spill?
- Are there other monitoring devices or procedures that need to be developed to help prevent a spill from occurring?
- What type of spill equipment should be stored on-site?
- What additional resources do the First Responders require to help contain and control the spill?
- What is the potential impact of a large spill from the tank system?

6.1.2.3 Scenario #2 Conclusions

The simulated release demonstrated that the worst-case spill traveled from the tank area toward the adjacent roadway and wetlands. The drill indicated that additional resources would be needed beyond the spill materials kept at the MARS site to handle a large spill in the area of the MARS AST. An additional quantity of spill materials is kept at the Wallops Island Fire Station to accommodate the spill potential of the MARS AST.

6.1.3 Scenario #3 Main Base: Runway Apron

The third worst case scenario selected was the rupture of either the fuel hose or tank of an aircraft fueling tanker while it is on the apron of the runway. The largest tanker had a capacity of 7,000 gallons (26,500 liters) and a fueling rate of 100 gpm (346 lpm). At regular grid intervals, storm water inlets are inlaid in the apron of the runway. The inlets are interconnected by the storm water system piping and drain to outfalls around the runway (Figure 2-1), and many of these outfalls lead to bodies of surface water. If a tanker ruptured on the apron, a potential release of 7,000 gallons (26,500 liters) of fuel oil could enter the surface waters of the Commonwealth of Virginia. To confirm this theory, the Environmental Office conducted a simulated spill exercise on the runway apron east of Building D-1. The exercise demonstrated that although the simulated spill impacted localized facility storm drains, it did not exhibit flow characteristics that would have the potential of reaching navigable surface waters. The Environmental Office also determined that flow retention on the property would allow for measurable response and complete containment well within the property lines of Wallops Flight Facility. The following section details the simulated spill exercise.

6.1.3.1 Scenario #3 Introduction

Aircraft fueling operations are primarily performed along the east ramp of Building D-1 with a small percent occurring along the east ramp of Building N-159. Since more aircraft are fueled on the east ramp at Building D-1, a spill occurring at this site was considered

as the "Worst Case Scenario." To support this theory, the Environmental Office conducted a simulated spill exercise on the runway apron east of Building D-1 on March 17, 2004. Please refer to Figure 6-1: Flow Path for Simulated Spill Drill, on the following page.

6.1.3.2 Scenario #3 Methods

A rain event occurred on March 16, 2004, with a total of 0.54 inches (1.37 centimeters) falling in the 24-hour period preceding the event. On the day of the simulation, meteorological conditions included cloudy skies, northeasterly winds at approximately 5 to 10 miles per hour (4.3 to 8.6 knots), a temperature of 38° F (3°C), and damp surface soils.

At 0926 hours, the Wallops Main Base Fire Department, in cooperation with the Environmental Office, began slowly releasing 7,000 gallons (26,500 liters) of water dyed with 4 ounces (120 milliliters) of Rhodamine® WT, onto the airfield tarmac east of Building D-1 (Figure 6-2). Previous calculations had determined that 2 ounces (60 milliliters) of the EPA approved, ultra violet-degradable, water-soluble dye, Rhodamine® WT (CJK Colors, 3001 North Graham Street, Charlotte, NC 28233) would be visible if diluted in 7,000 gallons (26,500 liters) of water. At 1048 hours, the Fire Department terminated flow, yielding a gravity-fed flow rate of approximately 85.4 gpm (388 lpm) through a 4-inch (10 centimeter) pipe exiting the tanker.

All flow sloped west of the release site into the storm drain system that terminates at Outfall 003 (Figure 6-3). Water entered the first storm drain, located east of Building D-1, at 0929 hours, approximately three (3) minutes after the initial flow release. Flow entered the thirteenth drain, the final drop inlet in this run of the storm drain system, at 0944 hours, approximately 18 minutes after flow initiation. At 1007 hours, 41 minutes after the release, the flow had reached and pooled at Outfall 003 (Figure 6-4). The release flowed through the outfall at 1010 hours (Figure 6-5). Although substantial increases in flow rate had been observed approximately 1,000 feet (305 meters) north of Outfall 003 by 1025 hours, the leading edge of the release flow was not observed until 1145 hours (Figure 6-6). Pink-tinted flow was still observed along Outfall 003 at 1430 hours. By 1525 hours, six (6) hours after initiation, the flow had not reached the perimeter fencing, located approximately 1,000 feet (305 meters) southwest of Little Mosquito Creek (Figure 6-7).

Figure 6-1 Flow Path for Simulated Spill Drill

Figure 6-2 Spill Release from Tanker

Figure 6-5 Spill Traveling Along Tributary

Figure 6-3 Spill Reaches Storm Drain

Figure 6-6 Leading Edge of Spill

Figure 6-4 Spill Reaches Outfall 003

Figure 6-7 Clear Tributary South of Creek

6.1.3.3 Scenario #3 Conclusions

The simulated release demonstrated that the worst-case spill traveled from the tarmac east of the D-1 Hangar through the storm water system and to Outfall 003 in approximately 40 minutes. The release then flowed through the unnamed tributary, leading to Little Mosquito Creek. After six (6) hours from release initiation, the spill was still over 1,000 feet (305 meters) southwest of Little Mosquito Creek, keeping the spill within the boundaries of Wallops Flight Facility.

Prior to flowing into the unnamed tributary, Outfall 003 empties into a manmade "pool," where a spill could be blocked and contained from going further downstream. If this containment opportunity were missed, the resultant spill would not reach the outer most boundaries of the facility property, or Little Mosquito Creek, within six hours.

In conclusion, if a spill incident occurred on the airport tarmac under similar weather conditions, containment, collection, and recovery operations could be implemented within a reasonable response time. The likelihood of a spill impacting state waters would be diminished or prevented.

6.1.4 Spill Drill 2010 and Hurricane Readiness

On June 30, 2010, NASA WFF conducted a site-wide Hurricane Readiness exercise, and also conducted a Hazmat Spill Exercise during the Hurricane Readiness event.

An individual in Building X-55 received a green card which stated:

> During routine movement of equipment and chemicals in preparation for a storm at Building X-35, you notice fuel leaking from the piping leading to aboveground tank X-35. It is an active leak, spraying from the pipe, and not captured by the secondary containment. You are unable to use any of the spill material located at the tank to protect the storm drain because the spill material is placed near the leaking piping.

An active release was created. The leak functioned as expected but we were prepared with a second green card if the leak malfunctioned. That card read:

> Fuel is spraying from the pipe under pressure at the point designated by the “X.” Only a very minor amount of fuel has entered the secondary containment. The rest is streaming toward the drain. It was not yet determined what amount of fuel had entered the storm drain.

The following responses were expected:

Expected Response From Caller:

1. X-55 person should call 911 (An incorrect response would be to call the HELP desk or do nothing).

Expected Response from Fire Department:

2. Fire Department (FD) uses/has the Incident Plan/Briefing (IP/B) and ICP to locate the nearest storm drain and protect it with socks, drain cover, etc. (FD does not protect drain and is not familiar with ICP or IP/B.)
3. FD has adequate supplies to protect storm drain. (An incorrect response would occur if the FD does not have adequate supplies.)
4. Dispatch calls Environmental and continues until someone responds. (An incorrect response would result if Dispatch does not call Environmental.)
5. FD is able to stop leak with a pipe repair kit. (Incorrect response would occur if FD does not have pipe repair kit.)
6. FD has adequate spill cleanup material and personnel to clean up spill. (Incorrect response would occur if FD does not have spill cleanup material.)
7. FD asks environmental to collect containerized waste. (Incorrect response would result if arrangements are not made for waste collection.)
8. FD contacted Maintenance to make repairs.
9. FD sends Incident Report and Hazardous Waste Disposal Inventory form to Environmental.

Expected Response from Environmental Personnel:

10. Environmental contractor notifies Environmental Coordinator, Alternate, or other civil servant.
11. Environmental brings radio, IP/B, SDS, and other equipment requested by FD.
12. Environmental provides technical advice to FD if requested.
13. Environmental picks up waste.
14. Environmental works with FD and Facilities to determine amount of spill.
15. Environmental determines if spill should be reported, by whom, and when.
16. Environmental secures Incident Report Form and Hazardous Disposal Inventory form from FD.

Expected Response from Fire Department:

17. FD Receives a call for a fuel spill at X-35 (Incorrect response would result if dispatcher does not alert Fire Station 2).
18. Duty officer established X-35 command (Incorrect response would occur if command not established).
19. Fire Department (FD) uses/has the IP/B and ICP to locate the nearest storm drain and protect it with socks, drain cover, and secures leaking pipe. (Incorrect response would occur if FD does not protect drain or secure leaking pipe and is not familiar with ICP or IP/B.)
20. Duty fire officer calls for medic unit, Hazmat 25 and trailer from Fire Station 1 for extra supplies and staffing and the Environmental office. (Incorrect response would result if Duty officer does not call for Medic unit, hazmat response trailer or Environmental Office.)
21. Firefighters have proper PPE on (Incorrect response would result if FD does not have proper PPE on).

6.1.4.1 Review of Incident

Responses 1-4 were correctly completed.
Response 5: FD stood up drums but did not have a pipe repair kit.
Response 6: FD calls for the HazMat trailer which is located on the island. During the time of the exercise, the Wallops Island Bridge is under repair with a single lane of traffic traveling at 10 mph. It takes 25 minutes for the trailer to arrive.
Response 7: Dispatch calls Environmental, but they do not tell them any details regarding the spill or what to bring for containerizing the waste. Environmental does not ask. Environmental does bring the correct drums, ICP, and PID.
Responses 8-10 completed correctly
Response 11: See 7 above.
Responses 12-16 completed correctly. During the time of the exercise, the Wallops Island Bridge is under repair with a single lane of traffic traveling at 10 mph. It takes 30 minutes for Environmental to arrive.
Responses 17-20 completed correctly.

6.1.4.2 Lessons Learned

1. A second Hazardous Materials trailer is needed or additional supplies need to be stored on the Island.
2. All Environmental needs better training on questions to ask the FD when responding to a spill. Training was conducted and a handout was developed.
3. Dispatch needs to give Environmental more details or request specific items when support is requested. FD conducted training.

6.1.5 Spill Exercise 2019

A spill exercise was conducted on April 26, 2019, to simulate a spill in the hangar from an aircraft which was uncontrollable and had reached the hangar door grate. Approximately 3,600 gallons of water at a rate of 60 gallons per minute was discharged from a 10,000 gallon tanker. On the day of the simulation, meteorological conditions included cloudy skies, and a temperature in the low 60's.

The objectives of the drill were to:

- Test the flow and quality of communication during the drill
- Time the arrival of the dyed water at the outfall
- Observe the actions of witness, dispatch, fire department, and environmental personnel

Dye was added to the stream of water flowing into the door grate on the west end of the D-1 Hangar. The spill drill began at 8:45, but the release of water from the tanker did not begin until 9:05 am. Water was observed in the storm drain inlet immediately west of the hangar door at 9:10 am. Slightly green water was observed at the outfall at 9:56 but a green slug of steady flow did not reach the outfall until 10:20 am. The drill was called at 10:20 am.

The fire department response did not include actual cleanup, but did include receiving notification from dispatch, responding, and conveying the information to environmental. Observers were positioned with each party involved in the drill, including witness, dispatch, fire department, and environmental.

6.1.5.1 Lessons Learned

1. WWTP operators need to be notified when a spill occurs that could impact the WWTP so they consider closing gates/valves. This was added to Section 4.1 of this ICP.

2. Responders to Outfall 003 should be aware that due to the low lying area a hazardous or oxygen deficient atmosphere may exist in addition to potential biological hazards. A PID or multi-gas meter and bug spray should be brought when checking on the outfalls during actual spills.

3. The Tower and Airfield Office should be notified by Dispatch when there is a spill in the hangar or on the airfield.

4. Environmental personnel should bring radios and determine the appropriate channel before responding to a spill.

5. When responding to a spill, Environmental personnel should bring a partner and a clear chain of communication should be implemented.

6. Additional spill training would be beneficial to reinforce Environmental at the scene acts as the Environmental spill Point of Contact.

7. The Fire Department should discuss completion of the Incident Report Form with Environmental. Notes and pictures should also be documented.

8. Additional spill response supplies (i.e. booms) should be ordered for Environmental.

9. The Fire Department should practice installing an overflow dam and hangar evacuations.

10. Dispatch should update the Emergency Call List and Echo List, and an incident channel should be established on the radios. The channel should be added to Environmental radios.

11. Additional exercises to time the flow of water to the outfalls should be conducted, which can be tied to annual spill drills.

12. Environmental should complete Incident Command System (ICS) 100 and ICS 700 training.

6.1.6 After Incident Reviews

The following after incident reviews (since 2010) were held to fulfill Code 250 Environmental Management System (EMS), ICP, and storage tank emergency preparedness requirements; discuss the effectiveness of ICP implementation; or improve spill response and coordination.

1. A review was held on December 10, 2012 to discuss the release that occurred on October 29, 2012, at Pad 0-A from a temporary generator following Hurricane Sandy. Lessons learned included: checking for temporary tanks on-site prior to severe weather events, designating a single person in charge of the spill clean-up, reinforcing the tenant requirement to notify NASA of temporary tanks, completing an incident briefing plan for MARS 33, discussing temporary tanks during pre-construction meetings and ICP training, and working with the WFF Fire Department on more descriptive ECHO messages.

2. A review was held on February 18, 2014, to discuss the generator failures and associated releases which occurred at Building U-12 on December 19, 2013, and at Building D-8 on January 8, 2014. Both releases were contained inside the buildings. Lessons learned focused on the need for a single person to be in charge at the spill and effectively transfer the information to all parties, especially as command transfers from one organization to another as the incident proceeds.

3. A review was held on July 2, 2014, following a series of spills that occurred on June 13, and June 24 from the Field Carrier Landing Practice (FCLP) project aircraft. Lessons learned included obtaining a better understanding of the operation of the aircraft and project spill procedures.

4. Daily, weekly, and monthly reviews were conducted beginning on October 30, 2014, and continued through March 2015, following the October 28, 2014 ORB-3 Mishap which occurred when an Antares ELV rocket was terminated shortly after lift-off. Lessons learned from the spill focused on preparedness to collect environmental data following a spill, recommended setting up an auto sampler at the nearest outfall, and amending the WFF VPDES permit.

5. Monthly reviews were held from January 7, 2016 to July 25, 2016 to discuss the spill that occurred on January 4, 2016, FCLP project aircraft. Lessons learned included purchasing a biological treatment chemical for small spills, installing drain filtering inserts, and conducting spill training with each crew that arrives at WFF.

6. A review was held on September 15, 2016, to discuss the spills that occurred on July 18, 2016, at Building U-12 and on August 1, 2016, at Buildings D-1 and V-10. Lesson learned focused on the need for ECHO notification for all spills.

7.0 FACILITY INSPECTIONS, TESTS, AND RECORDS [40 CFR 112.7(e), 112.8(c) and (d) and 9VAC25-91]

As part of the ongoing implementation of this ICP, WFF personnel will conduct routine inspections of the facility. WFF personnel will operate and maintain the AST systems, drums, and other items that store petroleum products and other liquids of concern in compliance with applicable state and local requirements.

In compliance with this ICP and local requirements, WFF personnel will conduct monthly and annual inspections of all ASTs and other storage containers. The inspections focus on potential spill sources, such as the tanks, dispensers, transfer points, storage areas, and loading and unloading areas. WFF personnel will promptly correct any visible oil leaks. WFF personnel will promptly report and correct any observed condition that causes, or could result in, a loss of petroleum product.

WFF personnel will conduct appropriate testing (i.e., hydrostatic, ultrasonic) of the tanks when required per state and federal regulations (e.g. 9 VAC 25.91-130B.5) if results of inspections indicate a deterioration of the tank condition or if a leak is evident, or as per industry standard recommendations, whichever occurs first.

The SPCC weekly and monthly site inspection checklists and annual inspection form are provided in Appendix M of this Plan. The Facilities Management Branch, Navy, Logistics Office, and Aircraft Office personnel maintain the completed weekly, monthly, and annual inspection forms. The written procedures and a record of the inspections and testing will be maintained for a period of five years.

Appendix O includes diagrams for NASA ASTs equipped with underground and/or aboveground pipes. The diagrams and photographs include detailed descriptions of the fill ports and connecting piping for the ASTs. For locations where the level of detail or the complexity of the piping run is difficult to show, more detailed drawings of the pipelines such as construction blueprints, engineering plans, or other detailed figures are available for reference by contacting the WFF FMB. Diagrams for ASTs that have very short interconnecting piping such as between a belly tank and an emergency generator are not included in the WFF ICP but are also available for reference with the WFF FMB.

7.1 Daily and Weekly Inspections [9 VAC 25-91-10]

Maintenance personnel, who oversee the D-9A, D-9B, and MARS-33 aboveground fuel oil tanks, complete daily walk-through inspections of the tanks and piping as required by Virginia regulations 9 VAC 25-91-130B.5 because they are single walled tanks over 660 gallons. This daily visual inspection involves looking for tank/piping damage or leakage, stained or discolored soils, or excessive accumulation of water in diked and bermed areas; and verifying that the dike drain valve is securely closed.

WFF FMB personnel conduct daily and weekly inspections for tanks D-9A and D-9B; Virginia Commercial Space Flight Authority personnel conduct daily weekly inspections for MARS-33. The records of these inspections are maintained by the inspecting organization. Weekly inspections are more thorough than those conducted daily and are done by the same maintenance personnel. In addition to the components of the daily inspections, weekly inspections include ensuring vent systems are operational, fuel gauges are functioning properly, and labels are appropriate and legible. Appendix M includes the Daily and Weekly Inspection Checklist.

Daily and weekly inspections of double-walled tanks are not required by 9 VAC 25-91-160.D Variances by Regulation for Categories of ASTs.

Facility maintenance and security personnel have also been trained to look for leaks or other problems with the tanks during their daily duties on base.

7.2 Monthly Inspection / Quarterly Inspections [40 CFR 112.7(e), 112.8(c) and (d)]

Appendix M includes monthly inspection forms. The monthly inspections cover the following key elements:

- Observing the exterior of aboveground storage tanks, pipes, and other equipment for signs of deterioration, leaks, corrosion, and thinning;
- Observing the exterior of portable containers for signs of deterioration or leaks;
- Observing tank foundations and supports for signs of instability or excessive settlement;
- Observing the tank fill and discharge pipes for signs of poor connection that could cause a discharge, and the tank vent for obstructions and proper operation;
- Checking the inventory of discharge response equipment and restocking as needed;
- Verifying the proper functioning of overfill prevention systems; and
- Observing the effluent and measuring the quantity of accumulated oil within the oil/water separator.

All problems regarding tanks, piping, or containment are recorded on the inspection form for initiation of a work order. WFF personnel repair visible oil leaks from tank walls, piping, or other components as soon as possible to prevent a larger spill, or discharge to navigable waters or adjoining shorelines. WFF personnel remove pooled oil immediately upon discovery.

WFF personnel sign written monthly inspection records and maintain the records for a period of five years.

WFF operations and maintenance personnel inspect the qualified oil-filled operational equipment on a routine schedule and document the inspections. Oil-filled transformers located throughout the Facility are monitored on a rolling quarterly inspection schedule for any signs of leakage, damage, or deterioration. Since the oil stored within the

operational equipment is not added, removed, or pumped, NASA WFF determined that quarterly inspections would be sufficient for these oil-filled containers. Elevators at WFF are regularly maintained and inspected by a contracted elevator service company. The qualified oil-filled operational equipment, including antennae, elevators, and generators are identified in Appendix C and Appendix M includes a copy of the monthly and quarterly inspection forms.

7.3 Annual Inspection [40 CFR 112.8(c) and (d)(4) and 112.12(d)(4)]

WFF personnel perform a more thorough inspection of facility equipment on an annual basis using the checklist provided in Appendix M of this Plan. This annual inspection compliments the monthly inspection described above. The WFF Environmental Office reviews the past year's inspection forms annually.

The inspector signs the written inspection records and maintains the records for a period of five years.

7.4 Periodic Integrity Testing [40 CFR 112.8(c) and (d)(4) and 112.12(d)(4)]

In addition to the above monthly and annual inspections by facility personnel, all tanks that have been installed for 20 years or more are periodically evaluated by an outside certified tank inspector following the STI *Standard for the Inspection of Aboveground Storage Tanks*, SP-001, 2018 version. Tanks in-use in 2010/2011 were inspected at that time. The next inspections of this type will be due in 2030, for tanks still in-use since 2010.

7.5 Inspections and Tests [40 CFR 112.8(c)(6)]

WFF personnel perform visual inspections of ASTs according to the procedure described in this ICP. Facility personnel promptly correct leaks from tank seams, gaskets, rivets, and bolts. The inspector signs the inspections and test documents, and the facility maintains the records for a period of five years.

The STI Standard SP-001 specifies the scope and schedule of certified inspections and tests performed on the facility’s ASTs. The external inspection could include ultrasonic testing of the shell, as specified in the standard, or, if recommended by the certified tank inspector, to assess the integrity of the tank for continued oil storage. USTs are inspected annually for release detection by tightness testing.

The Facilities Management Branch maintains records of certified tank inspections for at least five years. Shell test comparison records are retained for the life of the tanks. Table 7.5-1 summarizes the various types of tank inspections that occur at WFF.

TABLE 7.5-1 GENERAL TANK INSPECTION AND TESTING PROGRAM		
Facility Component	**Action**	**Frequency/Circumstances**
Aboveground container	After 20 years, test container integrity. Visual inspection may be combined with another testing technique (non-destructive shell testing). Inspect outside of container for signs of deterioration and discharges.	Following a regular schedule (monthly, annual, and during scheduled inspections) and whenever material repairs are made.
Container supports and foundation	Inspect container's supports and foundations.	Following a regular schedule (monthly, annual, and during scheduled inspections) and whenever material repairs are made.
Liquid level sensing devices	Test for proper operation.	Annually
Diked area	Inspect for signs of deterioration, discharges, or accumulation of oil inside diked areas. Check for water levels after rain events.	Monthly As required
Lowermost drain and all outlets of tank truck	Visually inspect	Prior to filling and departure
All aboveground valves, piping, and appurtenances	Assess general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces.	Weekly: single-walled tanks over 5000 gallons (ASTs D-9A, D-9B, MARS 33) Monthly: tanks greater than 660 gallons
Monitoring system	Test for proper operation	Monthly by facility personnel, annually by certified installer who should inspect and test all sensors and level gauges.
Interstitial Leak Detection Devices	Test for proper operation	Annually
Underground Containers	Leak Detection	Monthly: Leak Detection Annually: Tank Testing
Buried Product Piping	Leak Testing	Annual Testing

TABLE 7.5-1 GENERAL TANK INSPECTION AND TESTING PROGRAM		
Facility Component	**Action**	**Frequency/Circumstances**
Product Piping	Leak Testing	Every 5 years as required by 9 VAC 25-91-130-B.4 but there is an exemption for ASTs with a capacity of 5,000 gallons or less used for storing heating oil for consumptive use on the premises where stored; (9VAC25-91-30 B.1).
Oil/Water Separator	Clean out	As required Exempted from requirements of 9VAC25-91 by 9VAC25-91-30A.19.

Table 7.5-2 summarizes inspections and tests performed on bulk storage containers. "EE" indicates that an environmentally equivalent measure is implemented in place of the inspection/test.

TABLE 7.5-2 SCOPE AND FREQUENCY OF BULK STORAGE CONTAINERS INSPECTIONS AND TESTS				
Inspection/Test	**Single-Wall ASTs**	**Double-Wall ASTs**	**USTs**	**Drums**
Visual inspection by facility personnel (as per checklist of Appendix M-1)	D W A	-- M A	-- M A	-- M A
External inspection by certified inspector (as per STI Standard SP-001 or API 653)	20 yr.	20 yr.	N/A	--
	or as determined by Inspector			
Internal inspection by certified inspector (as per STI Standard SP-001or API 653)	(1)	EE	N/A	N/A
Line tightness test meeting requirements of 40 CFR 280	(2)	(2)	(3)	N/A
Berm Testing	Every Ten Years	N/A	N/A	N/A

Legend: D=Daily
W=Weekly
M=Monthly
A=Annual

EE=Inspection not required given use of environmentally equivalent measure (double-wall tank).
N/A=Not applicable
(1)=Internal inspection may be recommended by the certified inspector based on findings from the external inspection.
(2)=AST with underground piping needs to have piping tested annually.
(3)=Annual line and leak detector testing on single-wall USTs and underground product piping.

The frequency above is based on implementation of a scheduled inspection/testing program. To initiate the program, WFF personnel will inspect the ASTs by the following dates:

- All tanks: External inspection to be performed 20 years after installation.

7.6 Berm Testing [40 CFR 112.7(c)]

All tanks over 25,000 gallons shall have their berm or secondary containment certified with respect to its compliance with the applicable requirements of 40 CFR Part 112, NFPA 30, and 29 CFR 1910.106. The operator shall have this evaluation or certification performed by a professional engineer or other approved person every 10 years. This applies to D-9A, D-9B and MARS 33. Berm testing for D-9A and D-9B is due April 1, 2021.

8.0 Integrated Contingency Plan DEVIATIONS [40 CFR 112.7]

SPCC rules allow a deviation from some of the requirements in 40 CFR 112.7 for situations where spill control devices are impracticable.

8.1 ASTs and Oil-Filled Operational Equipment Deviation

A lighting deviation for single and double-walled ASTs is in place based on the following information: The inability to directly observe leaks of double-wall construction into the interstitial space at night, the presence of automatic leak detection devices in the interstitial space of each double walled tank, and the lack of unsecured discharge lines attached to the inner vessel of each tank. All existing ASTs have been evaluated for adequate lighting. The single walled tanks are secondarily contained, operational controls are in place and these tanks are inspected more frequently by the security force. In addition, a deviation for lighting requirements for qualified oil-filled operational equipment is in place. Due to the distant location of ASTs and operational equipment from electricity, the addition of security lighting is not practicable.

8.2 Environmental Equivalence For Monitoring of Mobile ASTs Outside of the United States

40 CFR 112.8 requires all bulk oil storage containers be inspected on a periodic basis to determine if the secondary containment provisions for each container are intact and a leak has not occurred. The inspections focus on potential spill sources, such as the tanks, dispensers, transfer points, loading and unloading areas. Any visible oil leaks will be promptly corrected.

When the mobile aboveground storage tanks are on site, tanks are inspected monthly for leaks. When any generator fuel containment is out of the United States, it is inspected for leaks during the monthly inspection cycle either by Wallops personnel performing monthly preventative maintenance (PM) at Coquina or in the case of Bermuda, Serco personnel inspecting generator co-located near the system as part of their routine PM. This PM and monitoring method will remain in effect until such time as a real-time remote sensing capability is in place.

8.3 Environmental Equivalence For Fats, Oil, and Grease Tank

NASA Wallops Flight Facility is deviating from the overfill protection provision of 40 CFR 112.8(c)(8) for the aboveground storage tank containing used cooking oil/grease at the Cafeteria, Building E-2. The design of the tank incorporates a large, fill opening in the lid of the tank that is large enough to allow visual observation of the tank level during filling. The level in the tank is visually inspected whenever cafeteria personnel pour used cooking oil/grease into the container. This practice ensures that the tank is not overfilled. This approach for the used cooking oil/grease tank provides environmental protection equivalent to the overfill protection provision required under CFR 112.8(c)(8) and is adequate to prevent a discharge, as long as the fill point is closed between each use.

9.0 ANNUAL FACILITY CHANGE HISTORY LOG

A log will be maintained and included here of changes that were made during the previous annual ICP updates.

DATE	FY 2018 FACILITY CHANGE HISTORY LOG
12/6/2018	Added updated information to include Protective Services training to Section 3.6 Site Security
12/6/2018	Corrected Table C-7 title
6/25/2019	Added "single-walled" to Pg. 12 Section 2.2. referring to contractor tanks brought onsite
6/25/2019	New transformers (U Area and Z-101) were added to the inventory. U-Area transformer is 49 gallons therefore not included in Table C-5
6/25/2019	Corrected Mobile Oil Storage Systems location date on Table C-7
6/25/2019	Table C-5: Updated X-79 to 1 container
7/31/2019	Included 2019 Spill Drill Summary
8/1/2019	Added notification of WWTP operators if a spill occurs which could impact the WWTP
8/14/2019	Adjusted Table C-8 totals based on drum storage and mobile containers
10/4/2019	Changed the NOAA BT (1 through 4) tanks from diesel to #2 Fuel Oil based on September 2019 NOAA/DEQ communication.
11/26/2019	Added 55-gallon cooking oil container (F-36)
12/10/2019	Removed NPOL and TOGA ASTs from ICP

APPENDIX A

CERTIFICATION OF THE APPLICABILITY OF THE SUBSTANTIAL HARM CRITERIA

APPENDIX A
CERTIFICATION OF THE APPLICABILITY OF THE SUBSTANTIAL HARM CRITERIA
[As per 40 CFR 112.20 (f) (1)]

Facility Name: GODDARD SPACE FLIGHT CENTER
WALLOPS FLIGHT FACILITY
Facility Address: WALLOPS ISLAND, VIRGINIA 23337

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?

   YES ____ NO __X__

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground storage tank area?

   YES ____ NO __X__

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in 40 CFR 112 Appendix C, Attachment C-III or a comparable formula[1]) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments, see Appendices I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments" (see 40 CFR 112 Appendix E, Section 10, for availability) and the applicable Area Contingency Plan.

   YES ____ NO __X__

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in 40 CFR 112 Appendix C, Attachment C-III or a comparable formula[1]) such that a discharge from the facility would shut down a public drinking water intake[2]?

   YES ____ NO __X__

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?

   YES ____ NO __X__

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1 If a comparable formula is used, documentation of the reliability and analytical soundness of the comparable formula must be attached to this form.

2 For the purposes of 40 CFR 112, public drinking water intakes are analogous to public water systems as described in 40 CFR 143.2 (c).

APPENDIX B

WALLOPS FLIGHT FACILITY SITE MAPS

Maps in this Appendix include the following:

Figure B.1.1	Facility Location Map – WFF Main Base, Mainland & Wallops Island
Figure B.2.1	NASA WFF Main Base Topography
Figure B.2.2	NASA WFF Mainland and Island Topography
Figure B.3.1	WFF Main Base Drainage Features
Figure B.3.2	WFF Mainland and Wallops Island Drainage Features
Figure B.4.1.1	WFF Main Base ASTs and Drainage Areas
Figure B.4.1.2	WFF Main Base East ASTs and Drainage Areas
Figure B.4.1.3	WFF Main Base West ASTs and Drainage Areas
Figure B.4.2.1	WFF Mainland ASTs and Drainage Areas
Figure B.4.2.2	WFF Island North ASTs and Drainage Areas
Figure B.4.2.3	WFF Island Central ASTs and Drainage Areas
Figure B.4.2.4	WFF Island South ASTs and Drainage Areas
Figure B.4.3.1	WFF Island USTs and Drainage Areas
Figure B.4.3.2	WFF Main Base USTs and Drainage Area
Figure B.5.1.1	WFF Main Base Oil Filled Transformers and Drainage Areas
Figure B.5.1.2	WFF Main Base North Oil Filled Transformers and Drainage Areas
Figure B.5.1.3	WFF Main Base East Oil Filled Transformers and Drainage Areas
Figure B.5.1.4	WFF Main Base South Oil Filled Transformers and Drainage Areas
Figure B.5.2.1	WFF Mainland Oil Filled Transformers and Drainage Areas
Figure B.5.2.2	WFF Island Oil Filled Transformers and Drainage Areas
Figure B.5.2.3	WFF Island North Oil Filled Transformers and Drainage Areas
Figure B.5.2.4	WFF Island Central Oil Filled Transformers and Drainage Areas
Figure B.5.2.5	WFF Island South Oil Filled Transformers and Drainage Areas
Figure B.6.1.1	Main Base Building Locations
Figure B.6.1.2	Main Base North Building Locations
Figure B.6.1.3	Main Base East Building Locations
Figure B.6.1.4	Main Base South Building Locations
Figure B.6.2.1	WFF Mainland Building Locations
Figure B.6.2.2	WFF Island Building Locations
Figure B.6.2.3	WFF Island North Building Locations
Figure B.7.1	WFF Main Base Evacuation Map
Figure B.7.2	WFF Mainland and Wallops Island Evacuation Map

APPENDIX B

WALLOPS FLIGHT FACILITY SITE MAPS (continued)

Figure	B.8.1	Spill Flow Directions AST D-1, D-2-17 - WFF Main Base
Figure	B.8.2	Spill Flow Directions AST D-04-14 - WFF Main Base
Figure	B.8.3	Spill Flow Directions AST D-8 Generator Day Tank - WFF Main Base
Figure	B.8.4	Spill Flow Directions AST D9A-D9B - WFF Main Base
Figure	B.8.5	Spill Flow Directions AST D-50B - WFF Main Base
Figure	B.8.6	Spill Flow Directions AST E-2 - WFF Main Base
Figure	B.8.7	Spill Flow Directions AST F-26-1A and F-26-1B - Main Base
Figure	B.8.8	Spill Flow Directions AST F-36 - WFF Main Base
Figure	B.8.9	Spill Flow Directions AST Spill Flow Directions Mobile Units MPS-1, MPS-2, MPS-3, MPS-4, – Main Base
Figure	B.8.10	Spill Flow Directions WI-R1-AST-01 - Navy Cropper Center
Figure	B.8.11	Spill Flow Directions AST WI-R30-AST-01 (Generator) - Navy SCDSC
Figure	B.8.12	Spill Flow Directions AST NOAA-3, NOAA-4, NOAA BT-1, NOAA BT-2, NOAA BT-3, and NOAA BT-4, UST NOAA-1, UST NOAA-2 - WFF Main Base
Figure	B.8.13	Spill Flow Directions AST USCG Housing Generator - USCG Housing location on WFF Main Base
Figure	B.8.14	Spill Flow Directions UST WI-R20-UST-01, WI-R20-UST-02, WI-R30-UST-01 – Main Base
Figure	B.8.15	Spill Flow Directions AST U-12A-13, U-12B-13 - WFF Mainland
Figure	B.8.16	Spill Flow Directions AST U-30B-15 - WFF Mainland
Figure	B.8.17	Spill Flow Directions AST U-48-15 - WFF Mainland
Figure	B.8.18	Spill Flow Directions AST U-65-15 - WFF Mainland
Figure	B.8.19	Spill Flow Directions AST WI-V3-AST-01 – Wallops Island
Figure	B.8.20	Spill Flow Directions AST WI-V10-AST-01, WI-V18-AST-01 and WI-V21-AST-01, WI-V10-UST-01, WI-V20-UST-01 - Wallops Island
Figure	B.8.21	Spill Flow Directions AST WI-V24-AST-01 and WI-V24-AST-03 – Wallops Island
Figure	B.8.22	Spill Flow Directions AST V-62 – Wallops Island
Figure	B.8.23	Spill Flow Directions AST W-20A-10 - Wallops Island
Figure	B.8.24	Spill Flow Directions AST X-16 -Wallops Island
Figure	B.8.25	Spill Flow Directions AST Z-62 – Wallops Island
Figure	B.8.26	Spill Flow Directions AST MARS-33 RP-1, MARS Hydraulic Reservoir - Wallops Island

Figure B.1.1 Facility Location Map - WFF Main Base, Mainland, Wallops Island

Figure B.2.1 NASA WFF Main Base Topography

Figure B.2.2 NASA WFF Mainland and Island Topography

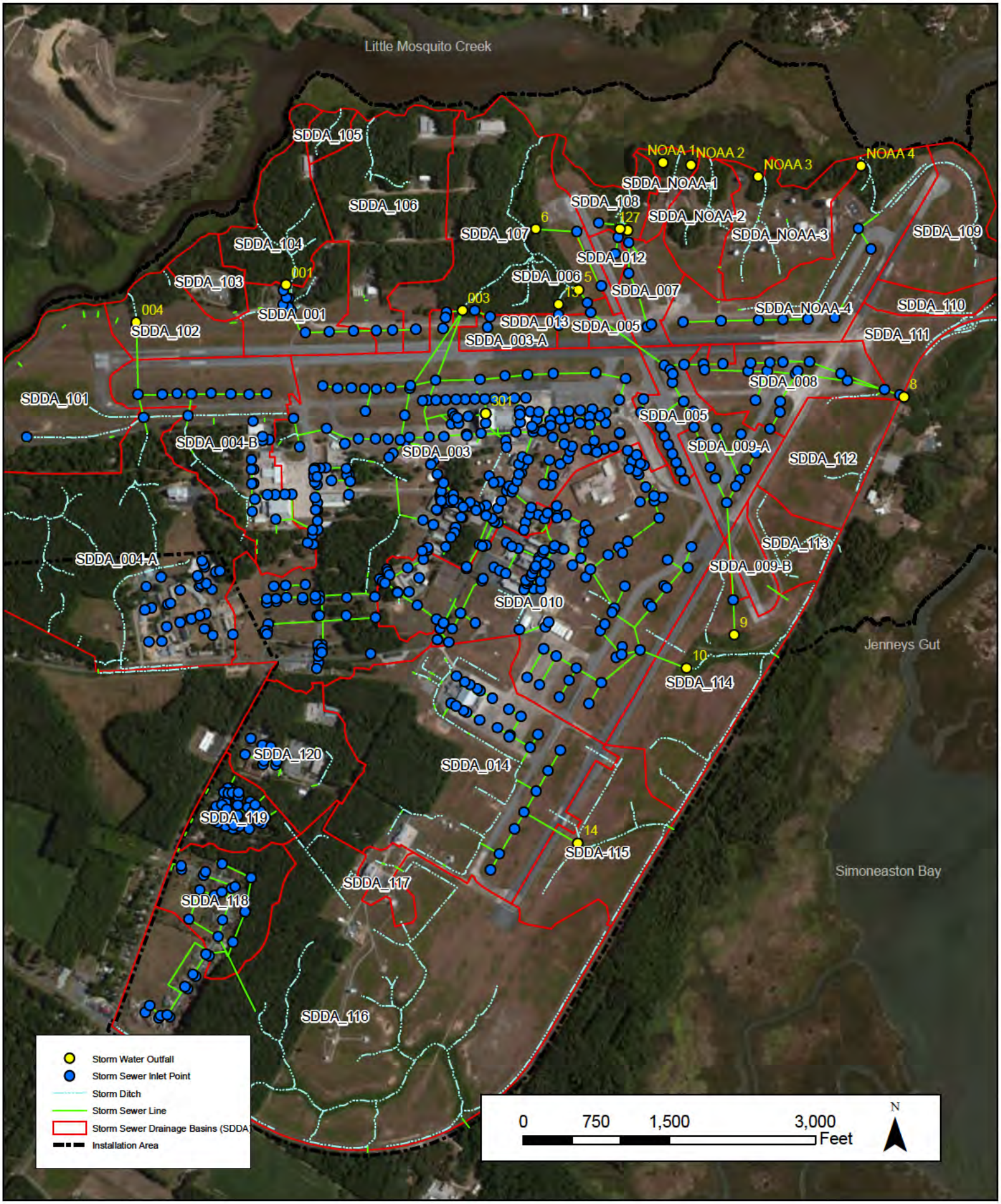


Figure B.3.1 WFF Main Base Drainage Features

Figure B.3.2 WFF Mainland and Wallops Island Drainage Features

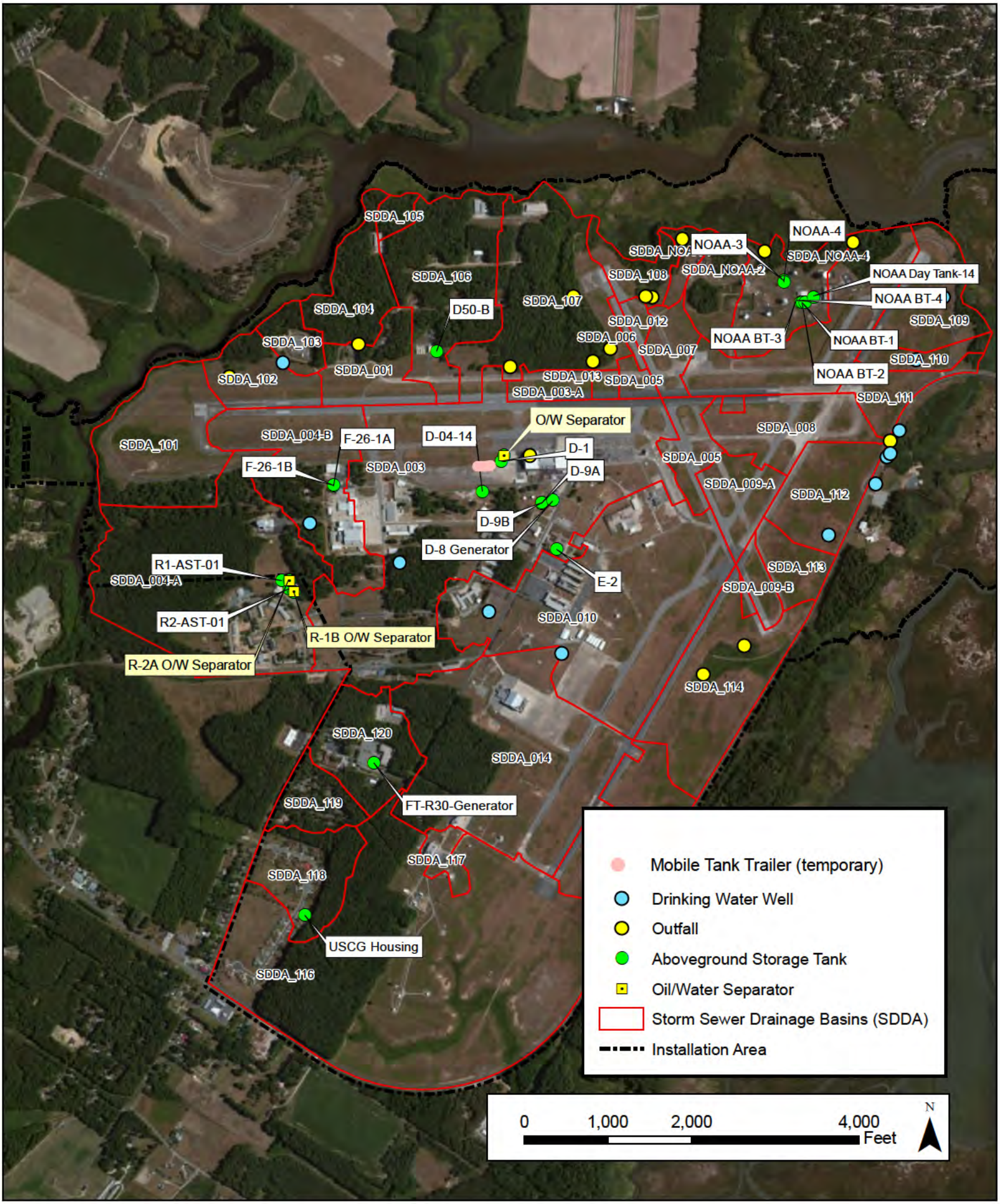


Figure B.4.1.1 WFF Main Base ASTs and Drainage Areas

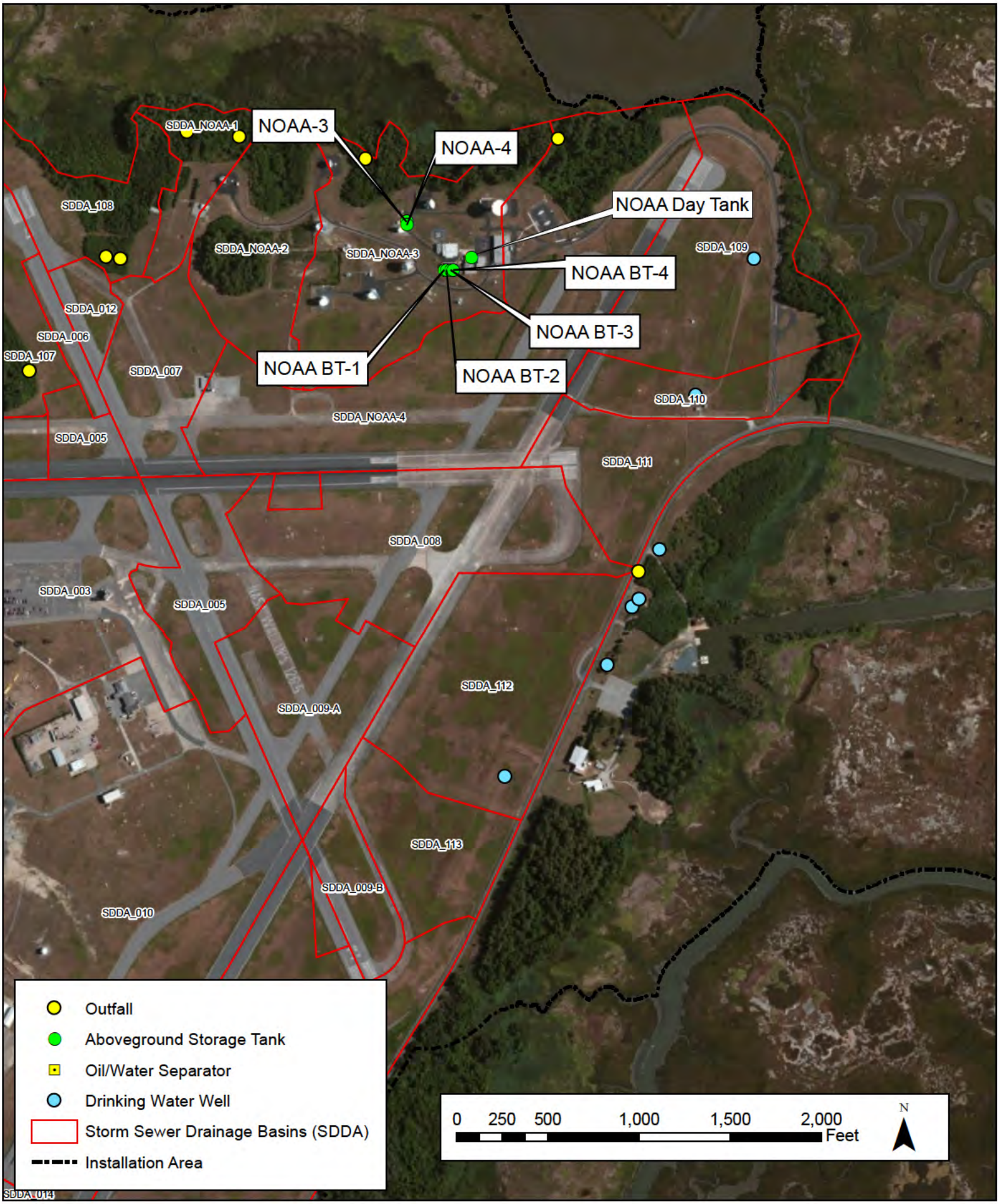


Figure B.4.1.2 WFF Main Base East ASTs and Drainage Areas

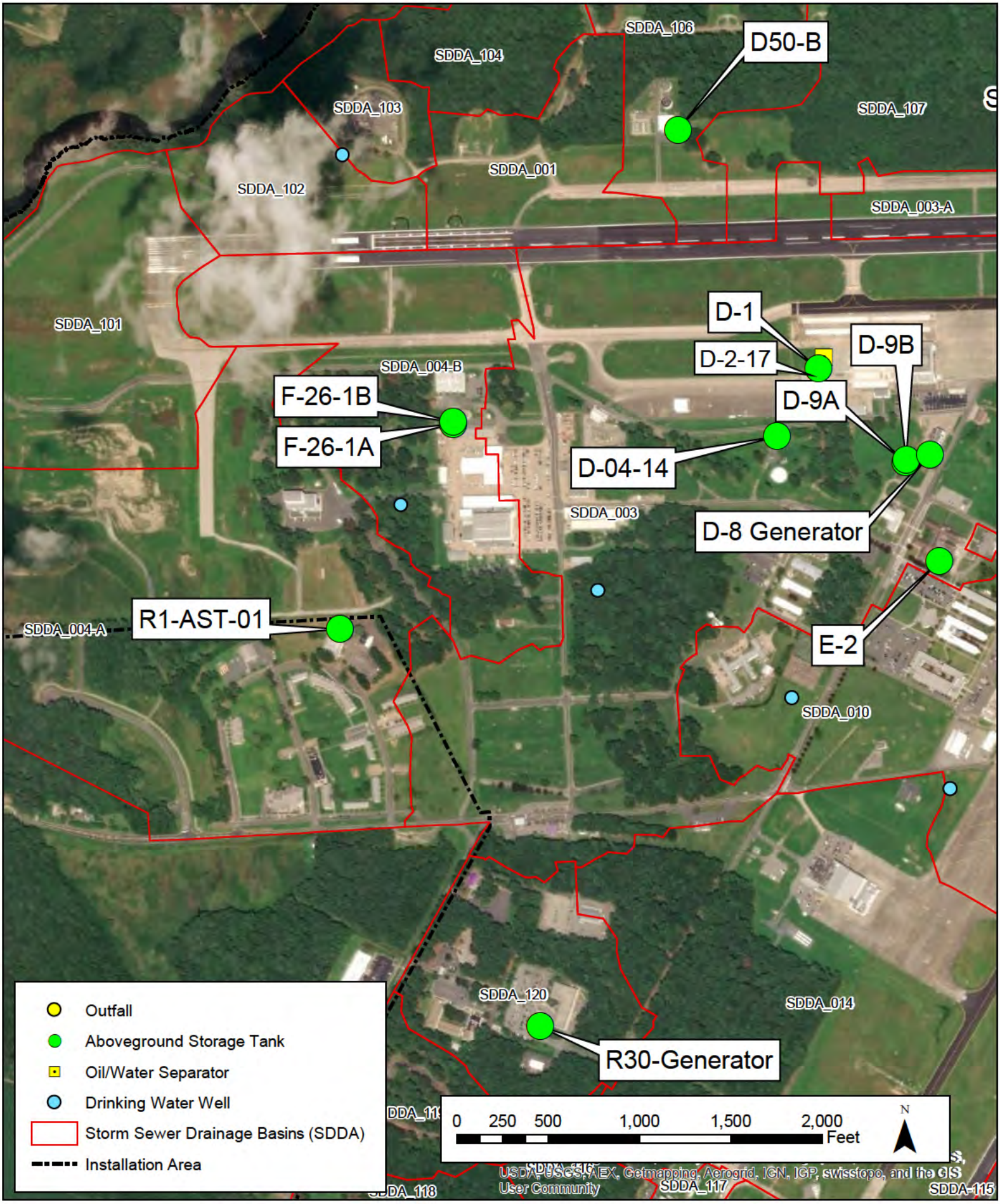


Figure B.4.1.3 WFF Main Base West ASTs and Drainage Areas

Figure B.4.2.1 WFF Mainland ASTs and Drainage Areas

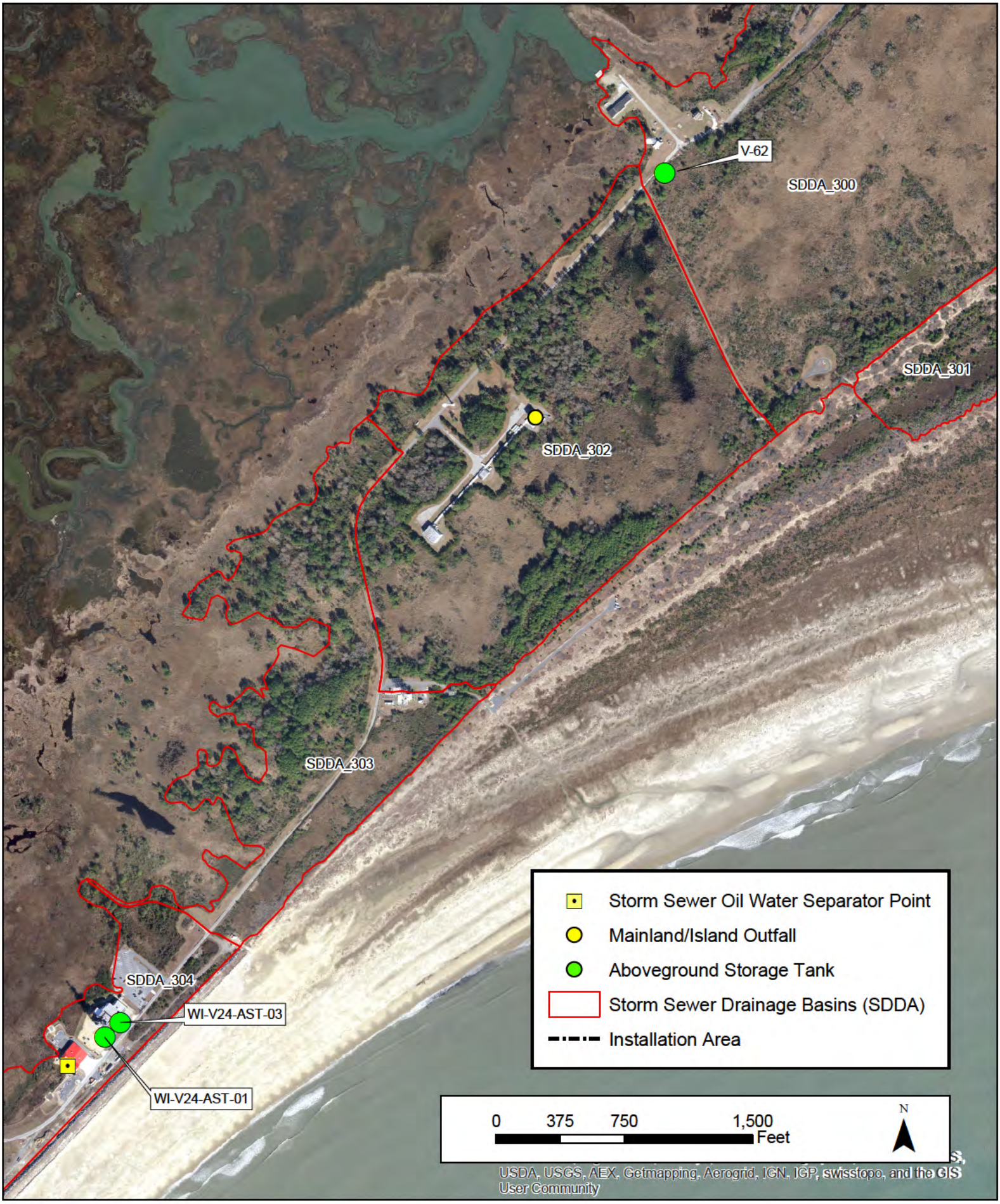


Figure B.4.2.2 WFF Island North ASTs and Drainage Areas

Figure B.4.2.3 WFF Island Central ASTs and Drainage Areas

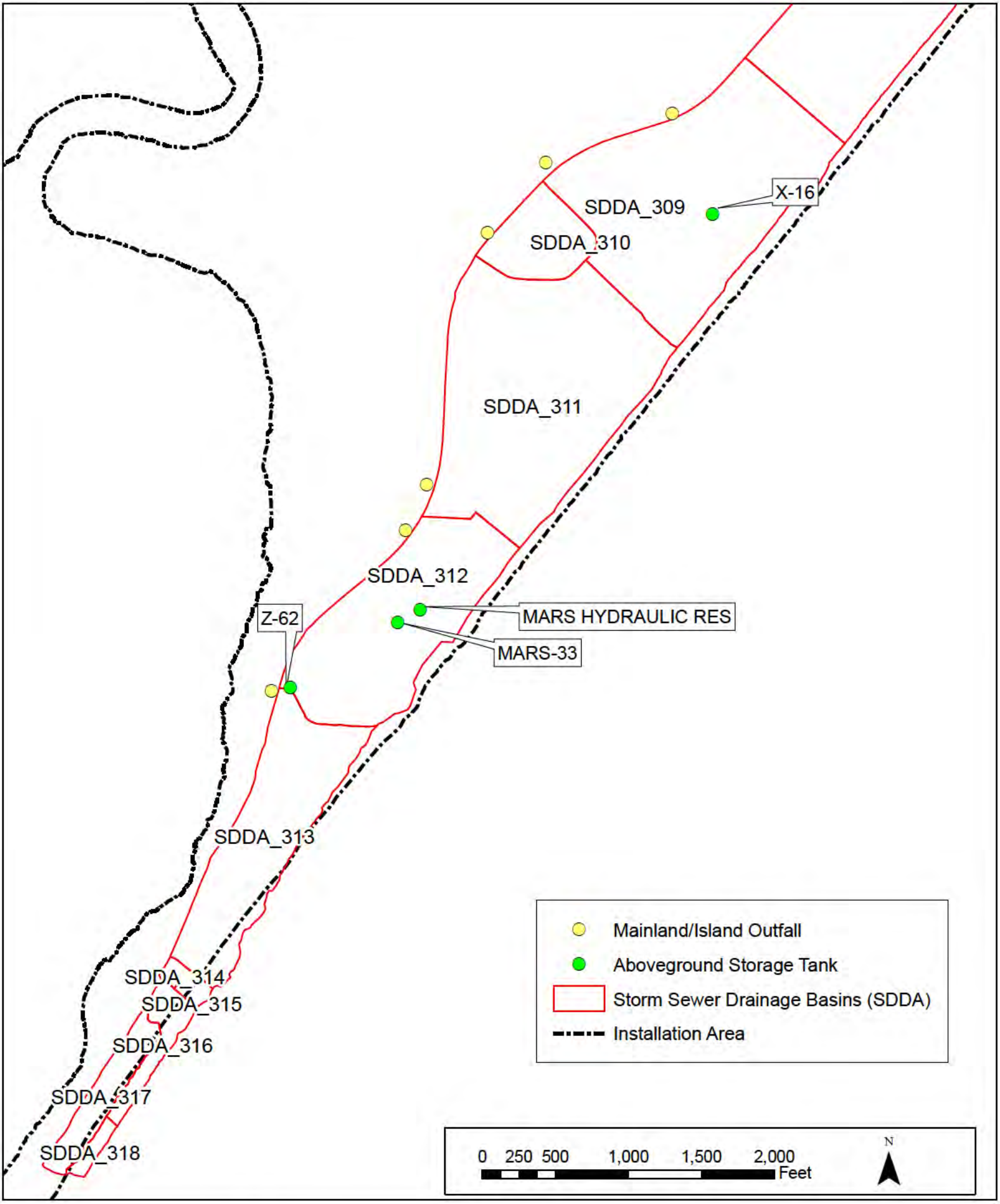


Figure B.4.2.4 WFF Island South ASTs and Drainage Areas

Figure B.4.3.1 WFF Island USTs and Drainage Areas

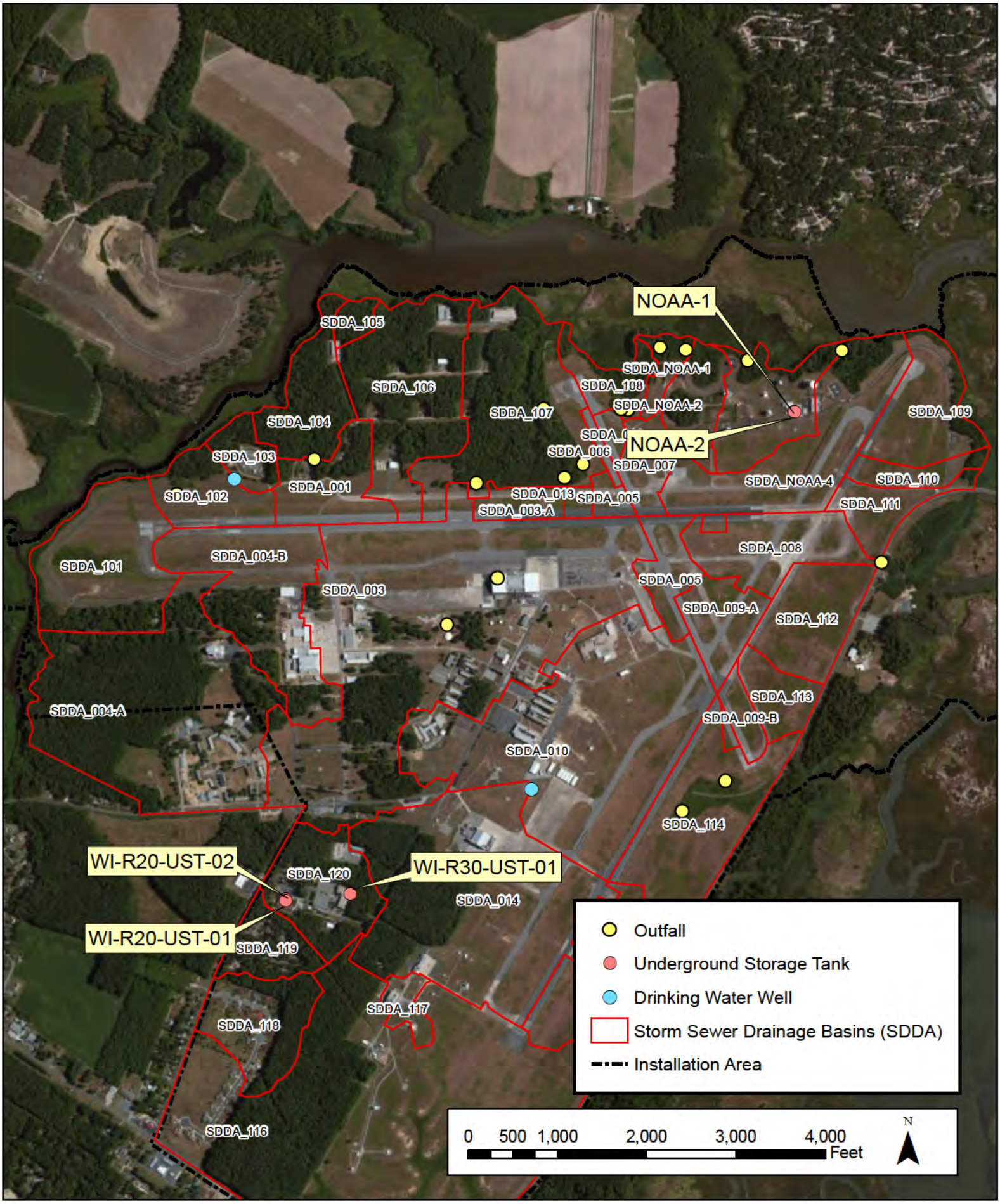


Figure B.4.3.2 WFF Main Base USTs and Drainage Areas

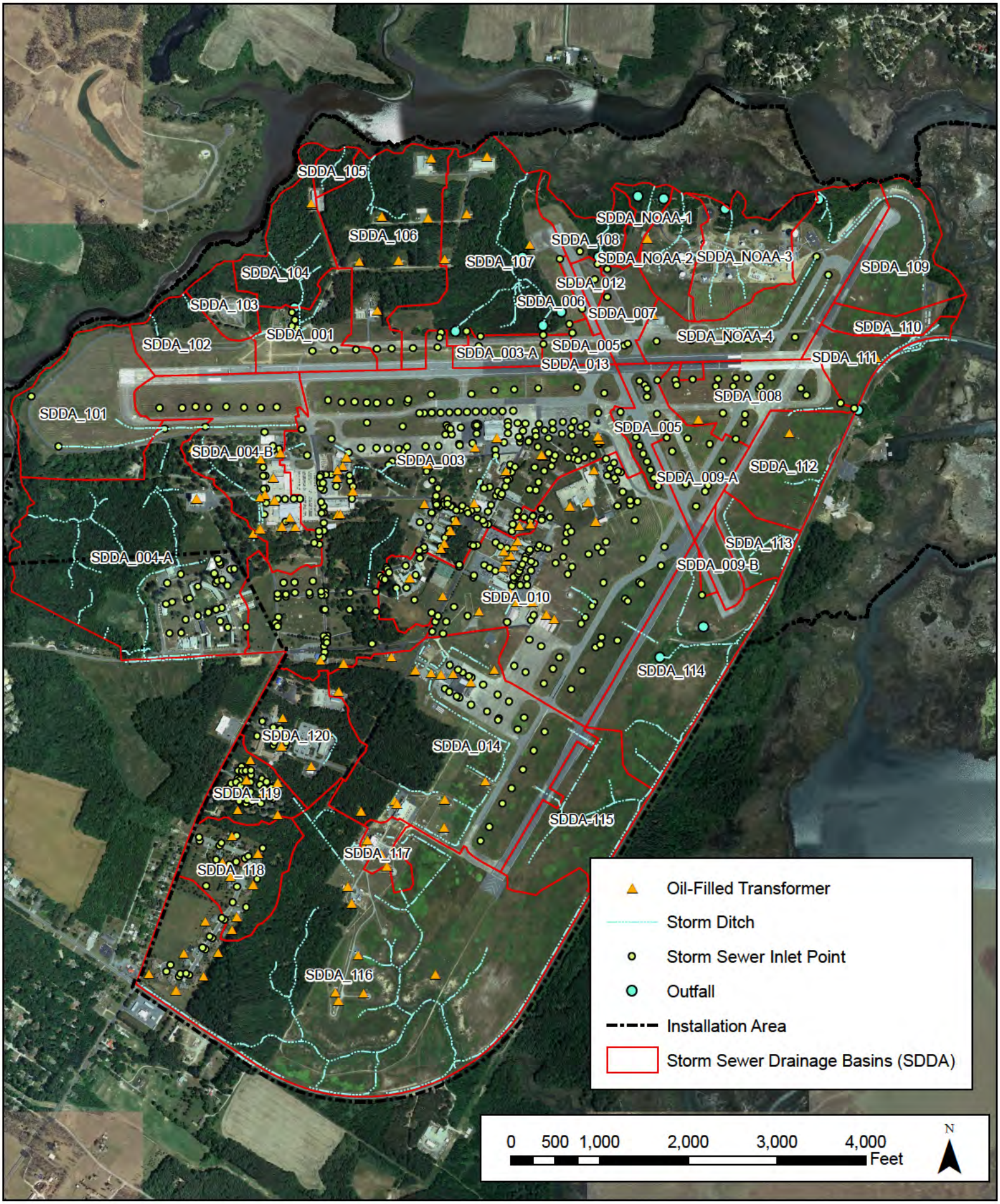


Figure B.5.1.1 WFF Main Base Oil Filled Transformers and Drainage Areas

Figure B.5.1.2 WFF Main Base North Oil Filled Transformers and Drainage Areas

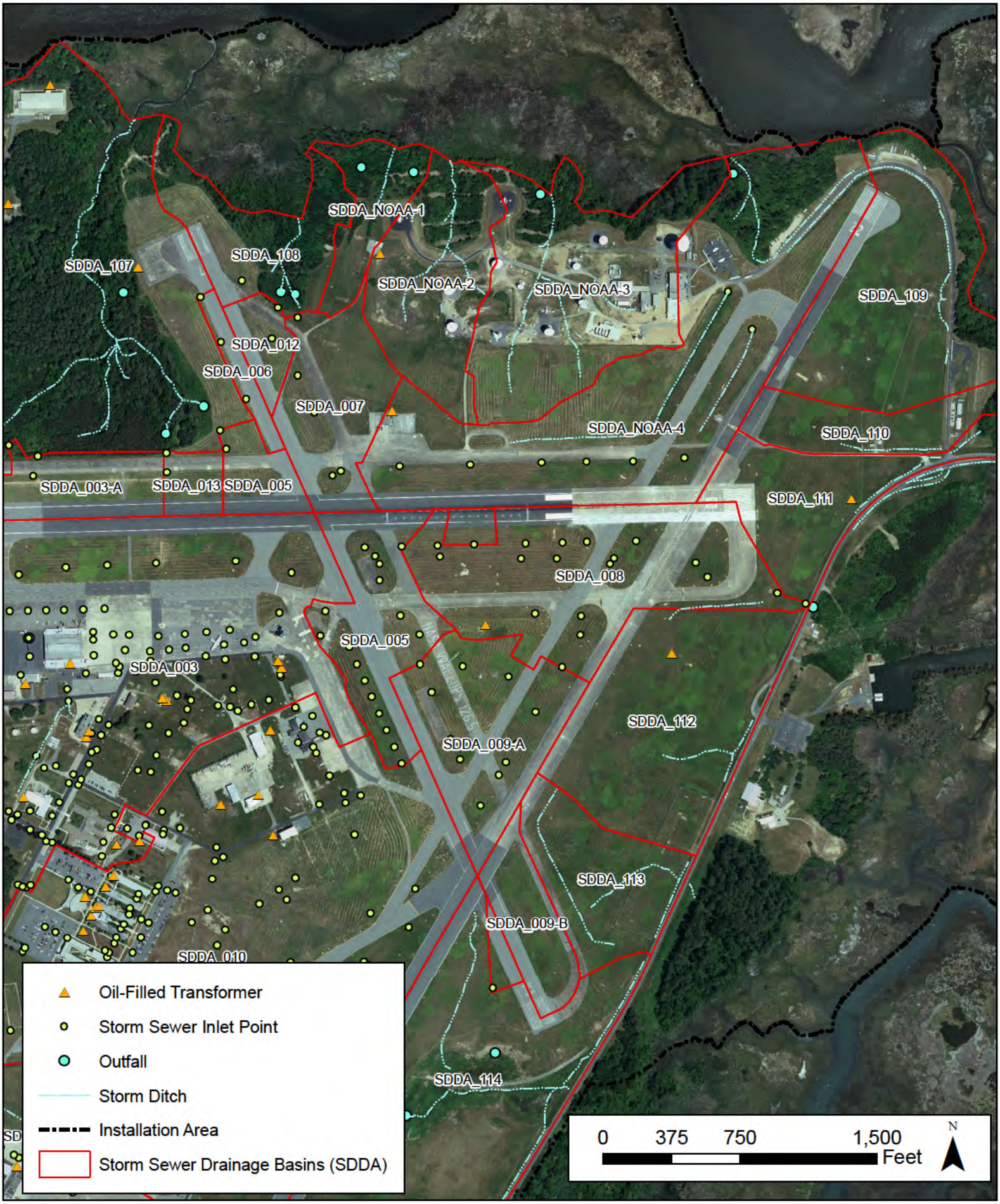


Figure B.5.1.3 WFF Main Base East Oil Filled Transformers and Drainage Areas

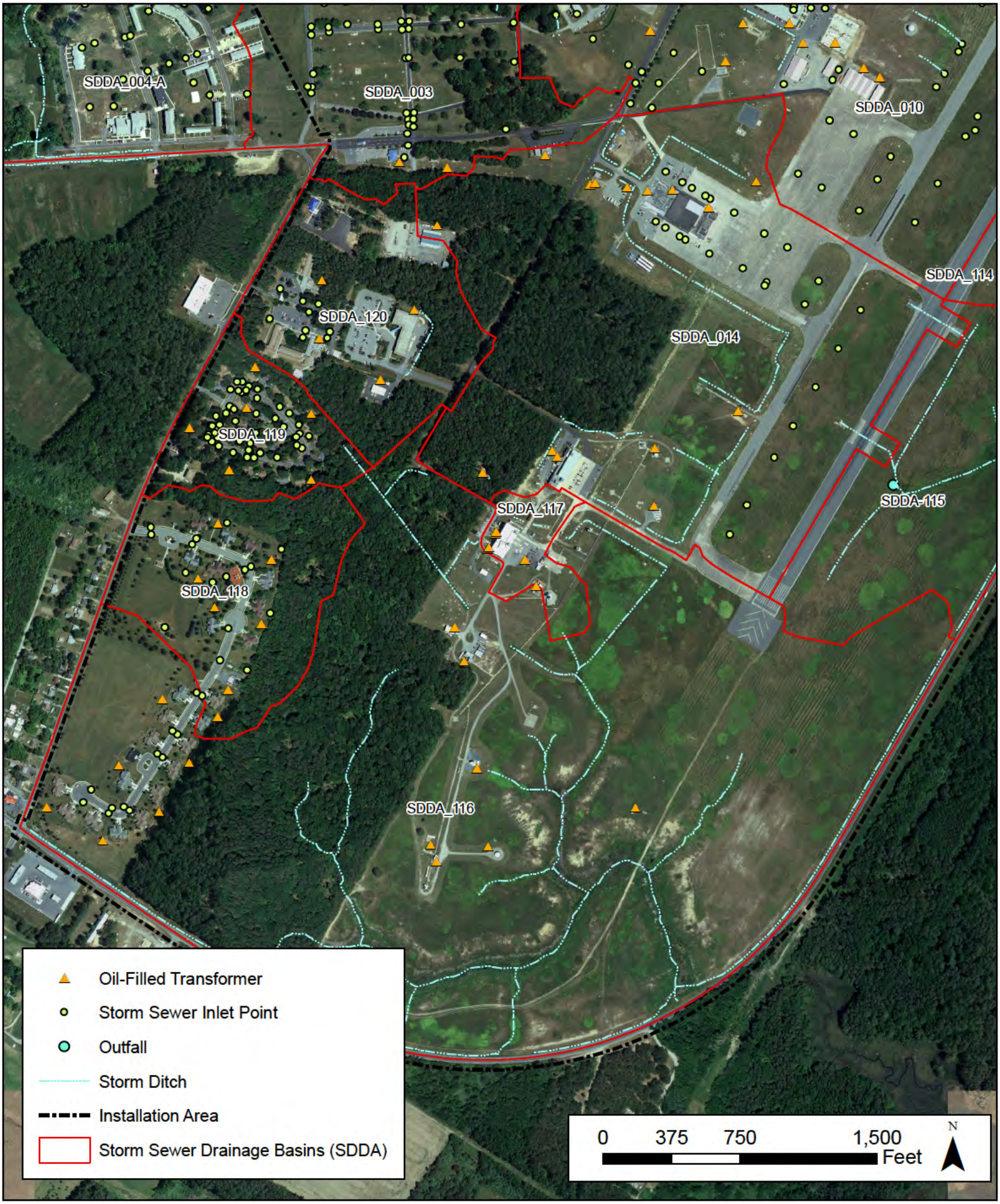


Figure B.5.1.4 WFF Main Base South Oil Filled Transformers and Drainage Areas

Figure B.5.2.1 WFF Mainland Oil Filled Transformers and Drainage Areas

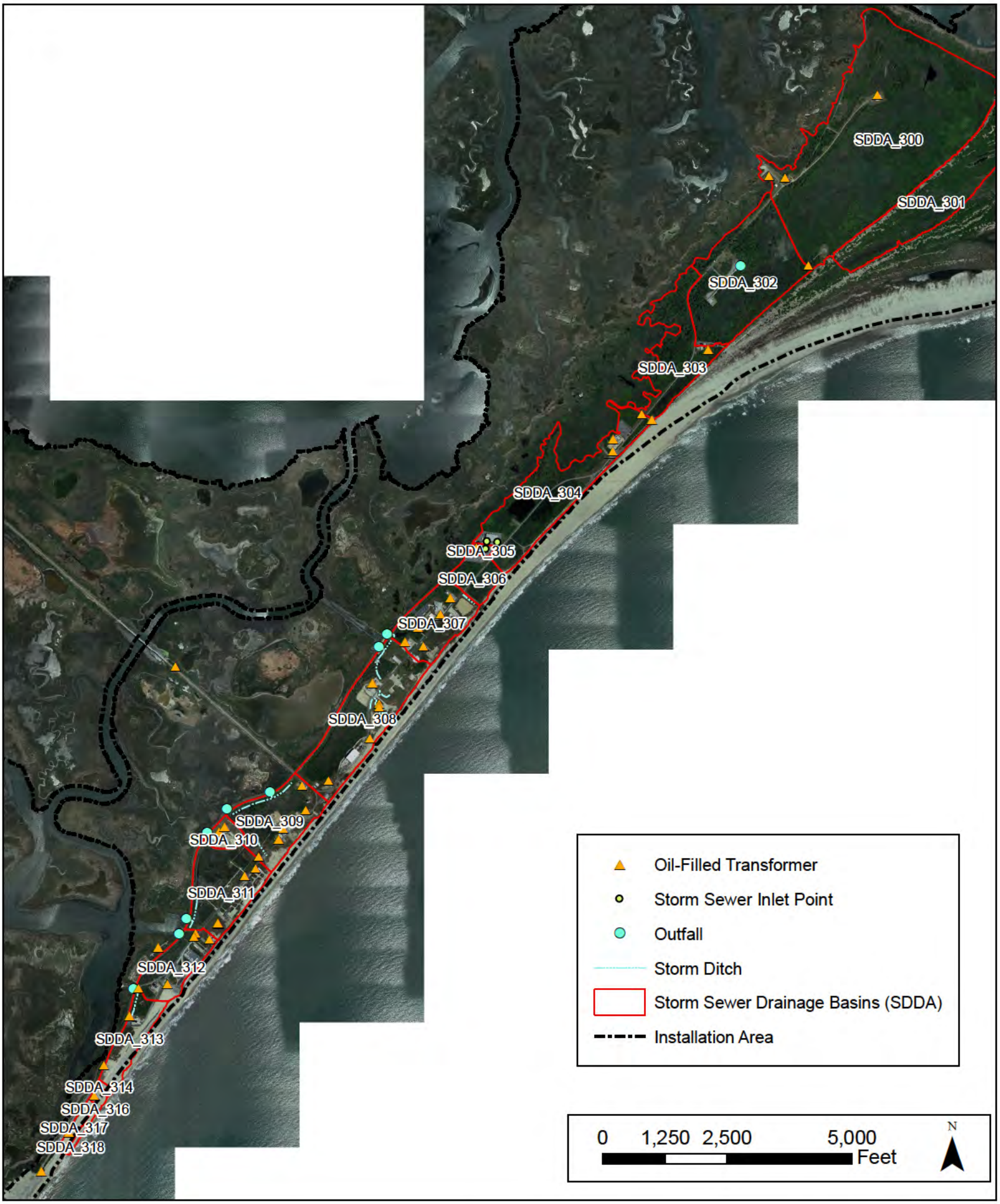


Figure B.5.2.2 WFF Wallops Island Oil Filled Transformers and Drainage Areas

Figure B.5.2.3 WFF Wallops Island North Oil Filled Transformers and Drainage Areas

Figure B.5.2.4 WFF Wallops Island Central Oil Filled Transformers and Drainage Areas

Figure B.5.2.5 WFF Wallops Island South Oil Filled Transformers and Drainage Areas

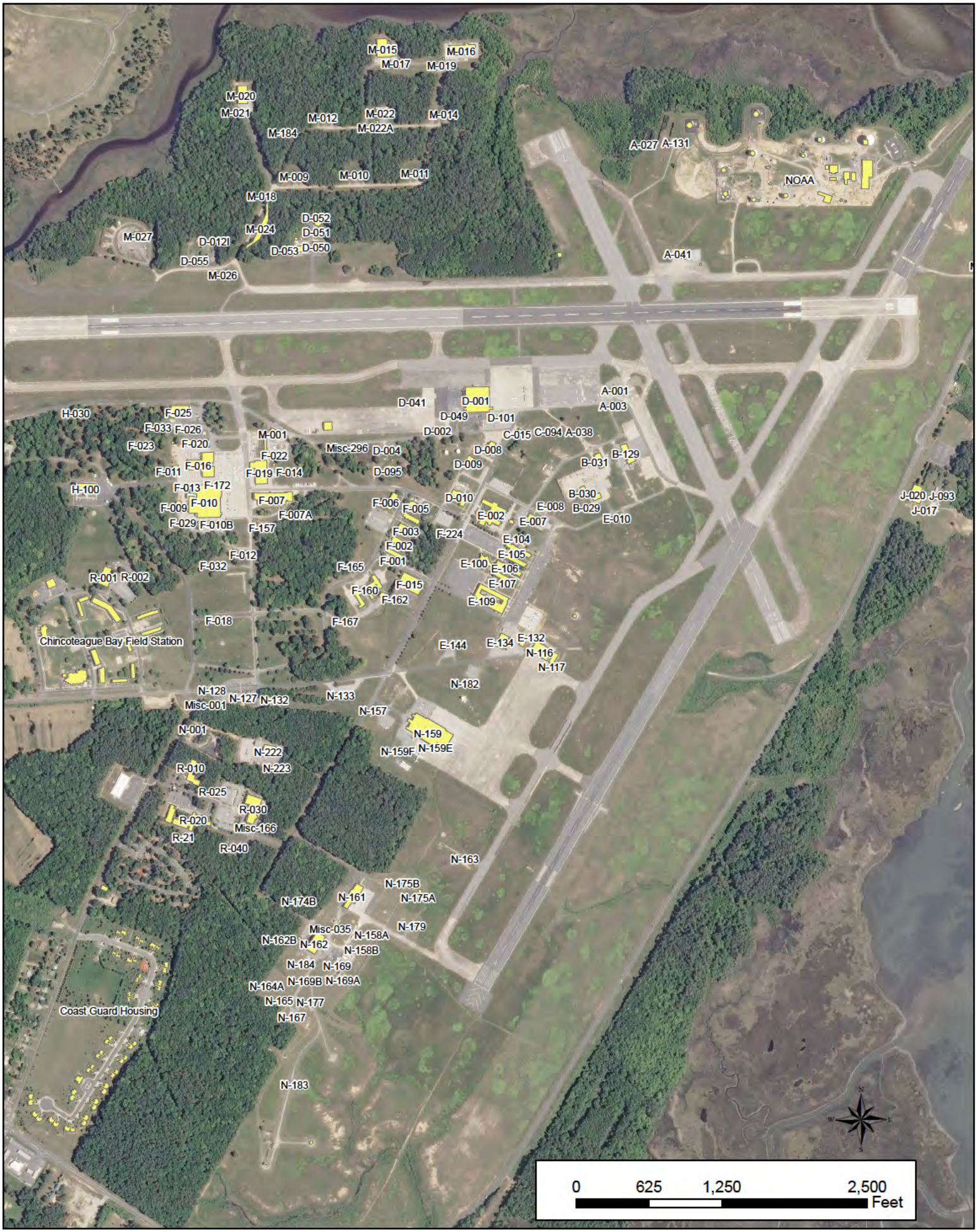


Figure B.6.1.1 Main Base Building Locations

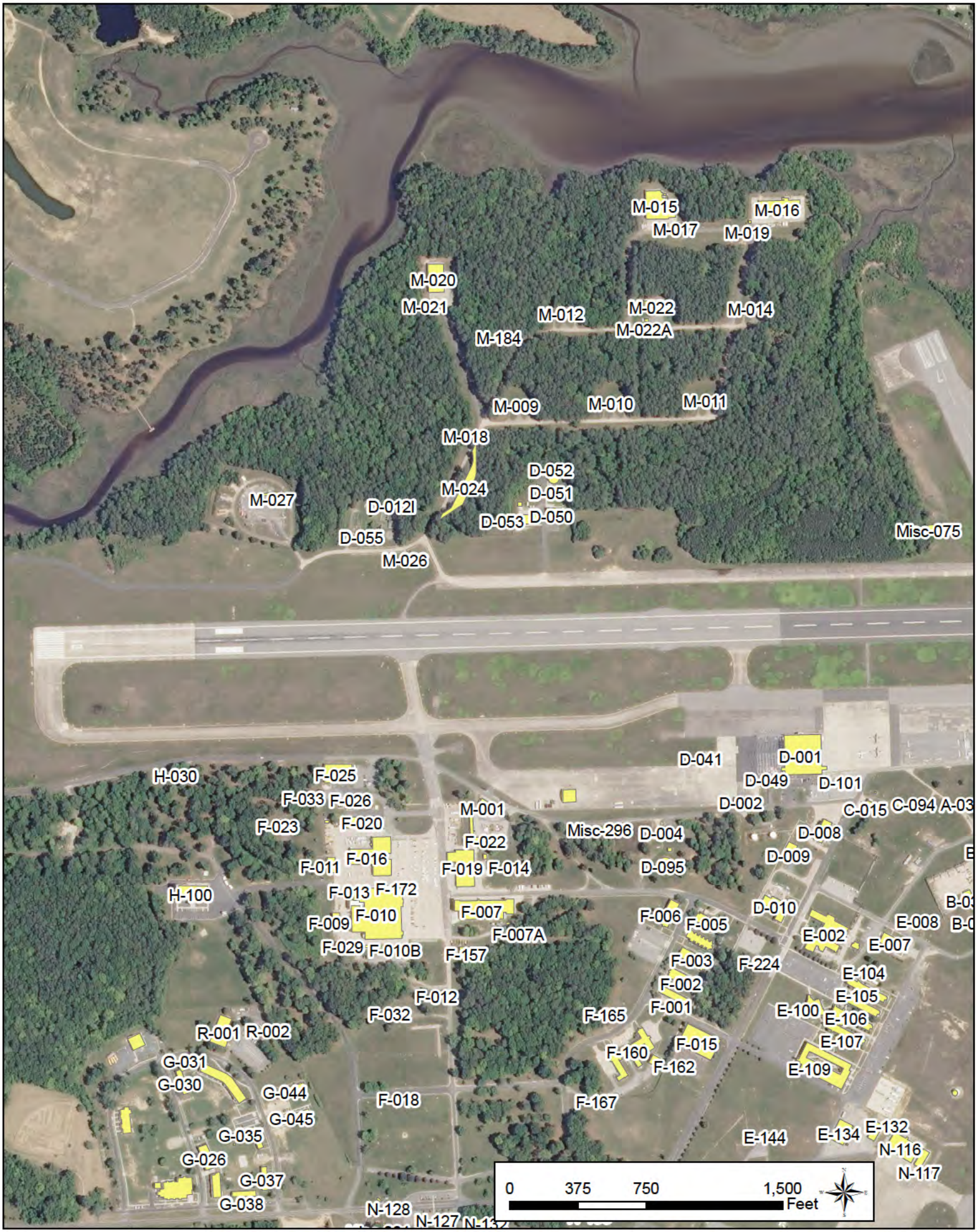


Figure B.6.1.2 Main Base North Building Locations

Figure B.6.1.3 Main Base East Building Locations

Figure B.6.1.4 Main Base South Building Locations

Figure B.6.2.1 Mainland Building Locations

Figure B.6.2.2 WFF Island Building Locations

Figure B.6.2.3 WFF Island North Building Locations

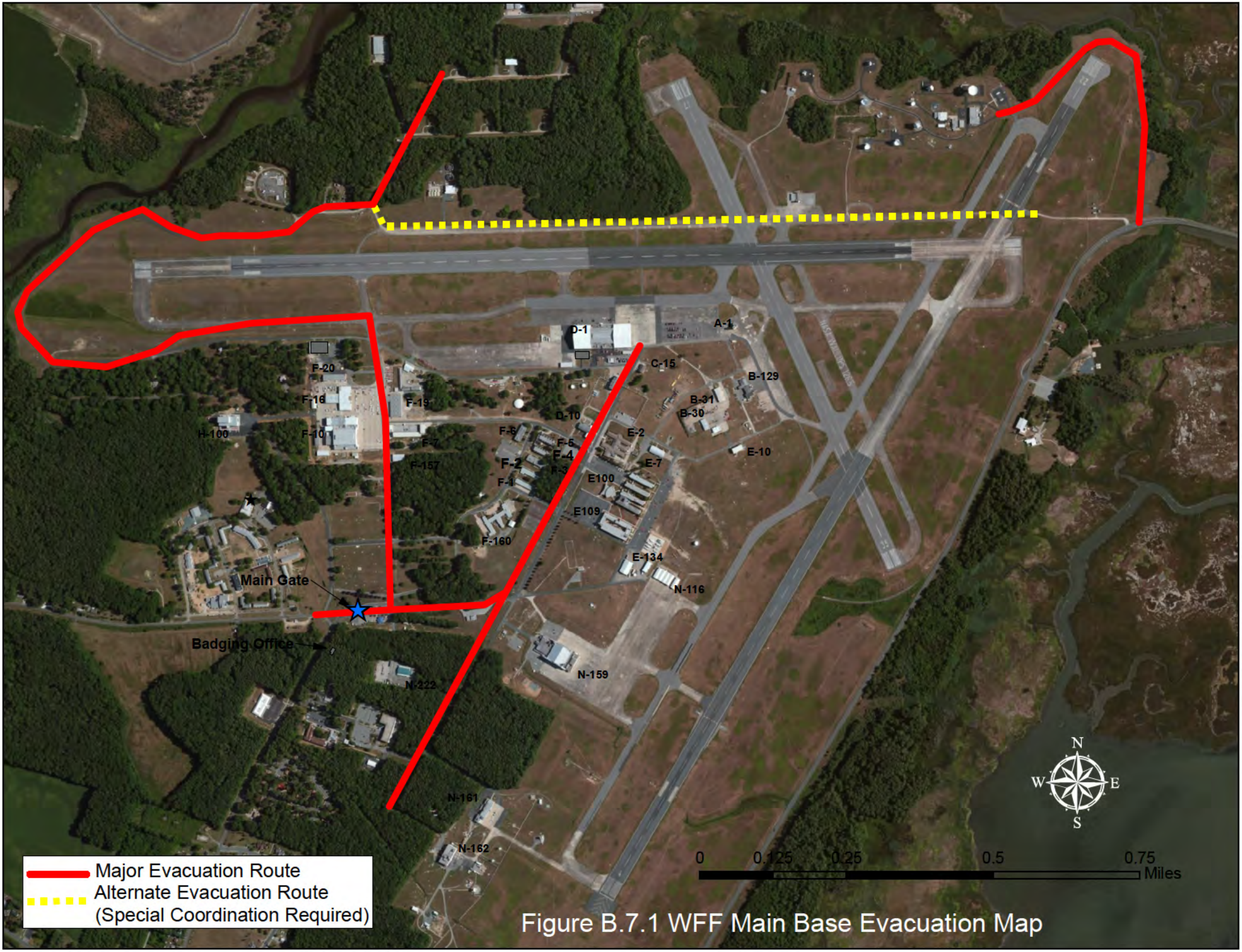


Figure B.7.1 WFF Main Base Evacuation Map

Figure B.7.2 WFF Mainland and Wallops Island Evacuation Map

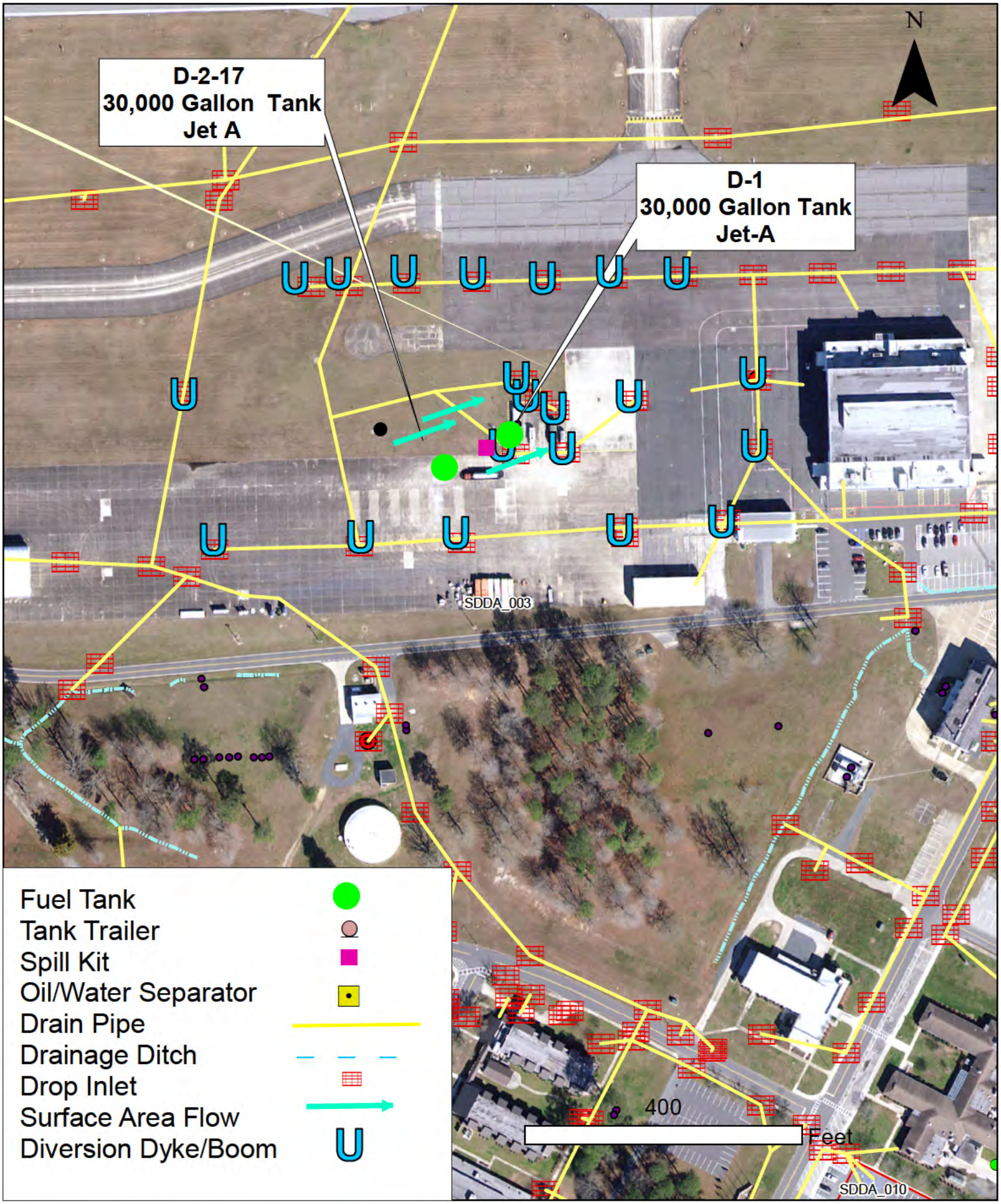


Figure B.8.1 Spill Flow Directions AST D-1, D-2-17 - WFF Main Base

D-04-14

Figure B.8.2 Spill Flow Directions AST D-04-14– WFF Main Base

D-8 Generator Day Tank

Figure B.8.3 Spill Flow Directions AST D-8 Generator Day Tank – WFF Main Base

D-9A, D-9B

Figure B.8.4 Spill Flow Directions AST D-9A, D-9B – WFF Main Base

D-50B

Figure B.8.5 Spill Flow Direction AST D-50B – WFF Main Base

E-2

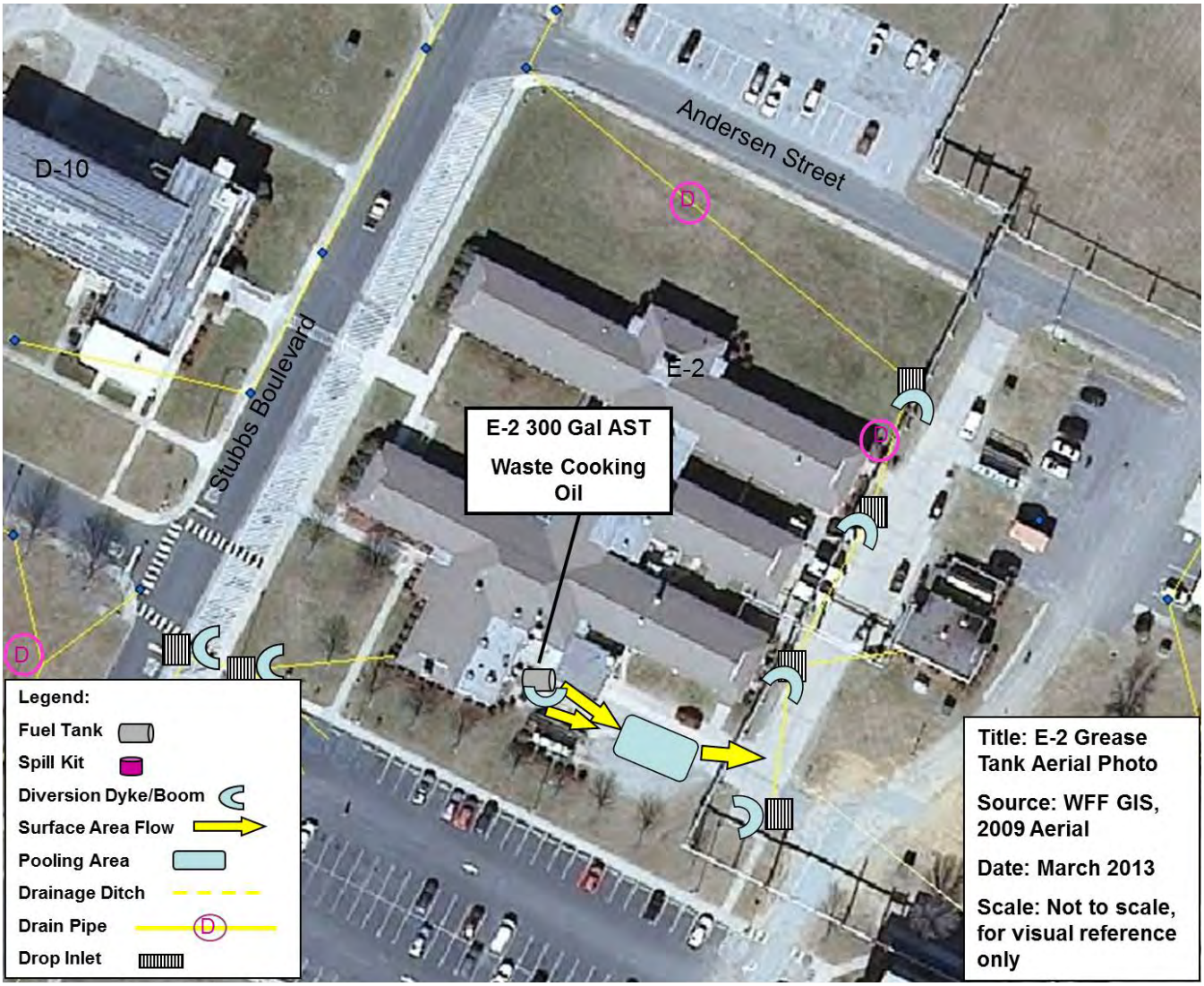


Figure B.8.6 Spill Flow Directions AST E-2 location on WFF Main Base

F-26-1A, and F-26-1B

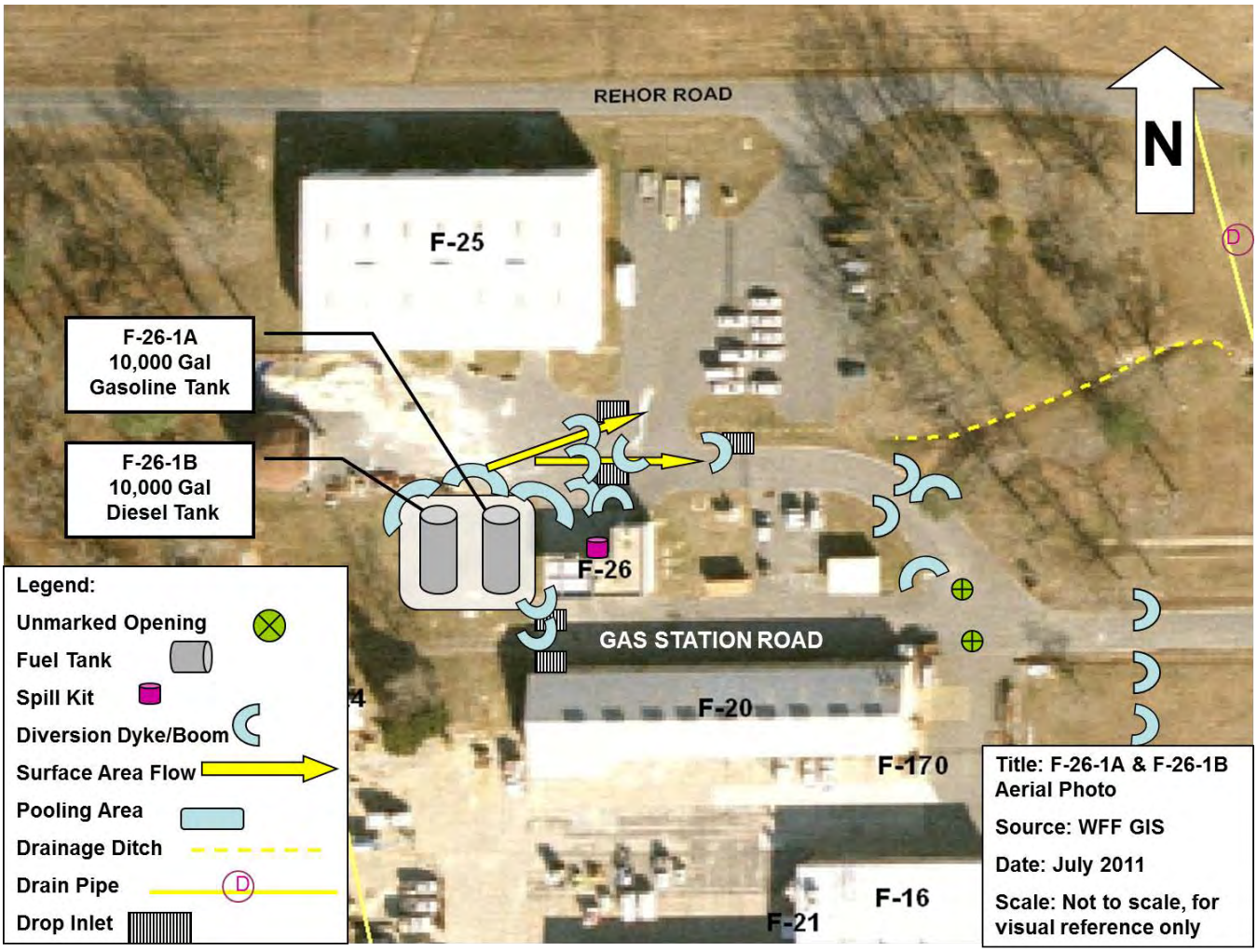


Figure B.8.7 Spill Flow Directions AST F-26-1A, and F-26-1B – Main Base

F-36

Figure B.8.8 Spill Flow Directions F-36 Cooking Oil Container - WFF Main Base

MPS-1, MPS-2, MPS-3, MPS-4

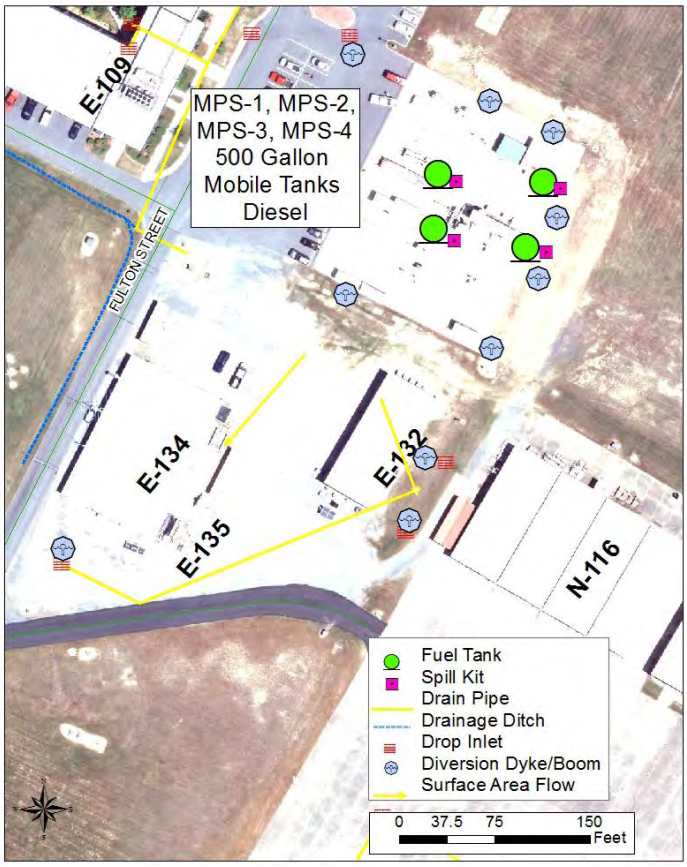


Figure B.8.9 Spill Flow Directions MPS-1, MPS-2, MPS-3, MPS-4,

WFF Main Base

WI-R1-AST-01

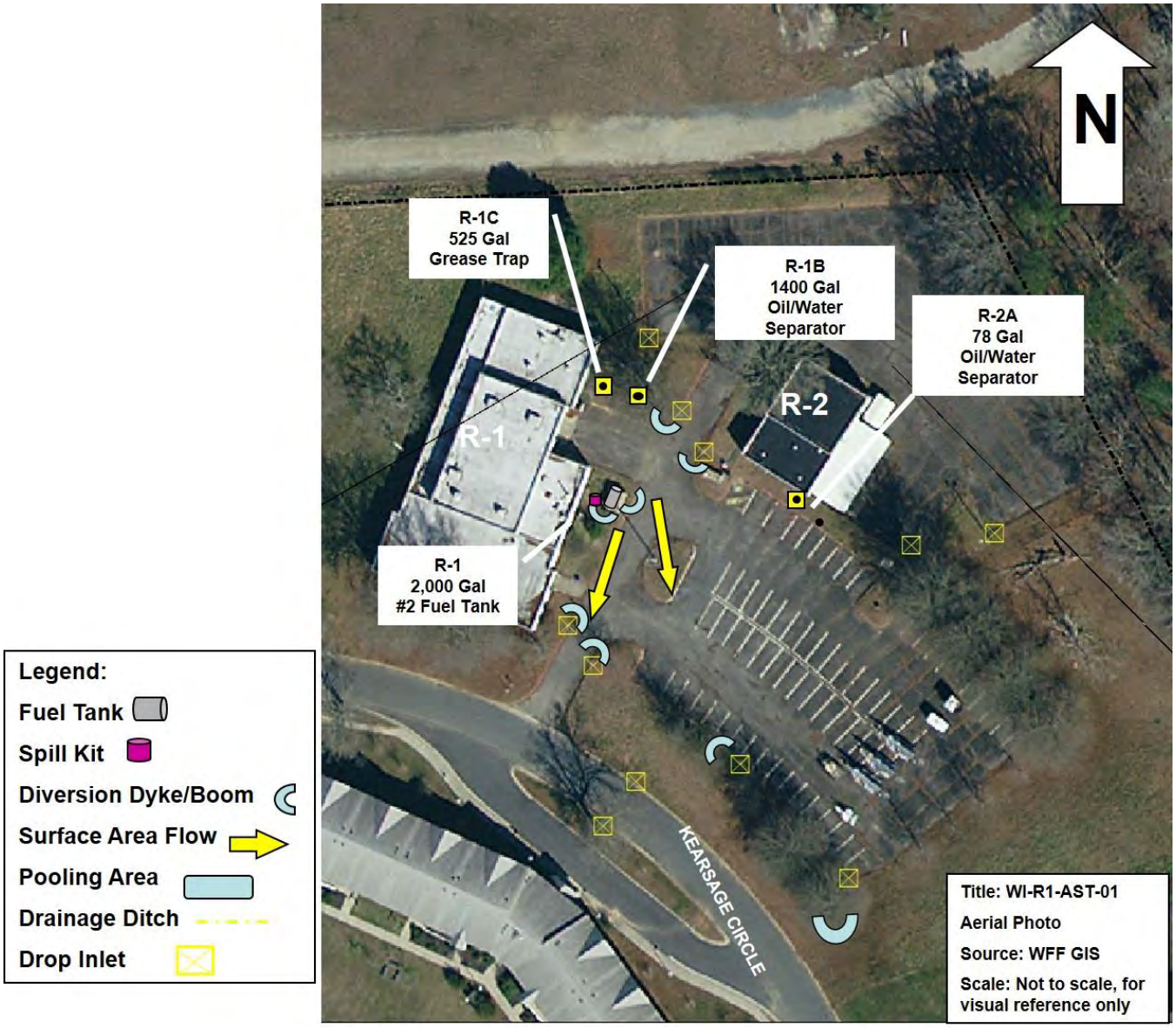


Figure B.8.10 Spill Flow Directions WI-R1-AST-01 WFF Main Base

R-30 Generator

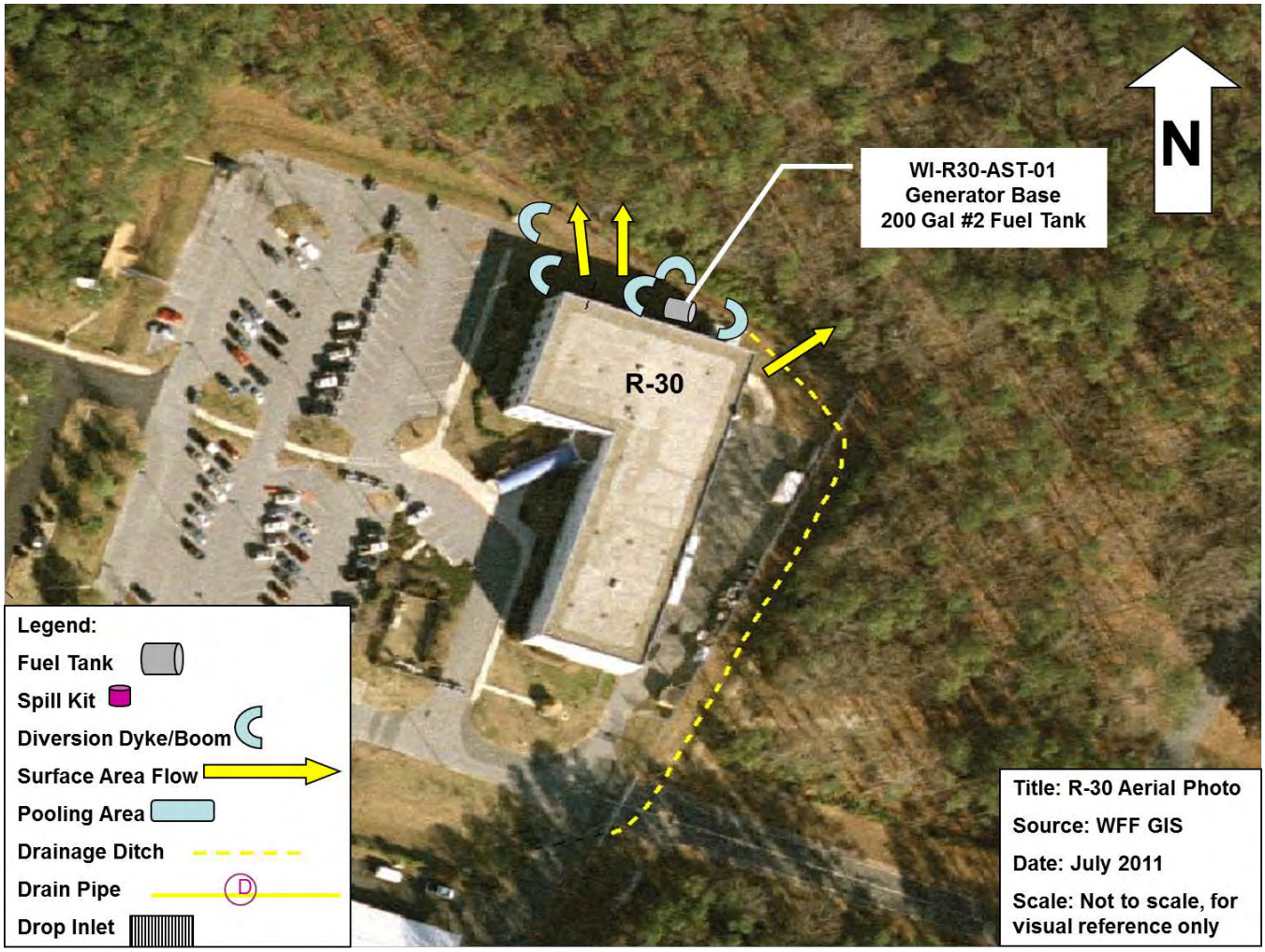


Figure B.8.11 Spill Flow Directions AST R-30 Generator - WFF Main Base

NOAA-3, NOAA-4, NOAA Day Tank, NOAA-BT1, BT-2, BT-3, BT-4, and USTs NOAA-1, NOAA-1

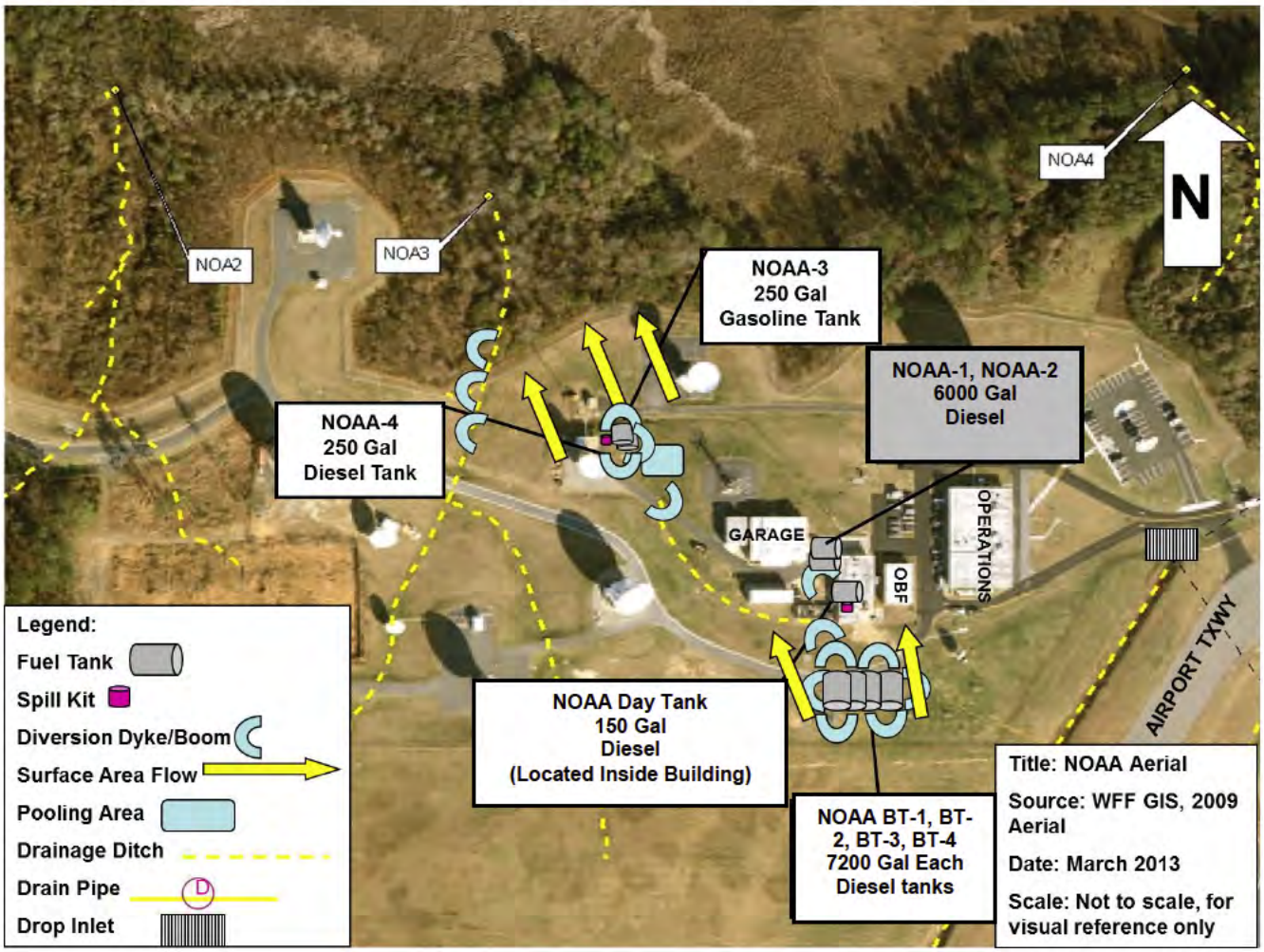


Figure B.8.12 Spill Flow Directions AST NOAA-3, NOAA-4, NOAA Day Tank, NOAA-BT1, BT-2, BT-3, BT-4, NOAA-1, NOAA-1

USCG Housing

Figure B.8.13 Spill Flow Directions AST USCG Housing Generator – USCG Housing location on WFF Main Base

WI-R20-UST-01, WI-R20-UST-02, WI-30-UST-01

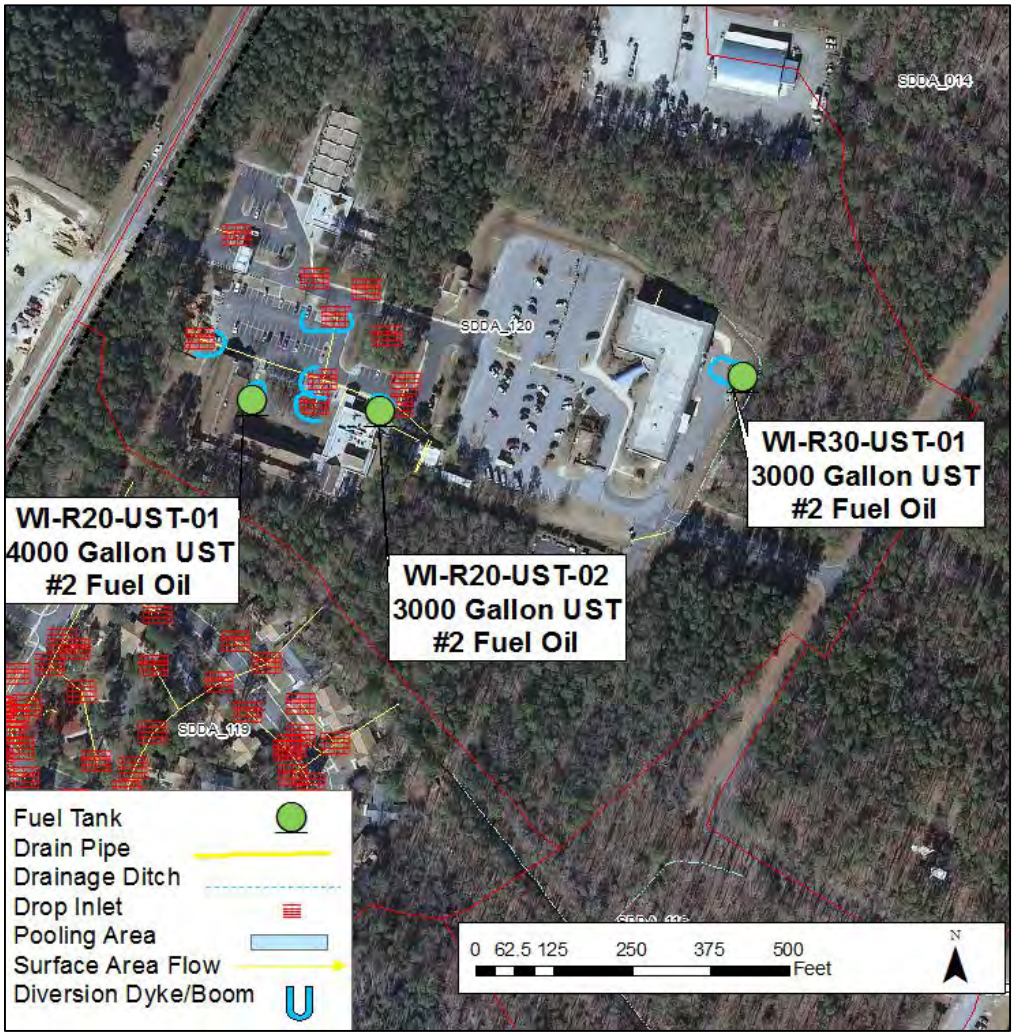


Figure B.8.14 Spill Flow Directions WI-R20-UST-01, WI-R20-UST-02, WI-30-UST-01 – Main Base

U-12A-13, U-12B-13

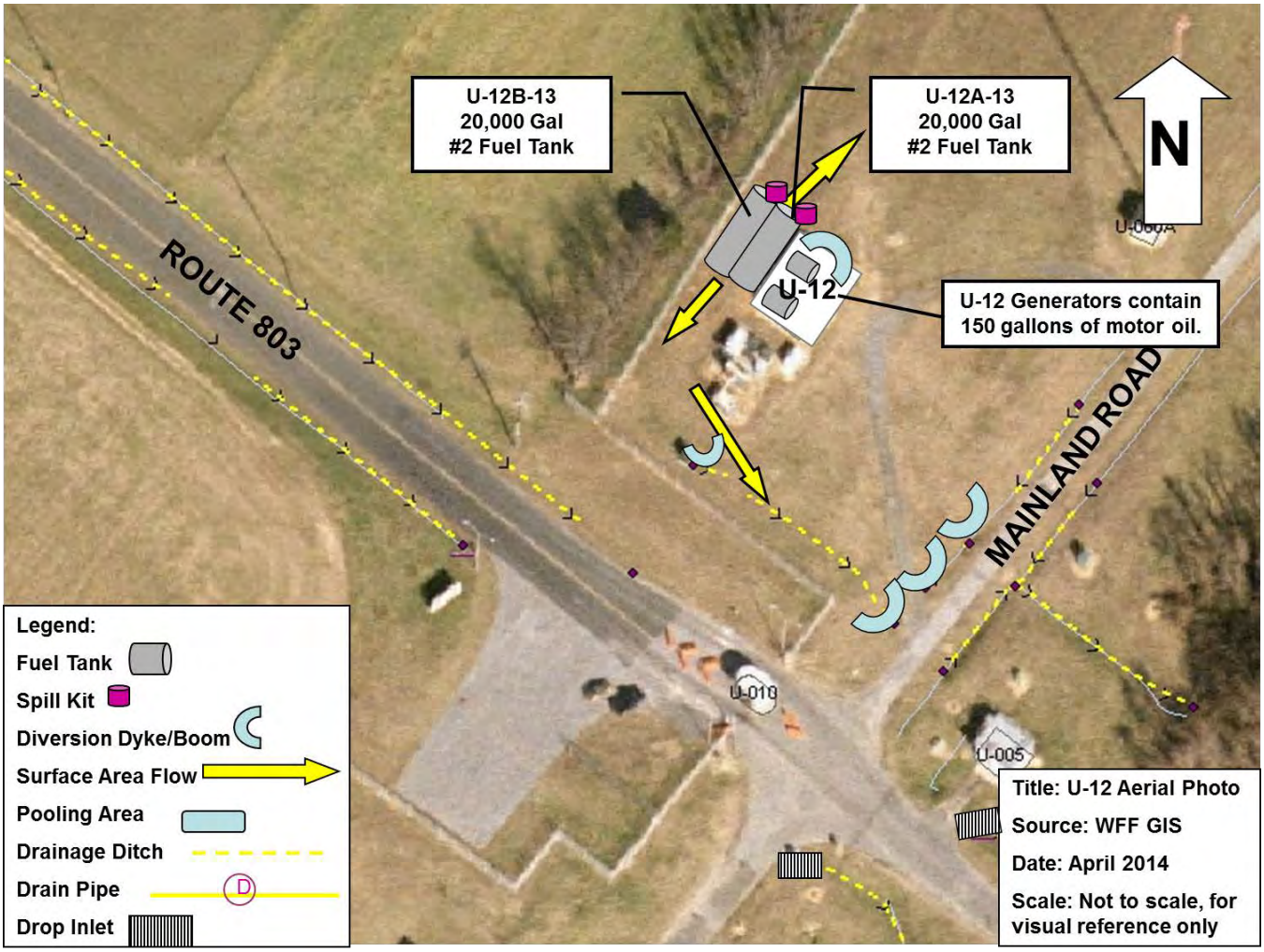


Figure B.8.15 Spill Flow Directions AST U-12A-13, U-12B-13 - WFF Mainland

U-30-15

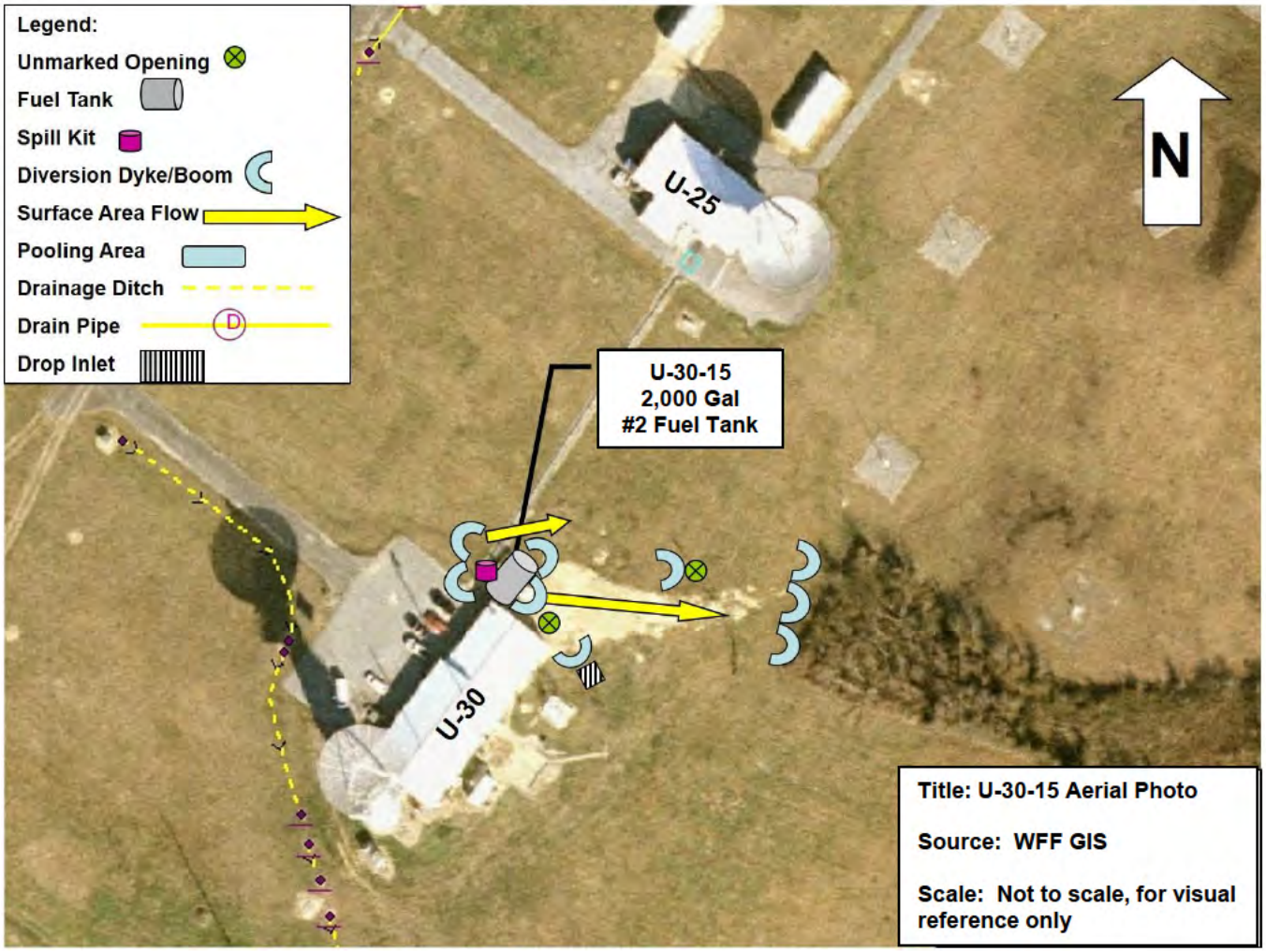


Figure B.8.16 Spill Flow Directions AST U-30-15 - WFF Mainland

U-48-15

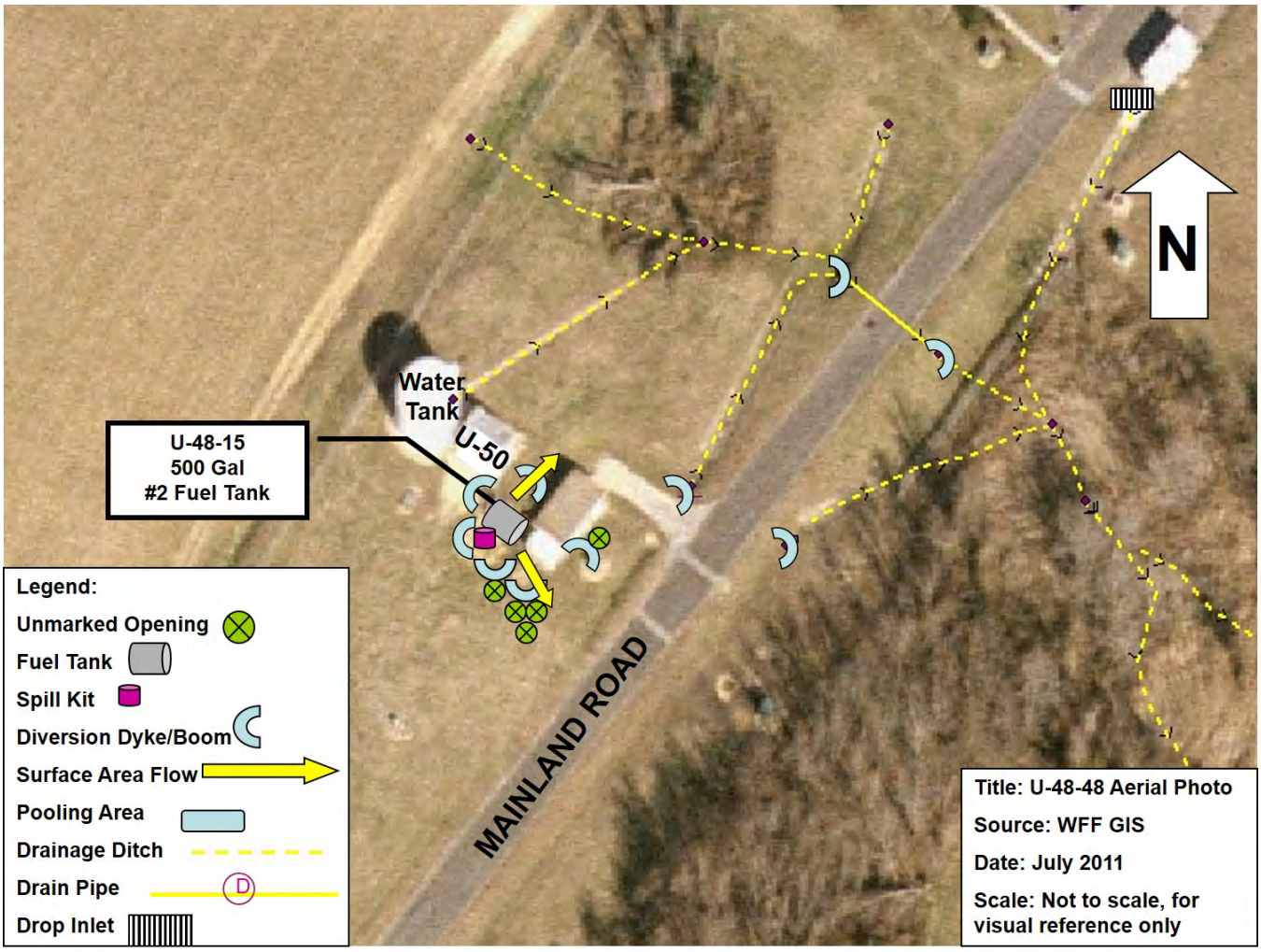


Figure B.8.17 Spill Flow Directions AST U-48 - WFF Mainland

U-65-15

Figure B.8.18 Spill Flow Directions AST U-65-15 - WFF Mainland

V-3

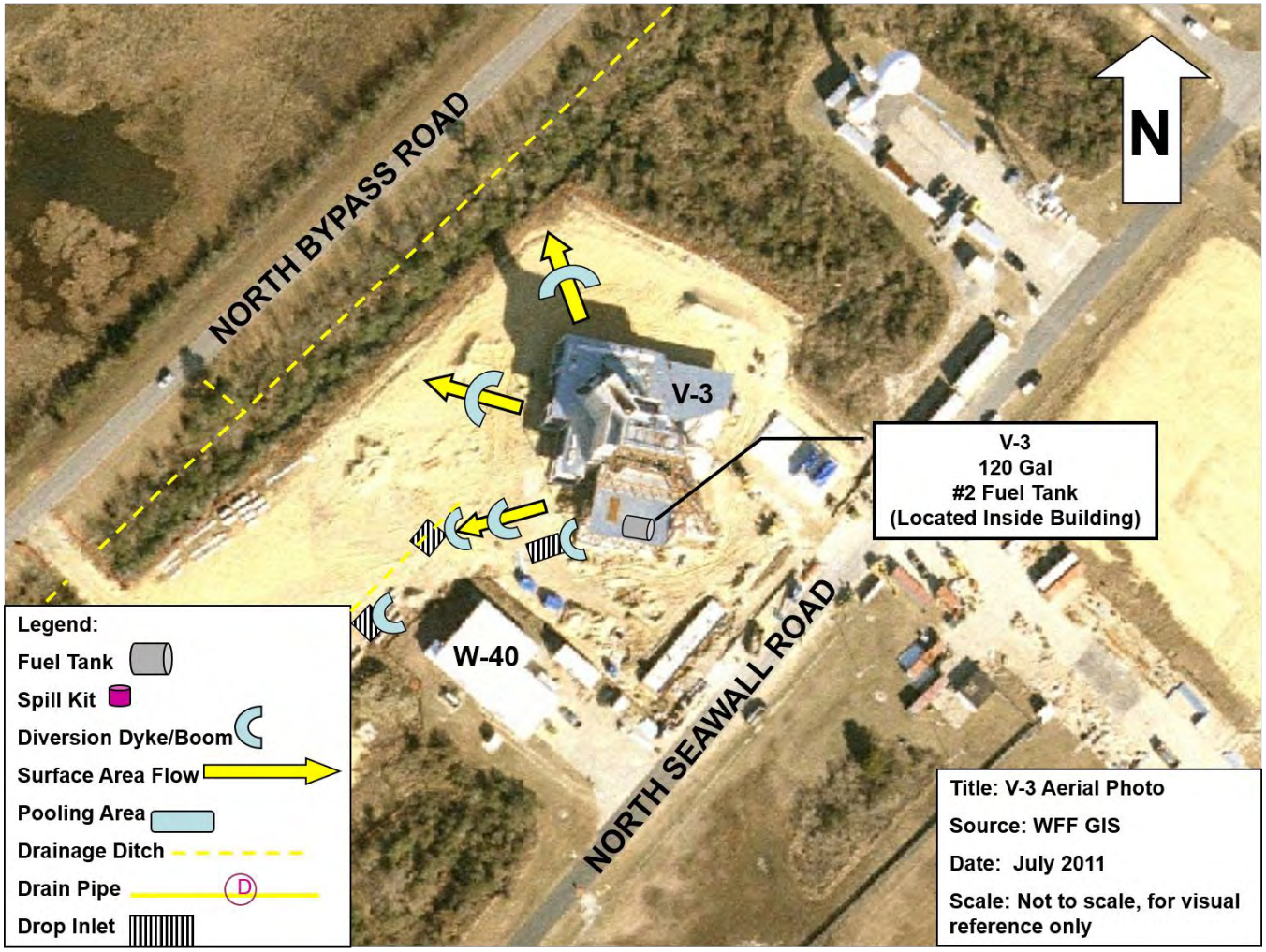


Figure B.8.19 Spill Flow Directions AST V-3 – Wallops Island

WI-V10-AST-01, WI-V18-AST-01, and WI-V21-AST-01

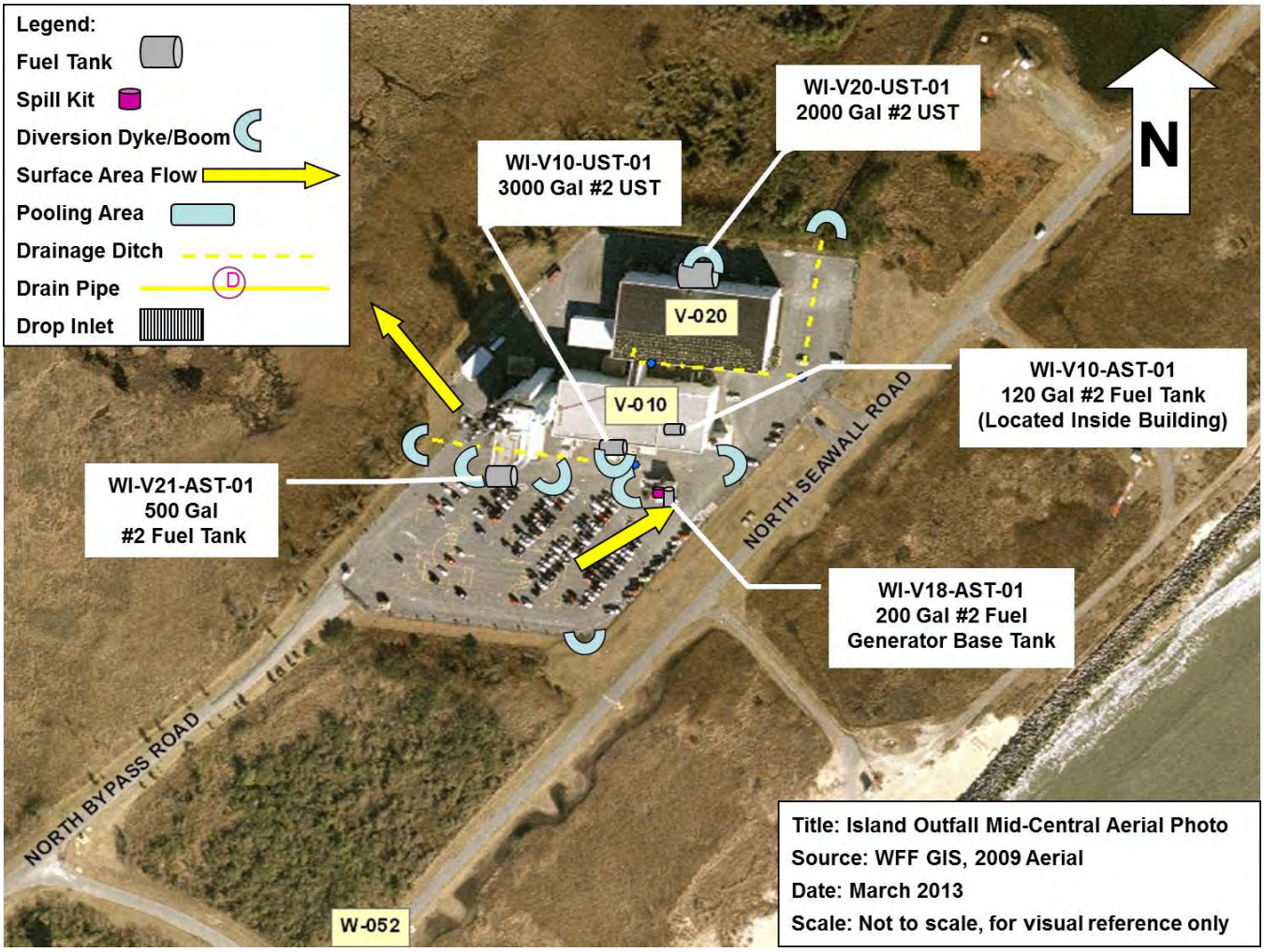


Figure B.8.20 Spill Flow Directions WI-V10-AST-01, WI-V18-AST-01, and WI-V21-AST-01, WI-V10-UST-01, VI-V20-UST-01 – Wallops Island

WI-V24-AST-01 and WI-V24-AST-03

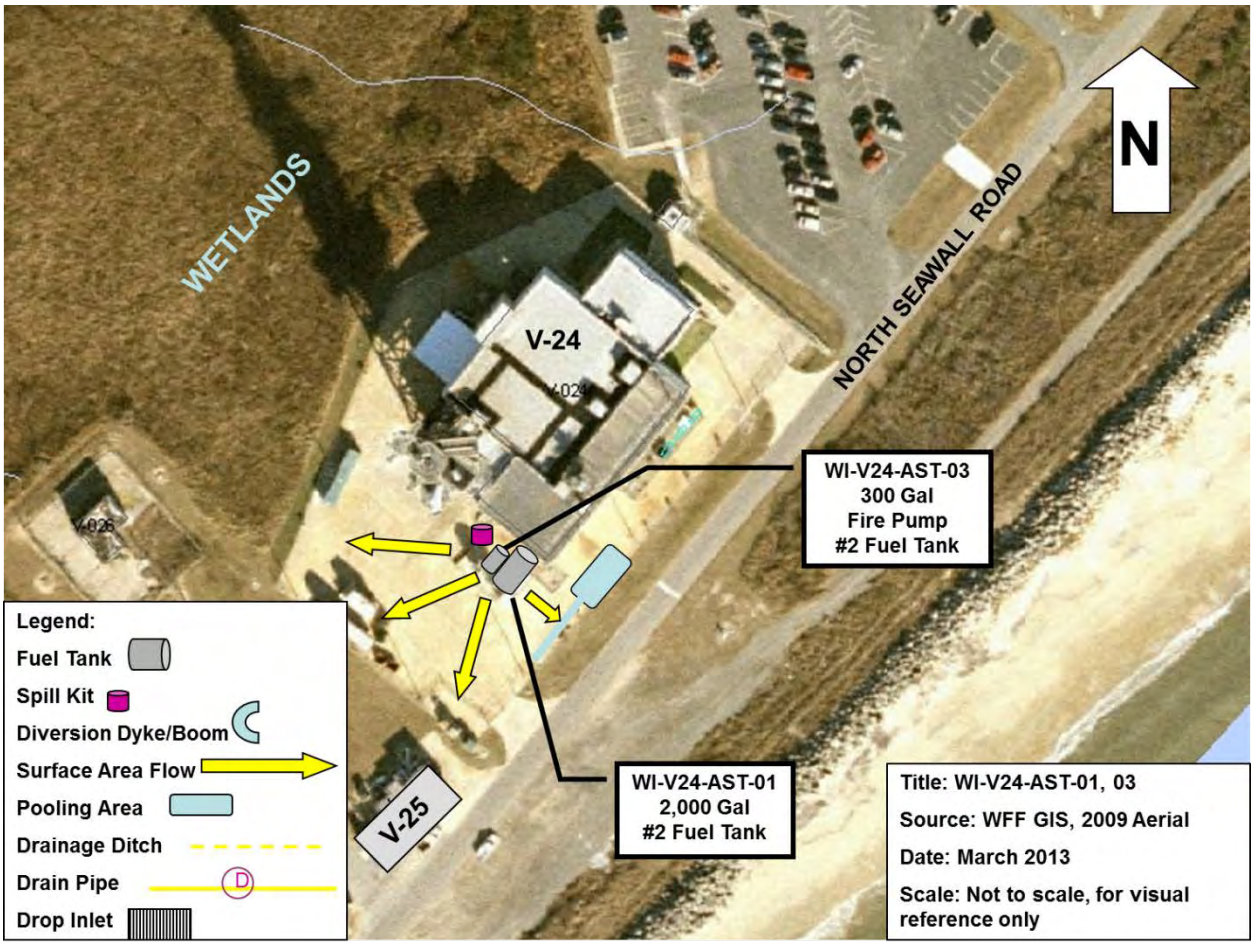


Figure B.8.21 Spill Flow Directions WI-V24-AST-01 and WI-V24-AST-03

WFF Wallops Island

V-62

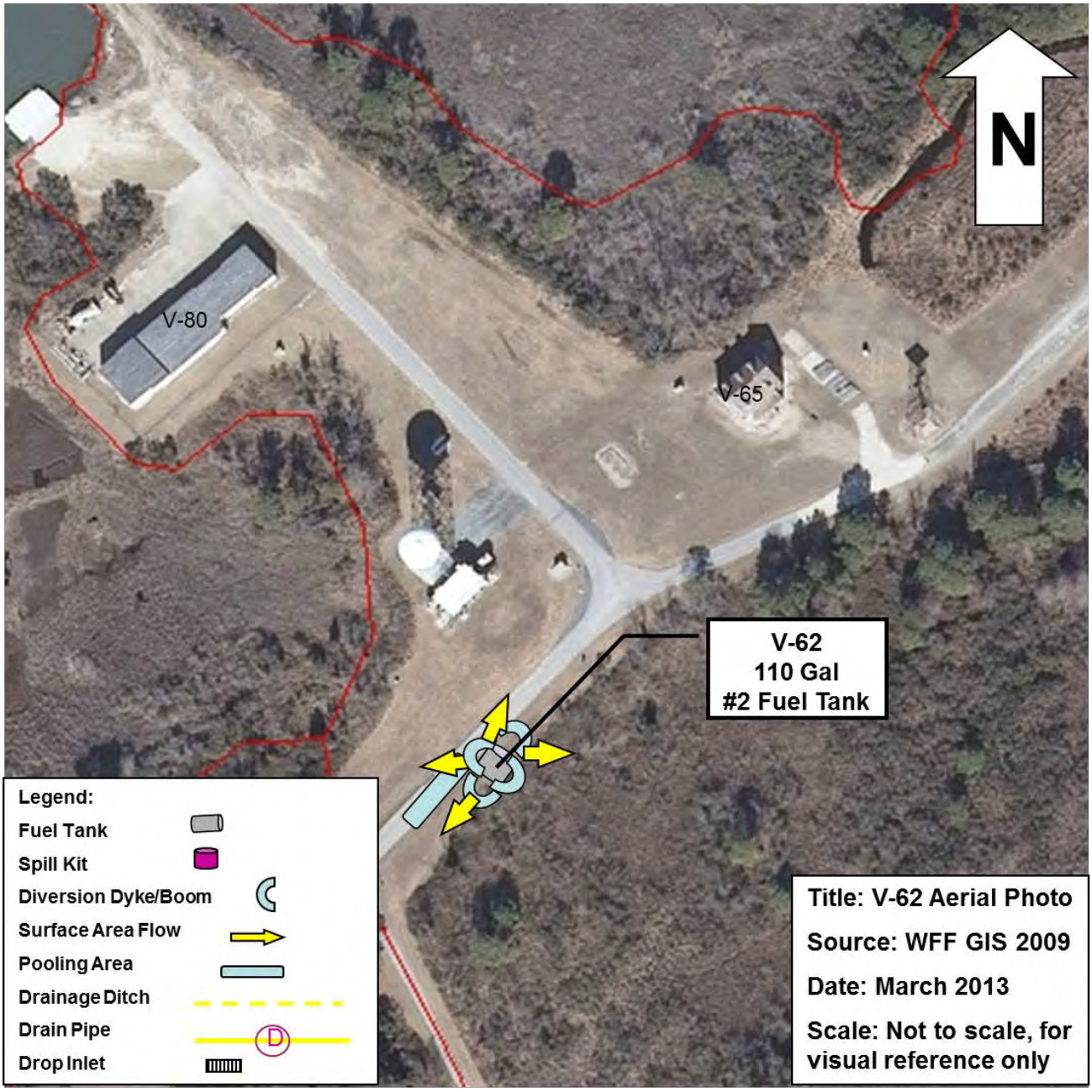


Figure B.8.22 Spill Flow Directions AST V-62 - Wallops Island

W-20A-10

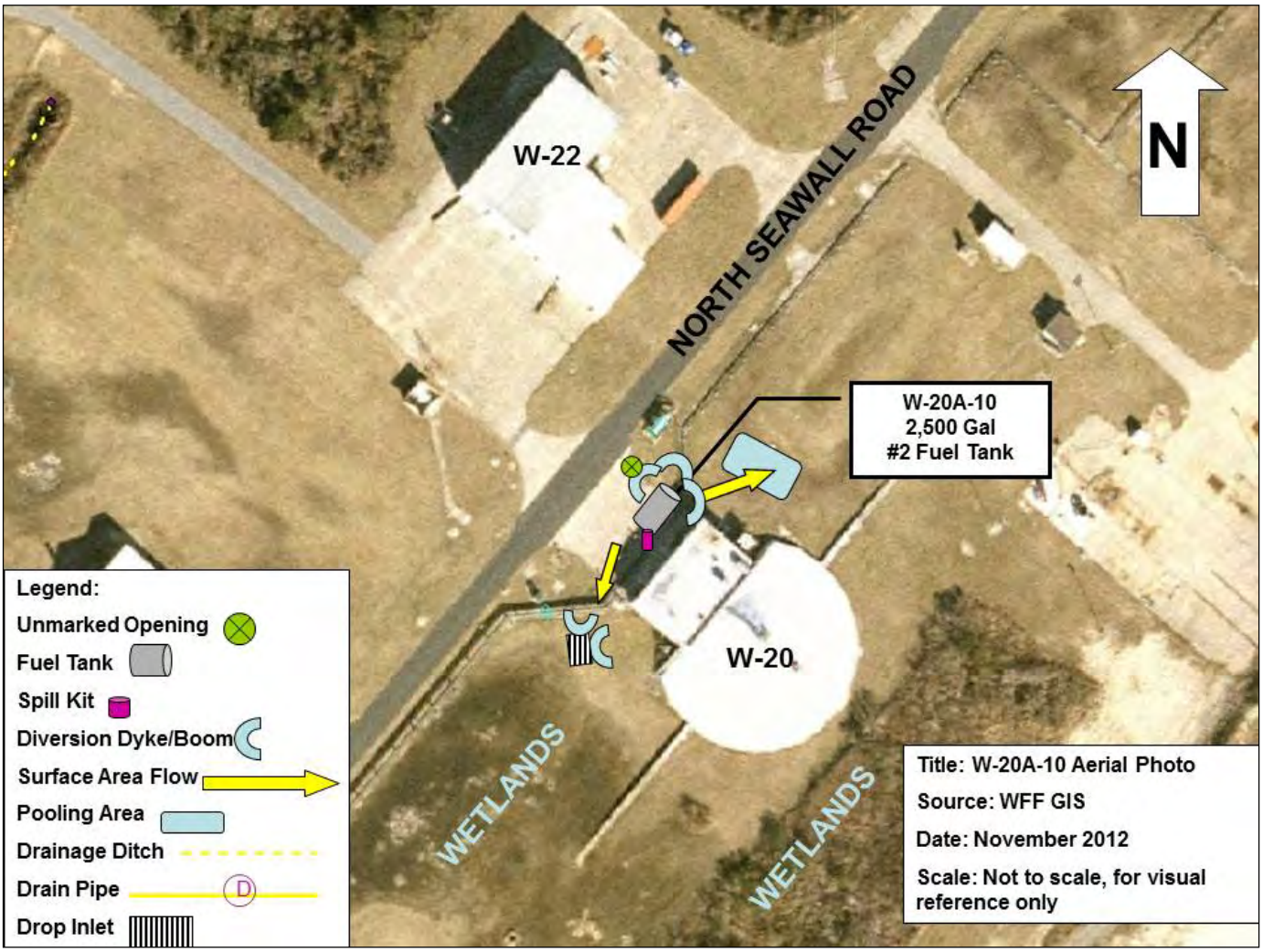


Figure B.8.23 Spill Flow Directions AST W-20A-10 – Wallops Island

X-16

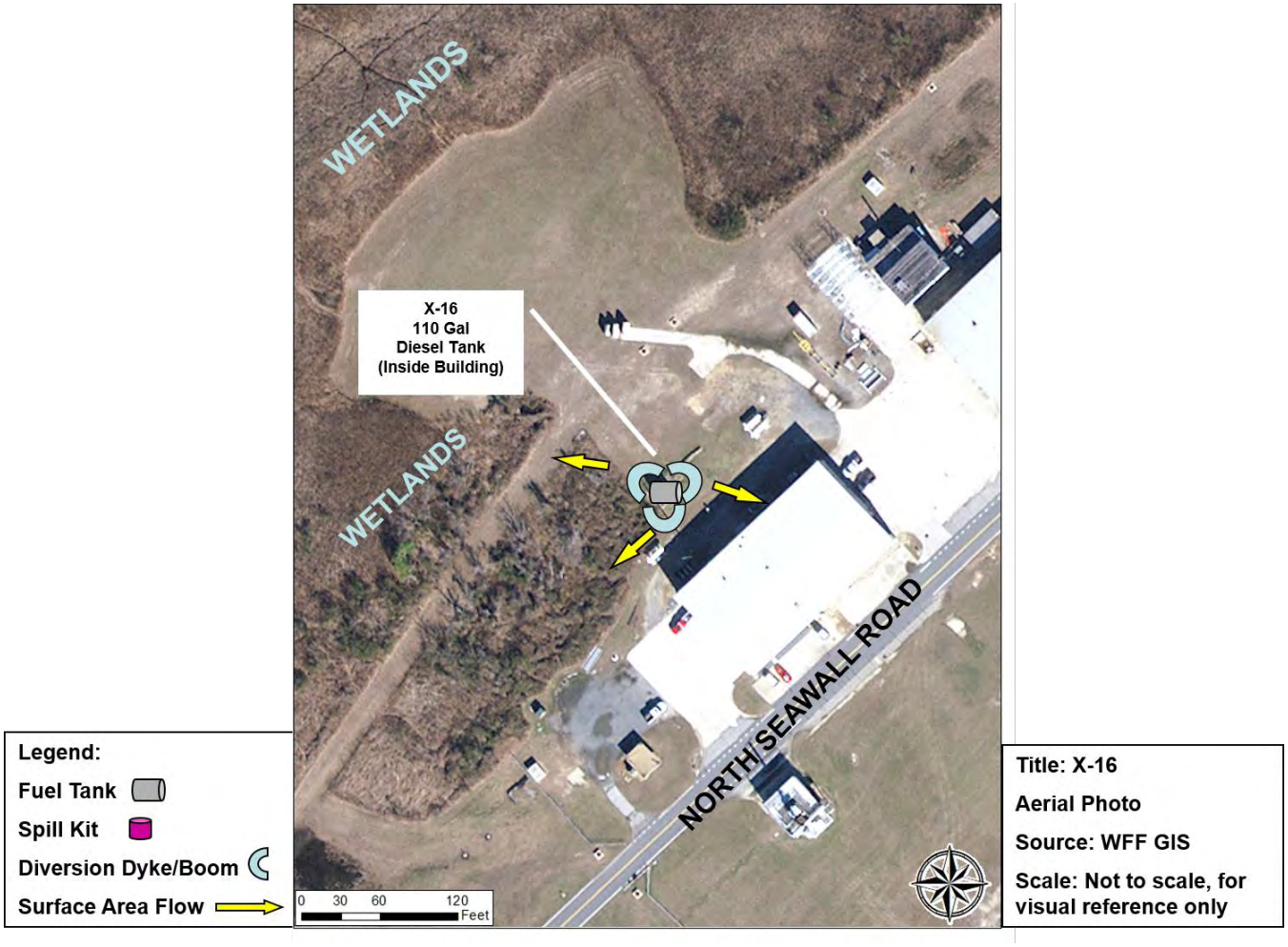


Figure B.8.24 Spill Flow Directions AST X-16 – Wallops Island

Z-62

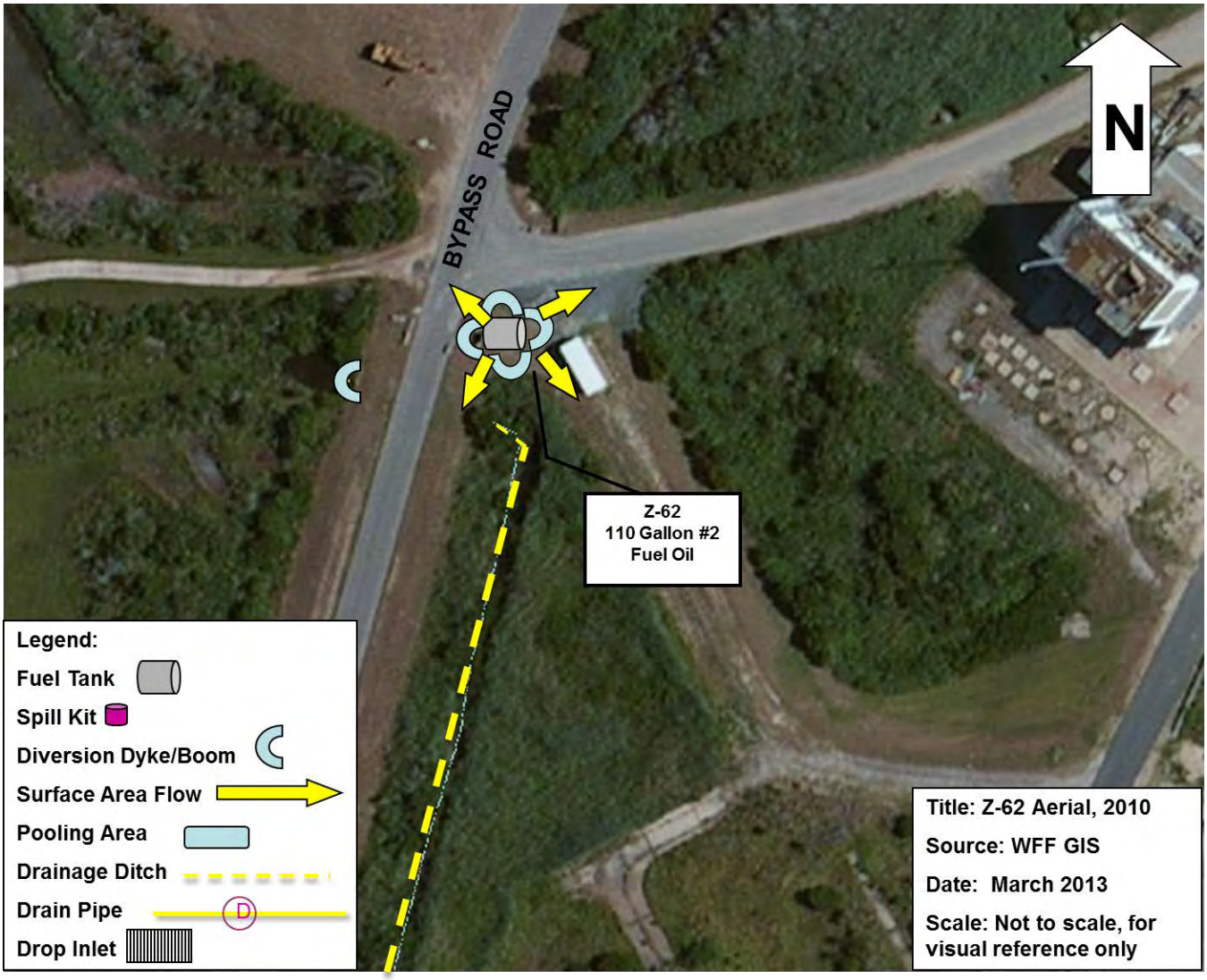


Figure B.8.25 Spill Flow Directions AST Z-62 - Wallops Island

MARS-33 and MARS Hydraulic Reservoir within Erector

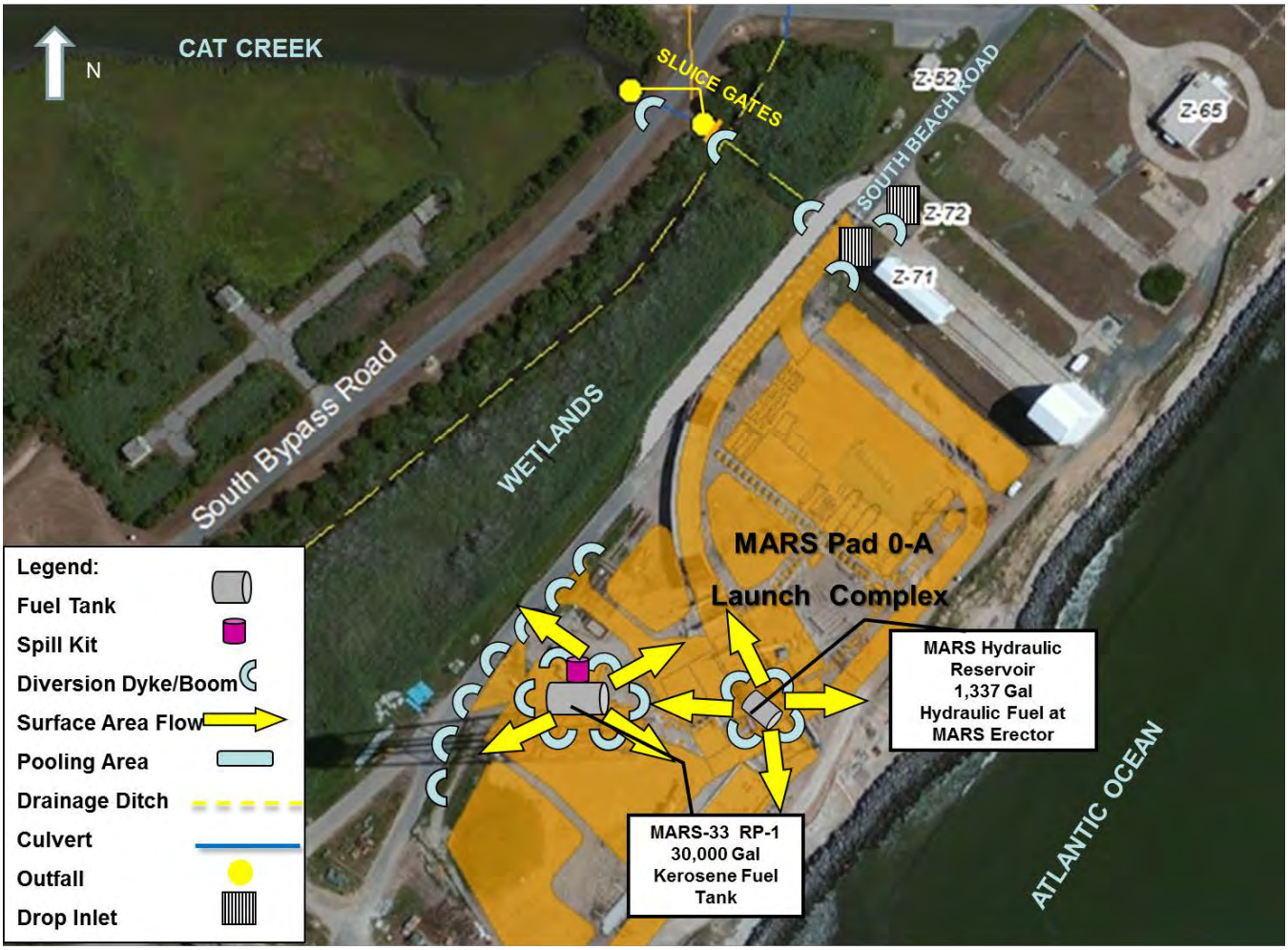


Figure B.8.26 Spill Flow Directions AST MARS-33 and MARS Hydraulic Reservoir- Wallops Island

APPENDIX C

UNDERGROUND STORAGE TANKS AND OIL STORAGE SUMMARIES

APPENDIX C

UNDERGROUND STORAGE TANKS AND OIL STORAGE SUMMARIES

TABLE C-1 NASA - WALLOPS FLIGHT FACILITY UNDERGROUND STORAGE TANKS				
Tank Identification #	**Contents**	**Capacity (gallons)**	**Status**	**Year Installed**
No USTS	0	0	N/A	N/A

TABLE C-2 NAVY - WALLOPS FLIGHT FACILITY UNDERGROUND STORAGE TANKS				
Tank Identification #	**Contents**	**Capacity (gallons)**	**Status**	**Year Installed**
WI-R30-UST-01	#2 Fuel Oil	3,000	Active	1993
WI-R20-UST-02	#2 Fuel Oil	3,000	Active	1987
WI-R20-UST-01	#2 Fuel Oil	4,000	Active	1987
WI-V10-UST-01	#2 Fuel Oil	3,000	Active	1995
WI-V20-UST-01	#2 Fuel Oil	2,000	Active	1989
	TOTAL GALLONS	**15,000**		

TABLE C-3 NOAA - WALLOPS FLIGHT FACILITY UNDERGROUND STORAGE TANKS				
Tank Identification #	**Contents**	**Capacity (gallons)**	**Status**	**Year Installed**
NOAA-1	#2 Fuel Oil	6,000	Active	1997
NOAA-2	#2 Fuel Oil	6,000	Active	1997
	TOTAL GALLONS	**12,000**		

Total Underground Oil Storage Capacity: 27,000 Gallons

TABLE C-4 UST OIL/WATER SEPARATORS				
Tank Identification #	**Contents**	**Capacity (gallons)[1]**	**Status**	**Year Installed**
D-1	Water/Oil	6,000/4,000	Active	1991
V-27	Water/Oil	350/216	Active	2017
Navy UST Off-Site Oil/Water Separators are listed in Table C-9				

[1] Refers to the capacities of water to oil; i.e., D-1 holds 6,000 gallons of water and 4,000 gallons of oil.

A listing of typical portable containers on-site is shown in Table C-5.

TABLE C-5 OPERATIONAL AREAS MAINTAINING OIL STORAGE CONTAINERS 55 GALLONS OR GREATER (All containers are drums unless otherwise noted)				
Location	**Contents**	**Capacity (gallons)**	**Approx. # of Containers**	**Status**
ASR-8	Motor Oil	55	1	Active
B-29	Used Oil	55	2	Active
B-30	Motor Oil	55	1	Active
B-31	Used Oil Hydraulic Oil Mineral Spirits	55	1 1 1	Active
D-1	Used Oil HW Jet-A	55	1 1	Active
D-50	Used Oil	55	1	Active
F-10	Hydraulic Oil Motor Oil	55	1 5	Active
F-29 Shed	Motor Oil Used Oil	55	3 1	Active
F-14	Motor Oil	55	1	Active
F-16	Motor Oil HW Laquer Thinner Used Oil	55	6 1 2	Active
F-17	Motor Oil	55	5	Active
N-159	HW Jet A	55	10	Active
N-165	Motor Oil Used Oil	55	1 3	Active
N-223	Used Oil	55	30	Active
U-25	Hydraulic Oil	55	8	Active
X-79	Used Oil	55	1	Active
MARS Pad 0-A	Hydraulic Oil RP-1	55	4 8	Active
Navy V-10	Used Oil	55	1	Active
NOAA Utility Building	Motor Oil	55	2	Active
NOAA Facilities Maintenance Building	Hydraulic Oil Used Oil	55	5 1	Active
D-8 Generator	Motor Oil in engine	150	1	Active
U-12-A Generator	Motor Oil in engine	150	1	Active
U-12-B Generator	Motor Oil in engine	150	1	Active

HW = Hazardous Waste

The Qualified oil-filled transformers at WFF include the following:

TABLE C-6 WALLOPS FLIGHT FACILITY QUALIFIED OIL-FILLED TRANSFORMERS		
Transformer #	**Owner**	**Capacity (gallons)**
3525494812	NOAA	821*
3489914712 (spare)	NOAA	821*
TR-CG-5	A&N Electric	160
T-CG-11	A&N Electric	160
T-CG-12	A&N Electric	160
T-CG-13	A&N Electric	160
T-CG-14	A&N Electric	160
T-CG-21	A&N Electric	160
T-CG-22	A&N Electric	160
T-CG-23	A&N Electric	160
T-CG-24	A&N Electric	160
T-10	NAVY	75
T-11	NAVY	75
T-12	NAVY	75
T-13	NAVY	88
T-14	NAVY	88
T-15	NAVY	88
T-16	NAVY	88
TR-A001-1	NASA	170
TR-A-2	NASA	150
TR-A-2-1 GSNS RADAR	NASA	170
TR-A-3-2	NASA	415
TR-A-41	NASA	180
TR-A-132	NASA	160
TR-B29-1	NASA	240
TR-B-30-1	NASA	180
TR-B129-1	NASA	211
TR-C94-1	NASA	130
TR-D001-1	NASA	162
TR-D001-2	NASA	168
TR-D004-1	NASA	195
TR-D008-1	NASA	184
TR-D008-4	NASA	139

TABLE C-6 WALLOPS FLIGHT FACILITY QUALIFIED OIL-FILLED TRANSFORMERS		
Transformer #	**Owner**	**Capacity (gallons)**
TR-D-10-1	NASA	175
TR-D-12-1	NASA	160
TR-D-49 & D-2	NASA	175
TR-D-50	NASA	240
TR-E-AREA CHILLER	NASA	198
TR-E-6-1	NASA	240
TR-E-7-1	NASA	175
TR-E-10-1	NASA	180
TR-E-100	NASA	136
TR-E-109	NASA	250
TR-E-110	NASA	281*
TR-E-134-1	NASA	175
TR-E-144-1	NASA	180
TR-F-1-1	NASA	290
TR-F-2	NASA	162
TR-F-3-1	NASA	195
TR-F-4 & F-5	NASA	184
TR-F-6-1	NASA	210
TR-F-7-1	NASA	137
TR-F-7-2	NASA	258
TR-F-10-3	NASA	415
TR-F-10-4	NASA	191
TR-F-10-B	NASA	150
TR-F-10-A	NASA	162
TR-F-11-1	NASA	146
TR-F-16-1	NASA	150
TR-F-16-2	NASA	137
TR-F-19-1	NASA	123
TR-F-20-1/F-26	NASA	180
TR-F-23-1	NASA	123
TR-F-160	NASA	147
TR-H-23-1	NASA	130
TR-HELO PAD	NASA	146
TR-HOT PAD	NASA	190

TABLE C-6 WALLOPS FLIGHT FACILITY QUALIFIED OIL-FILLED TRANSFORMERS		
Transformer #	**Owner**	**Capacity (gallons)**
TR-MOBILE RANGE TEST PAD	NASA	212
TR-M-1	NASA	146
TR-M1-BACK-1 (SPARE)	NASA	165
TR-M1-BACK-2 (SPARE)	NASA	150
TR-M1-BACK-3 (SPARE)	NASA	170
TR-M1-BACK-4 (SPARE)	NASA	380
TR-M1-BACK-5 (SPARE)	NASA	170
TR-M1-BACK-6 (SPARE)	NASA	160
TR-M1-BACK-7 (SPARE)	NASA	240
TR-M1-BACK-8 (SPARE)	NASA	160
TR-M1-BACK-9 (SPARE)	NASA	155
TR-M1-SHED-1 (SPARE)	NASA	240
TR-M1-SHED-2 (SPARE)	NASA	160
TR-M1-SHED-3 (SPARE)	NASA	130
TR-M1-SHED-4 (SPARE)	NASA	180
TR-M-009	NASA	55
TR-M-010	NASA	55
TR-M-011	NASA	55
TR-M-012	NASA	55
TR-M-014	NASA	55
TR-M-015/M-017	NASA	123
TR-M-016	NASA	141
TR-M-020-2	NASA	217
TR-M-020-3	NASA	125
TR-M-022	NASA	187
TR-MLS PAD-3	NASA	150
TR-MLS PAD-5	NASA	155
TR-N-116-1	NASA	180
TR-N-117	NASA	111
TR-N-127	NASA	94
TR-N-133	NASA	146
TR-N-157	NASA	130
TR-N-159-C	NASA	448
TR-N-159-D	NASA	342

TABLE C-6 WALLOPS FLIGHT FACILITY QUALIFIED OIL-FILLED TRANSFORMERS		
Transformer #	**Owner**	**Capacity (gallons)**
TR-N-159-POWER STAND	NASA	199
TR-N-161-C	NASA	308
TR-N-162-A	NASA	320
TR-N-162-B	NASA	320
TR-N-162-C	NASA	320
TR-N-162-D	NASA	290
TR-N-163-A	NASA	130
TR-N-165-1	NASA	136
TR-N-167-A	NASA	320
TR-N-167-B	NASA	417
TR-N-174-A&B	NASA	101
TR-N-176	NASA	290
TR-N-179	NASA	143
TR-N-181-1	NASA	128
TR-N-181-2	NASA	120
TR-N-181-3	NASA	130
TR-N-181-4	NASA	127
TR-WEB1	NASA	252
TR-WEB2	NASA	252
TR-N-222-1	NASA	160
TR-SEAWALL	NASA	55
TR-UAV-1	NASA	143
TR-U-5	NASA	146
TR-U-12	NASA	157
TR-U-20	NASA	152
TR-U-25	NASA	280
TR-U-30-1	NASA	362
TR-U-30-2	NASA	200
TR-U-40	NASA	220
TR-U-48	NASA	200
TR-U-50	NASA	159*
TR-U-55	NASA	199
TR-U-70-1	NASA	280
TR-U-70-2	NASA	280

TABLE C-6 WALLOPS FLIGHT FACILITY QUALIFIED OIL-FILLED TRANSFORMERS		
Transformer #	**Owner**	**Capacity (gallons)**
TR-U-70-C	NASA	185
TR-U-70-D	NASA	185
TR-U-80	NASA	141
TR-U-90	NASA	158*
TR-V-003 440 VOLT	NAVY	596
TR-V-003 448 VOLT	NAVY	641
TR-V-21-1	NAVY	619
TR-V-21-2	NAVY	352
TR-V-21-1	NAVY	619
TR-V-21-2	NAVY	352
TR-V-24-1	NAVY	226
TR-V-24-2	NAVY	226
TR-V-25	NASA	194
TR-V-27	NASA	206*
TR-V-50	NASA	181
TR-V-65	NASA	246
TR-V-66	NASA	158*
TR-V-67	NASA	92
TR-V-80	NASA	146
TR-V-100	NASA	150
TR-W-10	NASA	159*
TR-W-32	NASA	65
TR-W-40	NASA	181*
TR-W-56	NASA	102
TR-W-65-1	NASA	195
TR-W-65-2	NASA	95
TR-MET TOWER	NASA	86
TR-W-70	NASA	95
TR-W-83	NASA	160
TR-WELL-4-1	NASA	180
TR-X-33A	NASA	246
TR-X-57	NASA	86
STA-X-72	NASA	239
TR-X-75	NASA	87

TABLE C-6 WALLOPS FLIGHT FACILITY QUALIFIED OIL-FILLED TRANSFORMERS		
Transformer #	**Owner**	**Capacity (gallons)**
TR-X-85	NASA	158*
TR-X-89A	NASA	159
TR-X-100	NASA	203
TR-Y-39	NASA	119
TR-Y-50	NASA	124*
TR-Y-55	NASA	192
TR-Y-60	NASA	138
TR-Y-62A	NASA	88
TR-Y-75A-1	NASA	127
TR-Y-75A-2	NASA	119
TR-Y-80A-1	NASA	128
TR-Y-80A-2	NASA	124
TR-Z-3	NASA	55
TR-Z-4	NASA	170
TR-Z-25	NASA	155
TR-Z-38	NASA	130
TR-Z-40	NASA	140
TR-Z41A	NASA	82*
TR-Z-52	NASA	192
TR-Z-53	NASA	165
TR-Z-60	NASA	192
TR-Z-100	NASA	280
TR-Z-101	NASA	225
TR-Z-101 FlexDAR	NASA	250
TR-R-10	NAVY	100
TR-R-20	NAVY	155
TR-R-30	NAVY	326
TR-R-40	NAVY	137
TR-North UAV	MARS	287
MARS Payload Building	MARS	Construction
Circuit 3	NASA	478

*Contains vegetable oil. Note: List does not include air-cooled or transformers containing less than 55 gallons of oil.

TRANSFORMERS TOTAL GALLONS 38,689

TABLE C-7 MOBILE OIL STORAGE SYSTEMS					
Tag Number	**Contents**	**Capacity (gallons)**	**Purpose**	**Details**	**Location**
NA-000573	Unleaded Gasoline, Diesel Fuel	750, 750	Vehicle Fueling		Mobile, Stored near F-20
NA-000791	Jet-A Fuel	6,000	Aircraft Fueling		Mobile, Stored at D-1
NA-000364	Jet-A Fuel	6,000	Aircraft Fueling		Mobile, Stored at D-1
No tag number	Jet-A Fuel	6,000	Aircraft Fueling		Mobile, Stored at D-1
No tag number	Diesel	240	Equipment Fueling		Mobile, Stored at F-20
NA-00858T	#2 Fuel Oil	500	Mobile Generator	450Kw Himoinsa-	Mobile, In use at H-100
NA-00660T/10	#2 Fuel Oil	400	Mobile Generator		Mobile, In use at F-11/U-12
Generator-3	#2 Fuel Oil	500	Mobile Generator		Mobile, Stored at F-11
NA-00684T	#2 Fuel Oil	1250	Mobile Generator		Mobile, In use at N-132
NA-00246T/4	#2 Fuel Oil	198	Mobile Generator	150Kw Himoinsa-	Mobile, Stored at F-11
NA-00211T/1	#2 Fuel Oil	65	Mobile Generator	50Kw Spectrum-	Mobile, Stored at F-11
NA-00212T/2	#2 Fuel Oil	65	Mobile Generator	50Kw Spectrum-	Mobile, Stored at F-11
NA-00199T/7	#2 Fuel Oil	167	Mobile Generator	60Kw Caterpillar-	Mobile, Stored at F-11
NA-00616T/5	#2 Fuel Oil	157	Mobile Generator	150Kw Caterpillar-	Mobile, Stored at F-11
NA-00611T/8	#2 Fuel Oil	167	Mobile Generator	100Kw Caterpillar-	Mobile, Stored at D-50
NA-00612T/9	#2 Fuel Oil	167	Mobile Generator	100Kw Caterpillar-	Mobile, Stored at F-11
NA-00613T/6	#2 Fuel Oil	157	Mobile Generator	100Kw Caterpillar-	Mobile, Stored at F-11
A-7806 NAVY	#2 Fuel Oil	100	Mobile Generator	105Kw Kohler	Mobile, Stored at R-40

TOTAL GALLONS 23,633

TABLE C-8 WFF OIL STORAGE SUMMARY FOR CONTAINERS 55 GALLONS OR GREATER						
Oil Commodity	**Storage Type**					**Total Storage Capacity (gallons)**
	AST	**UST**	**Mobile**	**Equipment**	**Drum**	
#2 Fuel Oil	√	√	√			153,178
Animal Fats	√					355
Diesel Fuel	√		√			13,450
Gasoline	√		√			11,000
Hydrashield FR-395-2 Mineral Oil				√		1,343
AGIP OSO Elevator Hydraulic Fluid				√		2,708
Envirotemp FR3				√		3,308
Hydraulic Oil					√	825
DTE Heavy Gear Oil				√		385
Brayco 717 Hydraulic Fluid				√		65
Brayco Micronic 781-2 Hydraulic Fluid				√		90
Jet-A Fuel (N/U/HW)	√		√		√	73,005
JP-8						0
Lacquer Thinner					√	55
Mineral Oil				√		35,381
Mineral Spirits (N/HW)					√	55
Motor Oil (N/U)				√	√	1,825
RP-1 Kerosene (N/U)	√				√	30,000
TOTAL						327,028

N/U/HW = New, Used, and Hazardous Waste
JP-8 is stored onsite only when needed for specific projects

TABLE C-9 NAVY OFF-SITE OIL STORAGE						
ID	**Location**	**Contents**	**VADEQ ID#**	**Capacity (gallons)**	**Status**	**Year Installed**
WI-R1-AST-01	Cropper Center	#2 Fuel Oil Tank	N/A	2,000	Active	1998
R-2A	Cropper Center	Oil/Water Separator	N/A	78	Active	1978
R-1B	Cropper Center	Oil/Water Separator	N/A	1400	Active	1978
R-1C	Cropper Center	Grease	N/A	525	Active	1978
T-Cropper	Cropper Center	Oil Filled Transformer	A&N Electric	160	Active	N/A

All elevators at WFF are routinely inspected and maintained by a contracted elevator service company. Included within the inspections are the hydraulic tanks and lines for signs of leakage or deterioration. The capacity of each elevator at WFF is approximately 80 – 100 gallons of hydraulic fluid; the elevator at NOAA contains 108 gallons. An example of the elevator inspection form is provided in Appendix M.

TABLE C-10
WFF BUILDINGS WITH ELEVATORS

Elevator ID #	Owner
D-1	NASA
E-104	NASA
E-105	NASA
E-106	NASA
E-107	NASA
E-109	NASA
E-109-2	NASA
F-10 #1	NASA
F-10 #2	NASA
F-10 #3	NASA
F-10 #4	NASA
F-10 #5	NASA
F-6	NASA
H-100	NASA
J-20	NASA
N-159	NASA
N-161	NASA
N-162	NASA
NOAA	NOAA
R-30	NAVY
U-30	NASA
V-10	NAVY
V-10F	NAVY
V-20	NAVY
V-24	NAVY
V-3 DDX	NAVY
X-35 ELV1	NASA

*Estimated totals of 100 gallons per NASA and Navy elevators was utilized for total calculations of hydraulic fluid as presented in Tables 2.2-1 and Table C-8.

APPENDIX D

TANK AND POTENTIAL DISCHARGE DATA

To verify that all potential sources of releases at Wallops Flight Facility have been evaluated and are addressed in this Plan, Table D summarizes each tank system and the direction of a potential spill from that tank system. The table includes photos of each tank system.

APPENDIX D
TANK AND POTENTIAL DISCHARGE DATA
ABOVEGROUND STORAGE TANKS [40 CFR 112(a)(3), 112.7(b), 112.7(c), and 112.8(c)]

BASIC TANK INFORMATION												SECONDARY CONTAINMENT INFORMATION					POTENTIAL DISCHARGE INFORMATION							
Tank ID	VDEQ ID #	Building	Tank Location	Install Year	Contents	Capacity (gallons)	Construction	Overfill System	Grounding	Piping	Support	Pad Construction	Secondary Type	Secondary Material of Construction	Secondary Contain. Capacity (gal)	% of Tank Capacity	Spill Direction	Slope of Surr. Area	Distance to Soil From Containment	Distance to Surface Water	Distance to Paved Areas	Distance to Storm Drains	Storm Drain Discharge Area #	Photo
D-1	Not Required	D-1	Outside	2008	Jet A	30,000	Double-Wall Steel	Overfill Drop Tube; Gauge; High Level Alarm	Yes	Aboveground	Steel Saddles	Concrete	Double-Wall Tank	Steel	30,000	>100%	Runway	Slight Slope to Grass	10'	~0.25 miles	0'	25'	SDDA_03	
D-2-17	Not Required	D-1	Outside	2017	Jet A	30,000	Double-Wall Steel	Overfill Drop Tube; Guage; High Level Alarm	Yes	Aboveground	Steel Saddles	Concrete	Double-Wall Tank	Steel	30,000	>100%	Runway	Slight Slope to Grass	10'	~0.25 miles	0'	25'	SDDA_03	
D-04-14	Not Assigned	D-4	Outside	2014	#2 Fuel Oil	1000	Double-Wall Steel	Gauge	Yes	Aboveground	Steel Cradle	Concrete	Double-Wall Tank	Steel	1,000	>100%	Grass to concrete then to storm drain	Small slope towards grating	<1'	0.50 miles	100'	20'	SDDA_03	
D-8 Generator Day Tank	Not Required	D-8	Outside	2009	#2 Fuel Oil	500	Convault Double-Wall	Gauge; Spill Bucket	Yes	Aboveground and underground	Concrete	Concrete	Double-Wall Tank	Liner and Concrete	Approx. 550	>110%	Grass to concrete then ditch to storm drain	Shallow slope west and then north to drain	<1'	0.50 miles	5'	60'	SDDA_03	
D-9A	A190218	D-8	Outside	1993	#2 Fuel Oil	20,000	Single-Wall Steel	Overfill Drop Tube; Gauge; High Level Alarm; Spill Bucket	Yes	Aboveground piping trans. to underground in trough (not buried)	Concrete Cradle	Concrete	Concrete Walled Containment	Concrete and Painted	64,227 for 2 tanks	>160%	Grass to trough to parking lot	Small slope to trough	Tanks on grass	0.25 miles	100'	N/A	SDDA_03	
D-9B	A190248	D-8	Outside	1993	#2 Fuel Oil	20,000	Single-Wall Steel	Overfill Drop Tube; Gauge; High Level Alarm; Spill Bucket	Yes	Aboveground piping trans. to underground in trough (not buried)	Concrete Cradle	Concrete	Concrete Walled Containment	Concrete and Painted	64,227 for 2 tanks	>160%	Grass to trough to parking lot	Small slope to trough	Tanks on grass	0.25 miles	100'	N/A	SDDA_03	
D-50B	A190247	WWTP	Outside	1999	#2 Fuel Oil	1,000	Double-Wall Steel Fire-Rated	Gauge, Spill Bucket	Yes	Aboveground	Steel feet	Concrete	Double-Wall Steel	Steel	1,000	>100%	Off slat to soil and into sewer	Flat	100'	150'	3'	300'	SDDA_106	
E-2	Not Required	E-2	Outside	2010	Waste Cooking Oil	300	Double-Wall Steel	Visual	Yes	None	Steel Feet	Concrete	Dike Containment	Steel	330	>100%	Grass	Slight Slope to Driveway	<10'	~.75 miles	0	25'	SDDA_003	
F-26-1A	N/A	F-26	Outside	2008	Gasoline	10,000	Double-Wall Steel Fire-Rated	Drop Tube, Alarm	Yes	Steel aboveground trans. To DW flex piping. UG Testing Required	Steel Cradle	Concrete	Double-Wall Steel	Steel	10,000	>100%	Parking Lot	Small slope	10'	0.25 miles	0	50'	SDDA_004_B	
F-26-1B	N/A	F-26	Outside	2008	Diesel	10,000	Double-Wall Steel Fire-Rated	Drop Tube, Alarm	Yes	Steel aboveground trans. To DW flex piping. UG Testing Required	Steel Cradle	Concrete	Double-Wall Steel	Steel	10,000	>100%	Parking Lot	Small slope	10'	0.25 miles	0	50'	SDDA_004_B	
F-36	Not Required	F-36	Outside	2019	Waste Cooking Oil	55	Double-Wall Steel	Visual	No	None	Steel Base	None	Dike Containment	Steel	61	>100%	Driveway and Grass	Flat	0'	0.30 miles	230'	35'	SDDA_003	
MPS-1	Not Required	Mobile, but stored at E-132	Inside	2006	Diesel	500	Double-Wall Steel on flat bed trailer	Spill Bucket; Gauge	Yes	Aboveground Flex	Steel Cradle	Concrete	Double-Wall Steel	Steel	500	>100%	Concrete pad	Small slope	25'	0.5 miles	0	150'	SDDA_010	
MPS-2	Not Required	Mobile, but stored at E-132	Inside	2014	Diesel	500	Double-Wall Steel on flat bed trailer	Spill Bucket; Gauge	Yes	Aboveground Flex	Steel Cradle	Concrete	Double-Wall Steel	Steel	500	>100%	Concrete pad	Small slope	25'	0.5 miles	0	125'	SDDA_010	
MPS-3	Not Required	Mobile, but stored at E-132	Outside	2006	Diesel	500	Double-Wall Steel on flat bed trailer	Spill Bucket; Gauge	Yes	Aboveground Flex	Steel Cradle	Concrete	Double-Wall Steel	Steel	500	>100%	Concrete pad	Small slope	25'	0.5 miles	0	100'	SDDA_010	
MPS-4	Not Required	Mobile, but stored at E-132	Inside	2006	Diesel	200	Double-Wall Steel on flat bed trailer	Spill Bucket; Gauge	Yes	Aboveground Flex	Steel Cradle	Located within support frame of generator	Double-Wall Steel	Steel	200	>100%	Concrete pad	Small slope	25'	0.5 miles	0	100'	SDDA_010	

APPENDIX D
TANK AND POTENTIAL DISCHARGE DATA
ABOVEGROUND STORAGE TANKS [40 CFR 112(a)(3), 112.7(b), 112.7(c), and 112.8(c)]

BASIC TANK INFORMATION												SECONDARY CONTAINMENT INFORMATION					POTENTIAL DISCHARGE INFORMATION							
Tank ID	VDEQ ID #	Building	Tank Location	Install Year	Contents	Capacity (gallons)	Construction	Overfill System	Grounding	Piping	Support	Pad Construction	Secondary Type	Secondary Material of Construction	Secondary Contain. Capacity (gal)	% of Tank Capacity	Spill Direction	Slope of Surr. Area	Distance to Soil From Containment	Distance to Surface Water	Distance to Paved Areas	Distance to Storm Drains	Storm Drain Discharge Area #	Photo
U-12A-13	Not assigned	U-12	Outside	2013	#2 Fuel Oil	20,000	Double-Wall Steel	Gauge; Spill Bucket	Yes	Aboveground	Steel Cradle	Concrete	Double Walled Tank	Steel	20,000	>100%	Grass then to Driveway and ditch	Slope to road and ditch	<10'	600 Ft.	300'	N/A	SDDA_201	
U-12B-13	Not assigned	U-12	Outside	2013	#2 Fuel Oil	20,000	Double-Wall Steel	Gauge; Spill Bucket	Yes	Aboveground	Steel Cradle	Concrete	Double Walled Tank	Steel	20,000	>100%	Grass then to Driveway and ditch	Slope to road and ditch	<10'	600 Ft.	300'	N/A	SDDA_201	
U-30-15	Not assigned	U-30	Outside	2015	#2 Fuel Oil	2,000	Double-Wall Steel	Spill Bucket; Gauge	Yes	Aboveground	Steel Cradle	Concrete	Double Walled Tank and Concrete Containment	Steel	2,000	>100%	Grass	Flat	<1'	~120 yards	2'	N/A	SDDA-204	
U-48-15	Not Required	U-48	Outside	2015	#2 Fuel Oil	500	Double-Wall Steel	Spill Bucket; Gauge	Yes	Aboveground	Steel Cradle	Concrete	Double Walled Tank and Concrete Containment	Steel	500	>100%	Parking lot beside Bldg. U-50 and then to storm drain	Major slope to Bldg. U-50	<1'	~150 yds	13'	N/A	SDDA_202	
U-65-15	Not Assigned	U-65	Outside	2015	#2 Fuel Oil	1,000	Double-Wall Steel	Spill Bucket; Gauge	Yes	Aboveground	Steel Cradle	Concrete	Double Walled Tank	Concrete	1000	>100%	Grass	Flat	<1'	~200 yds	5'	N/A	SDDA_200	
V-62	Not Required	V-62	Inside	2009	#2 Fuel Oil	110	Double wall Steel	Gauge	Yes	Aboveground	Steel Feet	Floor tile	Double wall Polyethylene-Steel	Steel	110	>100%	Grass	Slight Slope to Grass	<1'	~100 yds.	1'	N/A	SDDA_300	
W-20A-10	A190237	W-20A-10	Outside	2010	#2 Fuel Oil	2,500	Double Wall-Steel	Hi Level Gauge Spill Bucket	Yes	Aboveground	Steel Cradle	Concrete	Double-Wall Steel	Steel	2,500	>100%	Parking Lot	Flat	<1'	~50 feet	1'	N/A	SDDA_307	
X-16	Q-208290	X-16	Inside	2009	Diesel Fuel	110	Double wall Steel	Gauge	Yes	Aboveground	Steel Feet	Concrete	Double wall Polyethylene-Steel	Metal	110	>100%	Grass	Steep slope to grass	<1'	~50 feet	10'	N/A	SDDA_309	
Z-62	Not Required	Z-62	Inside	2008	#2 Fuel Oil	110	Double Wall-Steel	Gauge	Yes	Aboveground	Steel Feet	Concrete	Double wall Polyethylene-Steel	Steel	110	>100%	Grass	Steep Slope to Grass	<1'	~100 yds.	1'	N/A	SDDA_313	

TOTAL GALLONS NASA MAIN BASE = 60,000 Gallons Jet A + 42,500 Gallons #2 Fuel Oil + 10,000 Gallons Gasoline + 11,700 Gallons Diesel + 355 Gallons Waste Cooking Oil = 124,555 Gallons
TOTAL GALLONS NASA WALLOPS ISLAND AND MAINLAND = 46,220 Gallons #2 Fuel Oil + 110 Gallons Diesel = 46,330 Gallons

NAVY PROPERTY TANKS - ISLAND																								
WI-V3-AST-01	Not Required	V-3	Inside	2008	#2 Fuel Oil	120	Single-Wall Steel In a Dike	Gauge	Yes	Aboveground	Metal Legs	Concrete	Inside Building with spill pan	Steel	120	100%	Building Floor	Flat	N/A	150 yds.	N/A	N/A	SDDA_307	
WI-V10-AST-01 (NASA V-10B)	Not Required	V-10	Outside	2012	#2 Fuel Oil	120	Double-Wall Steel	Gauge	Yes	Aboveground	Metal Legs	Concrete	Double Wall Steel	Steel	120	100%	Concrete Pad, then parking lot	Flat	100'	200 yds.	1'	60'	SDDA_305	
WI-V18-AST-01 (NASA V-18A)	Not Required	V-18	Inside	1992	#2 Fuel Oil	200	Single-Wall Steel	Gauge	Yes	Aboveground	Bolted to base of Gen.	Concrete	Double-Wall Steel	Steel	220	>100%	Building Floor	Flat	70'	200 yds.	1'	60'	SDDA_305	
WI-V21-AST-01	Not Required	V-10	Outside	2003	#2 Fuel Oil	500	Double-Wall Steel	Gauge; Spill Bucket	Yes	Aboveground	Steel Support	Concrete	Double-Wall Steel	Steel	550	>100%	Concrete Pad, then parking lot	Slight Slope to parking lot	120'	400 yds.	1'	140'	SDDA_305	

APPENDIX D
TANK AND POTENTIAL DISCHARGE DATA
ABOVEGROUND STORAGE TANKS [40 CFR 112(a)(3), 112.7(b), 112.7(c), and 112.8(c)]

BASIC TANK INFORMATION												SECONDARY CONTAINMENT INFORMATION					POTENTIAL DISCHARGE INFORMATION							
Tank ID	VDEQ ID #	Building	Tank Location	Install Year	Contents	Capacity (gallons)	Construction	Overfill System	Grounding	Piping	Support	Pad Construction	Secondary Type	Secondary Material of Construction	Secondary Contain. Capacity (gal)	% of Tank Capacity	Spill Direction	Slope of Surr. Area	Distance to Soil From Containment	Distance to Surface Water	Distance to Paved Areas	Distance to Storm Drains	Storm Drain Discharge Area #	Photo
WI-V24-AST-01 (NASA V-24A)	A190243	V-24	Outside	2002	#2 Fuel Oil	2,000	Double-Wall Steel	Gauge; Spill Bucket	Yes	Aboveground	Steel Cradle	Concrete	Double-Wall Steel	Steel	2,200	>100%	Concrete pad then onto parking lot	Flat	40'	~50 yds	5'	N/A	SDDA_304	
WI-V24-AST-03 (NASA V-24C)	A190246	V-24	Outside	2007	#2 Fuel Oil	300	Double-Wall Steel	Gauge; Spill Bucket	Yes	Aboveground	Steel Supports	Concrete	Double-Wall Steel	Steel	330	>100%	Concrete pad then to parking lot	Flat	40'	~50 yds	5'	N/A	SDDA_304	
				TOTAL GALLONS		**3,240**																		

APPENDIX D
TANK AND POTENTIAL DISCHARGE DATA
ABOVEGROUND STORAGE TANKS [40 CFR 112(a)(3), 112.7(b), 112.7(c), and 112.8(c)]

BASIC TANK INFORMATION												SECONDARY CONTAINMENT INFORMATION					POTENTIAL DISCHARGE INFORMATION							
Tank ID	VDEQ ID #	Building	Tank Location	Install Year	Contents	Capacity (gallons)	Construction	Overfill System	Grounding	Piping	Support	Pad Construction	Secondary Type	Secondary Material of Construction	Secondary Contain. Capacity (gal)	% of Tank Capacity	Spill Direction	Slope of Surr. Area	Distance to Soil From Containment	Distance to Surface Water	Distance to Paved Areas	Distance to Storm Drains	Storm Drain Discharge Area #	Photo
NAVY PROPERTY TANK - MAIN BASE																								
WI-R30-AST-01 (NASA R-30 B)	Not Required	R-30	Outside	2006	#2 Fuel Oil	200	Double-Wall Steel	Gauge	Yes	Aboveground	Bolted to base of Gen.	Concrete	Double-Wall Steel	Steel	220	>110%	Grass	Slope to dry ditch	25'	.5 miles	4'	100'	SDDA_120	
WI-R40-AST-01	Not Required	R-40	Outside	2006	Diesel Fuel	250	Double-Wall Steel	Gauge	Yes	Aboveground	Bolted to base of Gen.	Concrete	Double-Wall Steel	Steel	275	>110%	Grass	Slope to dry ditch	25'	.5 miles	4'	100'	SDDA_120	
				TOTAL GALLONS	**450**																			
NOAA TANKS																								
NOAA-3	Not Required	CDA	Outside	2007	Gasoline	250	Double Wall-Steel	Gauge, Spill Bucket	Yes	Aboveground	Steel Cradle	Concrete	Double-Wall Steel	Steel	300	>100%	Paved Drive	Flat	20'	300'	<1'	54'	SDDA_NOAA_3	
NOAA-4	Not Required	CDA	Outside	2007	Diesel	250	Double Wall-Steel	Gauge, Spill Bucket	Yes	Aboveground	Steel Cradle	Concrete	Double-Wall Steel	Steel	300	>100%	Paved Drive	Flat	20'	300'	<1'	58'	SDDA_NOAA_3	
NOAA BT-1	Not Assigned	CDA	Outside	2013	#2 Fuel Oil	7,200	Double Wall-Steel	Alarms at 95% of rated capacity	Yes	Aboveground	Internal	Concrete	Double-Wall Steel	Steel	8352	>100%	South	>5°	adjacent	1000 ft	<1'	400'	SDDA_NOAA_3	
NOAA BT-2	Not Assigned	CDA	Outside	2013	#2 Fuel Oil	7,200	Double Wall-Steel	Alarms at 95% of rated capacity	Yes	Aboveground	Internal	Concrete	Double-Wall Steel	Steel	8352	>100%	South	>5°	12 ft.	1000 ft	<1'	400'	SDDA_NOAA_3	
NOAA BT-3	Not Assigned	CDA	Outside	2013	#2 Fuel Oil	7,200	Double Wall-Steel	Alarms at 95% of rated capacity	Yes	Aboveground	Internal	Concrete	Double-Wall Steel	Steel	8352	>100%	South	>5°	12 ft.	1000 ft	<1'	400'	SDDA_NOAA_3	
NOAA BT-4	Not Assigned	CDA	Outside	2013	#2 Fuel Oil	7,200	Double Wall-Steel	Alarms at 95% of rated capacity	Yes	Aboveground	Internal	Concrete	Double-Wall Steel	Steel	8352	>100%	South	>5°	12 ft.	1000 ft	<1'	400'	SDDA_NOAA_3	
NOAA Day Tank-14	Not Assigned	CDA	Inside	2014	Diesel	150	Double Wall-Steel	Electronic overflow device	Yes	Aboveground and Underground	Steel Feet	Concrete	Double-Wall Steel	Steel	150	>100%	South	Flat	200 ft.	1000 ft	<1'	400'	SDDA_NOAA_3	
				TOTAL GALLONS	**29,450**																			
MARS TANKS																								
MARS-33	N/A	Pad 0-A	Outside	2011	Kerosene	30,000	Single-Wall Steel	Gauge	Yes	Aboveground	Steel	Concrete	Walled Containment	Concrete	33,000	>110%	Parking Lot	Slight Slope to Lot	2'	~100 yds.	2'	50'	SDDA_312	
				TOTAL GALLONS	**30,000**																			

APPENDIX D
TANK AND POTENTIAL DISCHARGE DATA
ABOVEGROUND STORAGE TANKS [40 CFR 112(a)(3), 112.7(b), 112.7(c), and 112.8(c)]

BASIC TANK INFORMATION												SECONDARY CONTAINMENT INFORMATION					POTENTIAL DISCHARGE INFORMATION							
Tank ID	VDEQ ID #	Building	Tank Location	Install Year	Contents	Capacity (gallons)	Construction	Overfill System	Grounding	Piping	Support	Pad Construction	Secondary Type	Secondary Material of Construction	Secondary Contain. Capacity (gal)	% of Tank Capacity	Spill Direction	Slope of Surr. Area	Distance to Soil From Containment	Distance to Surface Water	Distance to Paved Areas	Distance to Storm Drains	Storm Drain Discharge Area #	Photo
US COAST GUARD TANK																								
USCG Housing	Not Required	CG Housing Area	Outside	2003	#2 Fuel Oil	325	Double-Wall Steel Day Tank	None	Yes	Aboveground	Concrete Pad	Concrete	Double-Wall Steel	Steel	409	126%	Pavement, then to driveway	Slight slope to pavement	1'	0.75 miles	85'	N/A	SDDA_118	
				TOTAL GALLONS		**325**																		
NAVY OFF-SITE PROPERTY TANKS - CROPPER CENTER																								
WI-R1-AST-01	N/A	Cropper Center	Outside	1998	#2 Fuel Oil	2,000	Convault Double-Wall	Gauge, Spill Bucket	Yes	Steel above. piping trans. to under. piping in a chase Testing Required	Concrete	Concrete	Double Wall Tank	Liner and Concrete	2,650	>100%	Parking Lot	Flat	<5	0.5 miles	<5	25'	SDDA_104A	
				TOTAL GALLONS		**2,000**																		
PERMANENT GENERATORS																								
D-8	Not Required	D-8	Inside	2013	Motor Oil	150	Double-Wall Steel	Gauge	Yes	Contained within Generator	Steel Generator	Concrete	N/A	Steel	N/A	N/A	Parking Lot	Concrete then ditch to storm drain	Shallow slope west and then north to drain	.50 miles	0.50 miles	5'	SDDA_03	
U-12	Not Required	U-12	Inside	2013	Motor Oil	150	Double-Wall Steel	Guage	Yes	Contained within Generator	Steel Generator	Concrete	N/A	Steel	N/A	N/A	Sump	Slope to Sump	18'	600 Ft.	300'	N/A	SDDA_201	
U-12	Not Required	U-12	Inside	2013	Motor Oil	150	Double-Wall Steel	Guage	Yes	Contained within Generator	Steel Generator	Concrete	N/A	Steel	N/A	N/A	Sump	Slope to Sump	18'	600 Ft.	300'	N/A	SDDA_201	
				TOTAL GALLONS		**450**																		

Total Gallons Appendix D **237,745**

APPENDIX E

HAZARDOUS WASTE ACCUMULATION AREAS AND EVACUATION ROUTES

Main Base Satellite Accumulation Areas

ASR 8
V-55
V-24
V-27
V-10
V-3
W-40
W-15
X-79
X-30
X-55
X-15
X-35
Y-55
Z-65
MARS Pad 0A
Z-40
0
1,500
3,000
Feet
N

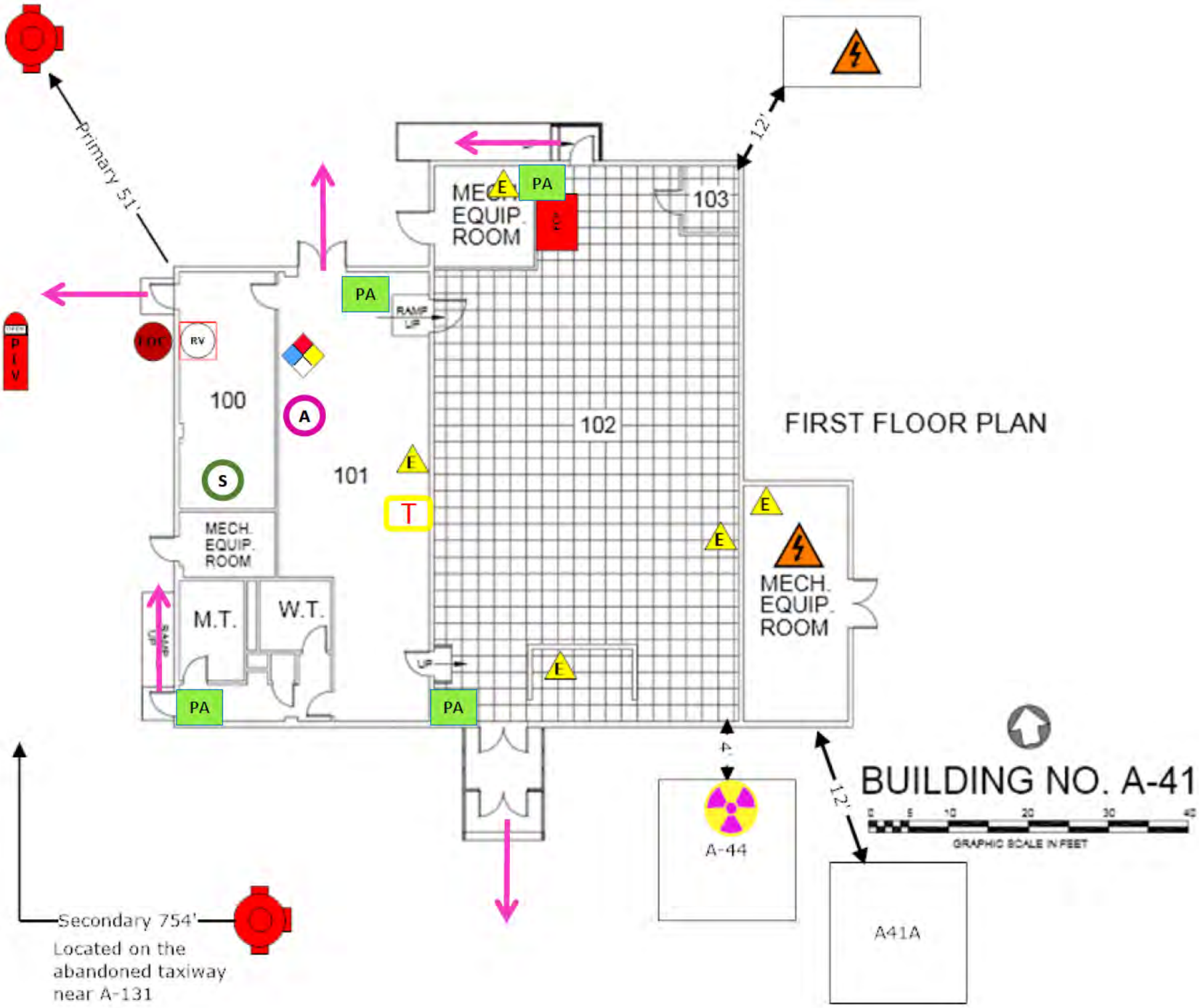
Wallops Satellite Accumulation Area Emergency Figures

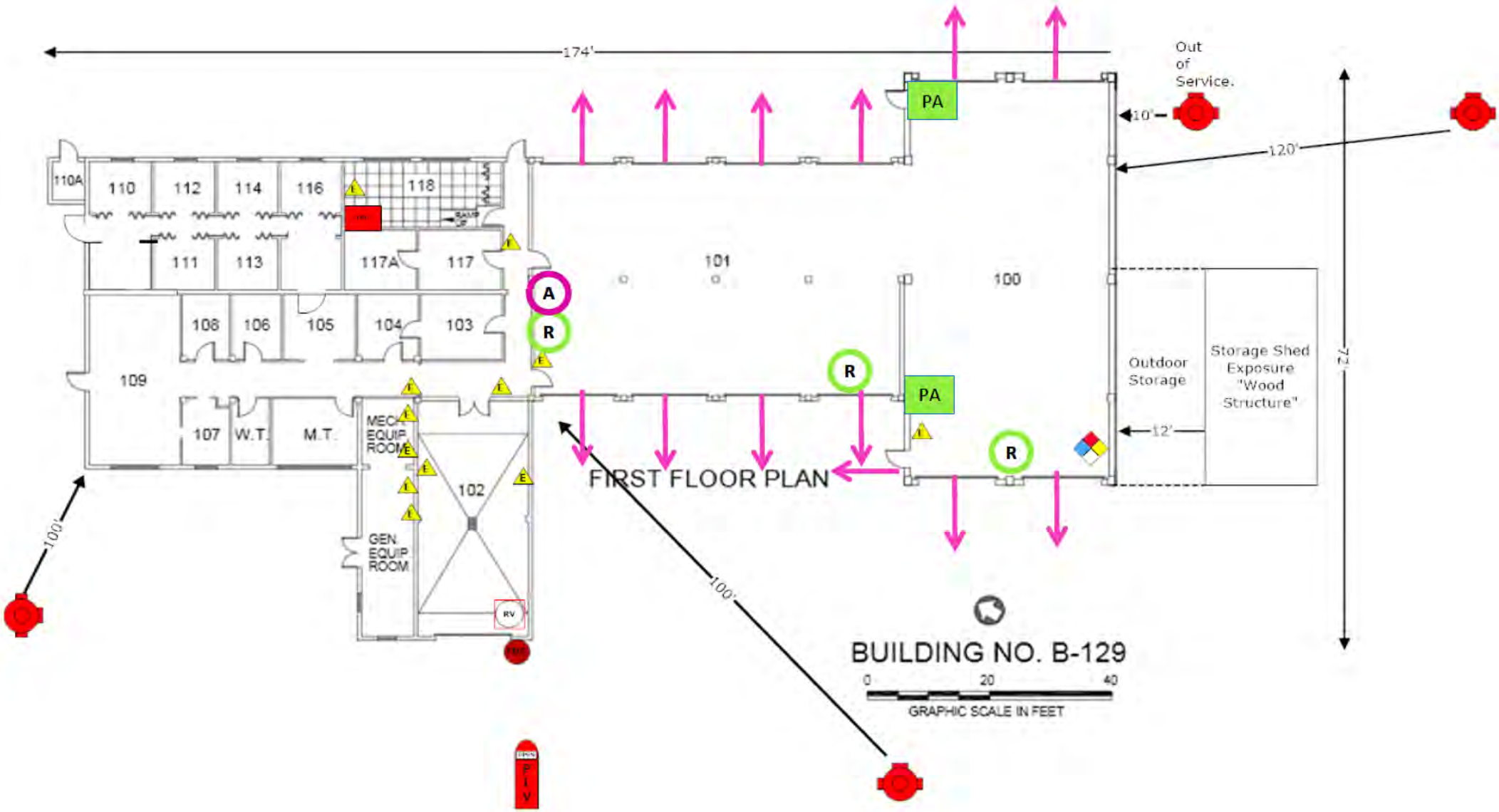
Symbol Legend

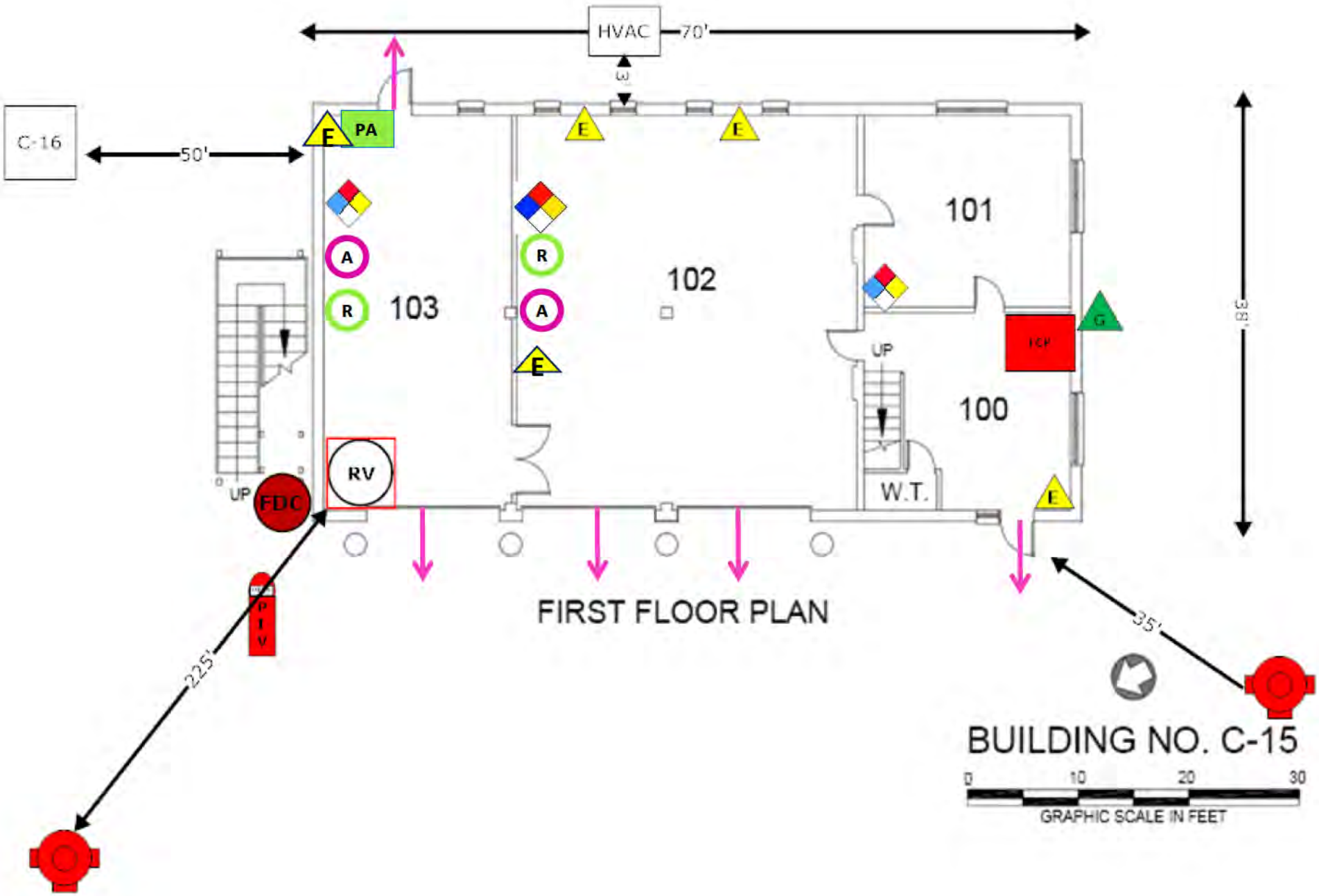
SAA HW Containers

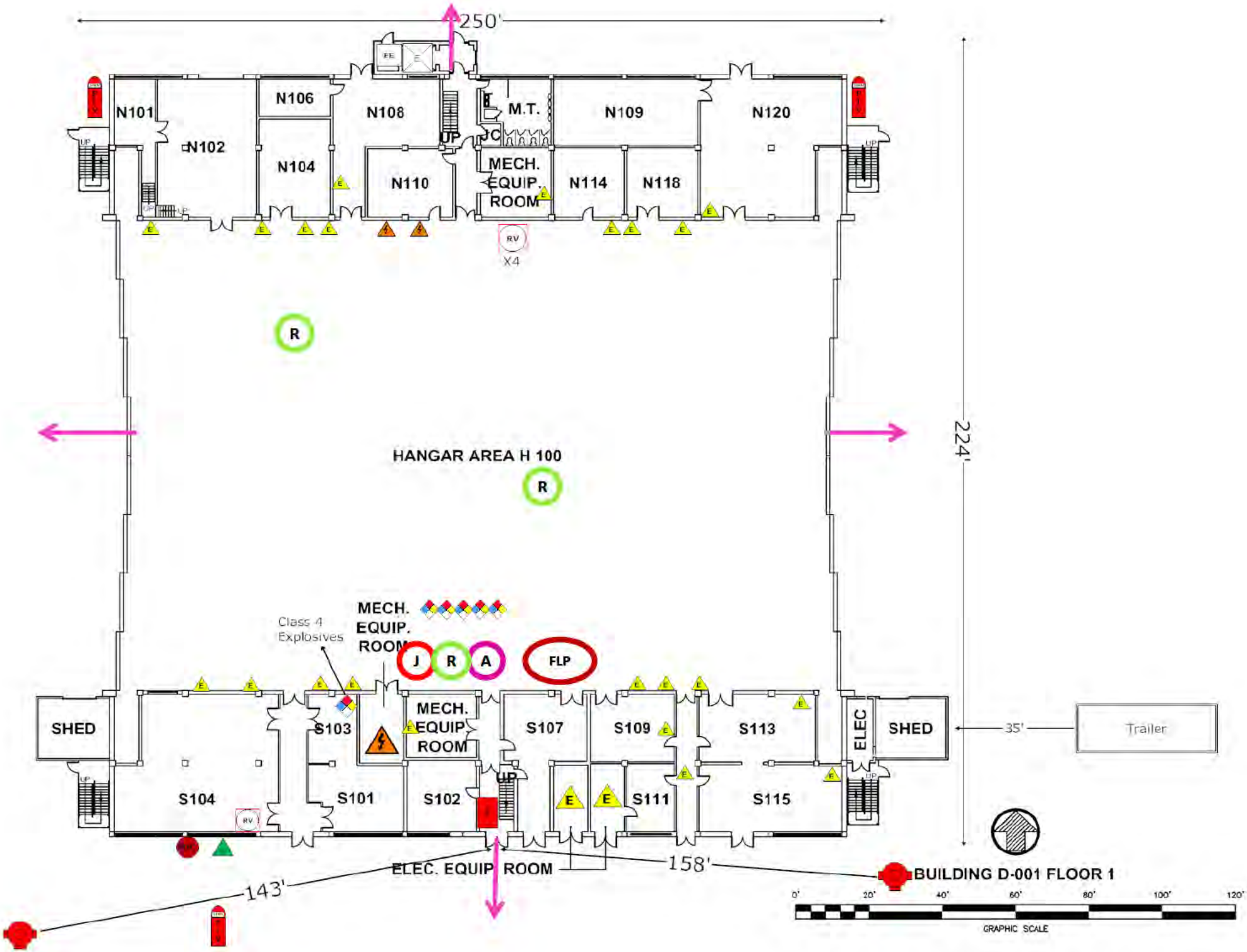
- I — Isopropyl Alcohol (D001)
- A — Aerosol Cans (D001)
- S — Solder Can (D008)
- R — Solvent Rags (D001, F002, F003, F005, D035)
- J — Jet A (D001)
- RS — Solvent Rags w/solder (D001, F002, F003, F005, D008)
- B — Blast Grit (D006)
- F — Fuel Filters (D001, D018)
- P — Paint Thinner (D001, F003, F005, D035)
- O — Oil and Ethanol (D001)
- L — Lead Tire Weights (D008)
- C,T — Corrosive, Toxic Lab Waste (D002, D008)
- FLP — Flammable Lab Packs (D001)
- COD — COD Vials (D002, D009, D011, D007)

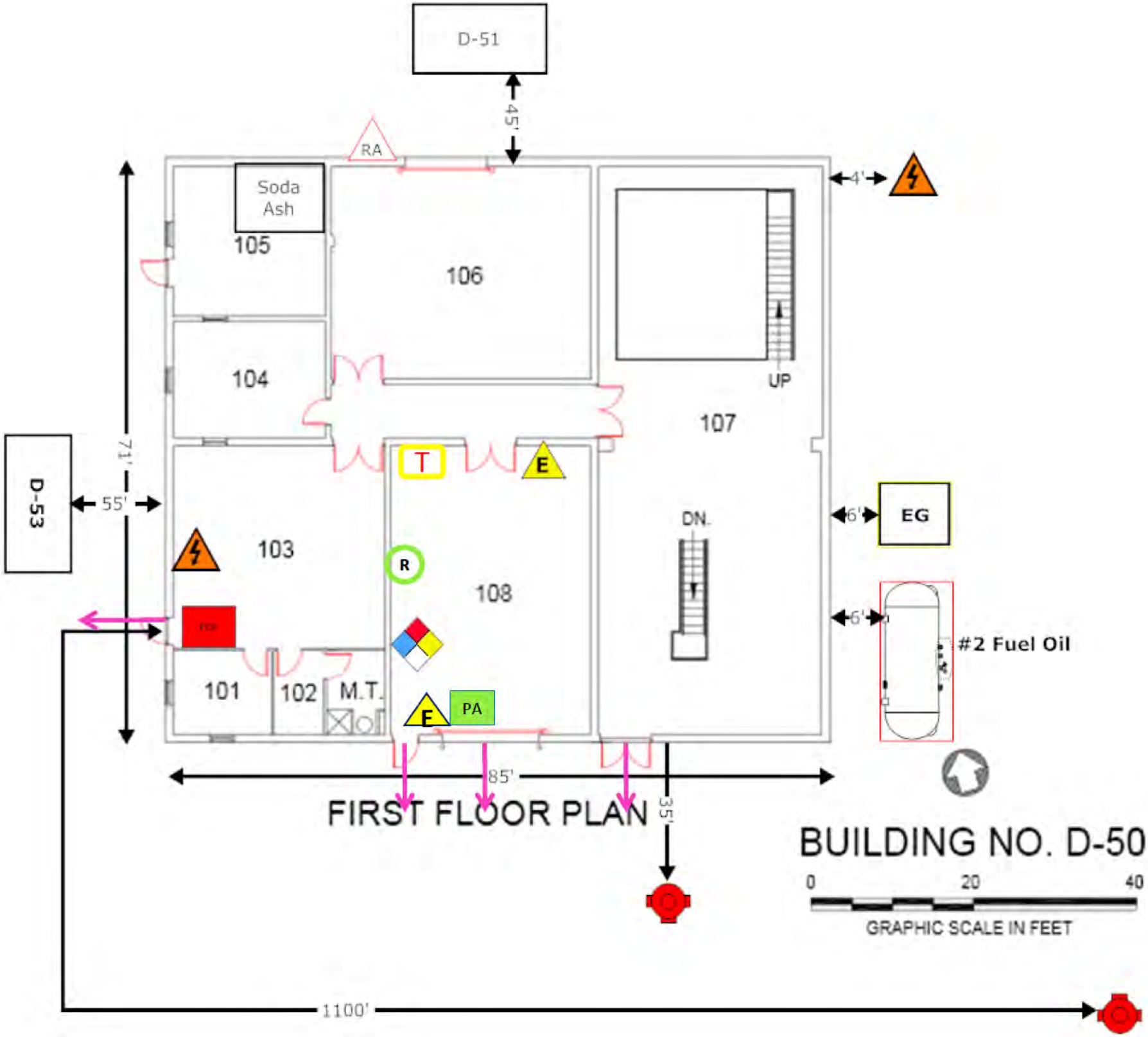
- Exit Direction
- T — Telephone
- PA — Pull Alarm
- Flam Cabinet
- Radioactive
- F — Fire Extinguisher
- Electric Shutdown

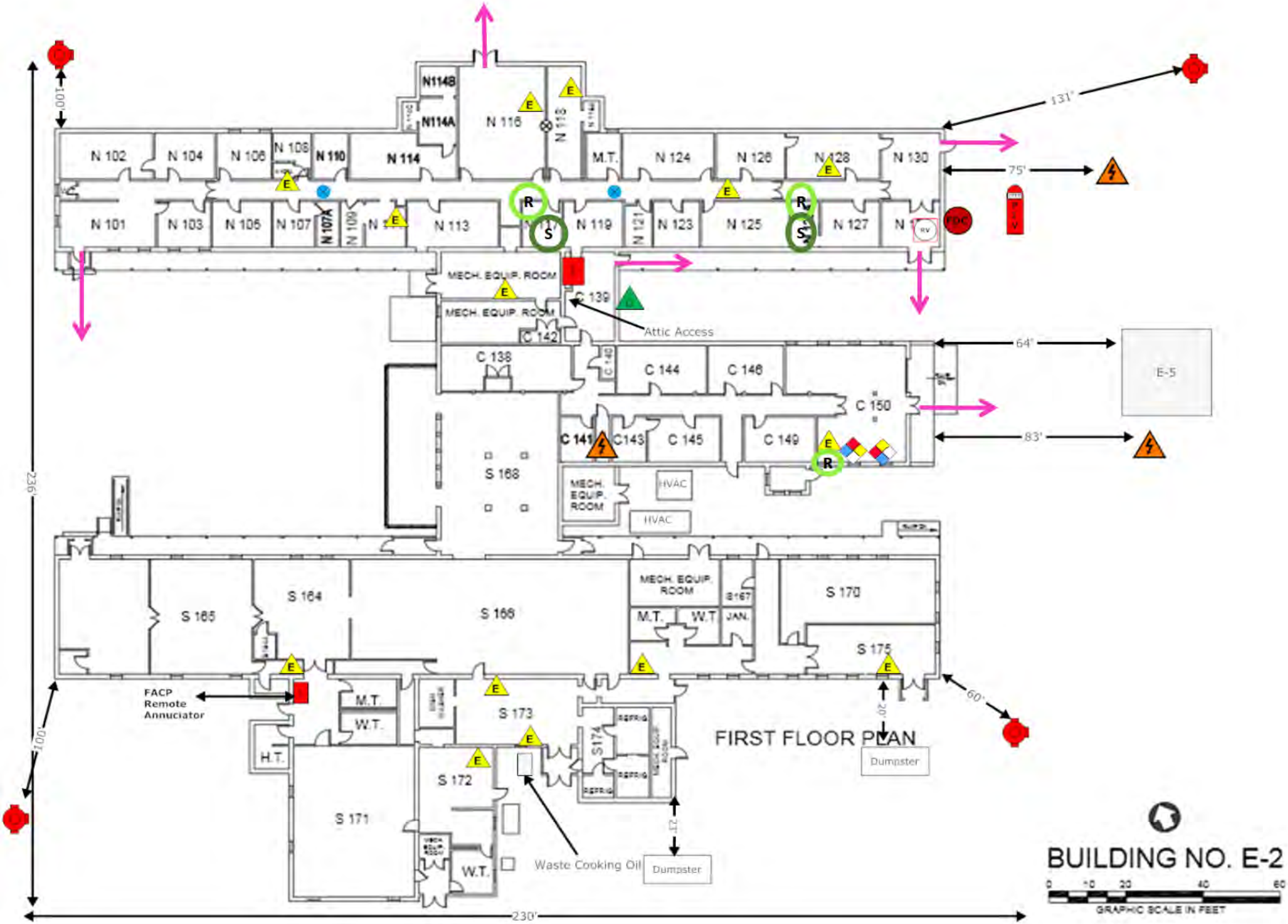

FIRST FLOOR PLAN
BUILDING NO. A-41
GRAPHIC SCALE IN FEET
Primary 51'
Secondary 754'
Located on the abandoned taxiway near A-131
12'
12'
MECH. EQUIP. ROOM
103
102
101
100
MECH. EQUIP. ROOM
M.T.
W.T.
MECH. EQUIP. ROOM
RAMP UP
PA
PA
PA
PA
E
E
E
E
E
T
A
S
RV
A-44
A41A

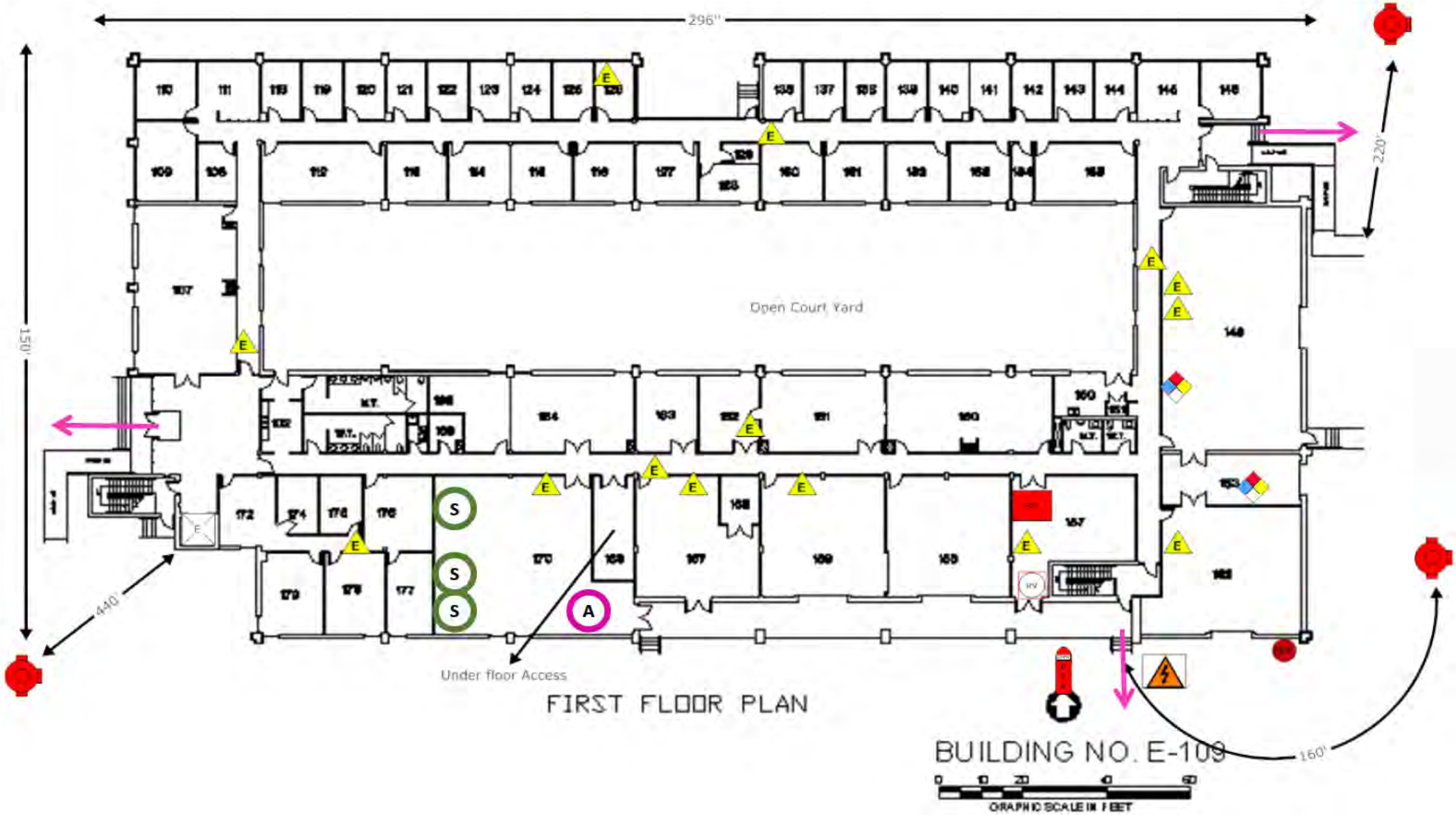

174'
Out of Service.
PA
10'
120'
110A
110
112
114
116
118
111
113
117A
117
101
100
A
R
108
106
105
104
103
109
107
W.T.
M.T.
MECH. EQUIP. ROOM
102
GEN. EQUIP. ROOM
R
PA
R
Outdoor Storage
Storage Shed Exposure "Wood Structure"
12'
72'
FIRST FLOOR PLAN
100'
100'
BUILDING NO. B-129
0
20
40
GRAPHIC SCALE IN FEET
P I V

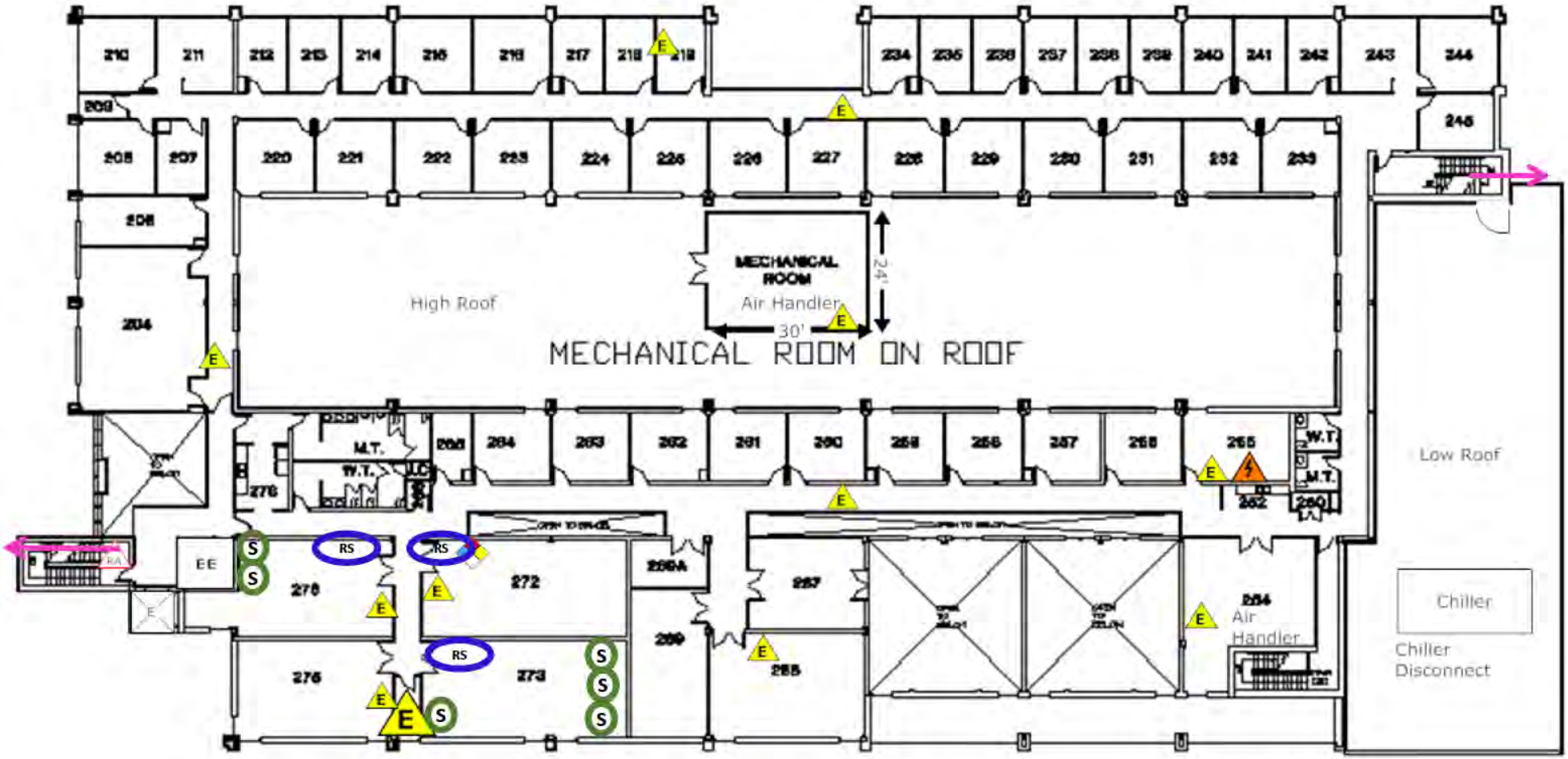

HVAC
70'
C-16
50'
PA
E
A
R
103
102
101
100
G
ICP
UP
W.T.
RV
FDC
P I V
225'
35'
38'
FIRST FLOOR PLAN
BUILDING NO. C-15
0
10
20
30
GRAPHIC SCALE IN FEET


250'
224'
N101
N102
N106
N104
N108
N110
M.T.
JC
MECH. EQUIP. ROOM
N109
N114
N118
N120
UP
RV
X4
R
HANGAR AREA H 100
R
Class 4 Explosives
MECH. EQUIP. ROOM
J
R
A
FLP
SHED
S104
S103
S101
MECH. EQUIP. ROOM
S102
S107
S109
S111
S113
S115
ELEC
SHED
35'
Trailer
ELEC. EQUIP. ROOM
158'
143'
BUILDING D-001 FLOOR 1
0'
20'
40'
60'
80'
100'
120'
GRAPHIC SCALE


D-51
45'
RA
Soda Ash
105
106
104
4'
UP
107
71'
D-53
55'
T
E
103
R
108
DN.
6'
EG
6'
#2 Fuel Oil
101
102
M.T.
E
PA
85'
35'
FIRST FLOOR PLAN
BUILDING NO. D-50
0
20
40
GRAPHIC SCALE IN FEET
1100'


N114B
N114A
N 116
N 118
N 102
N 104
N 106
N 108
N 110
N 114
M.T.
N 124
N 126
N 128
N 130
N 101
N 103
N 105
N 107
N 107A
N 109
N 113
N 117
N 119
N 121
N 123
N 125
N 127
FDC
MECH. EQUIP. ROOM
MECH. EQUIP. ROOM
C 139
Attic Access
C 142
C 138
C 144
C 146
C 150
E-5
C 141
C143
C 145
C 149
S 168
MECH. EQUIP. ROOM
HVAC
HVAC
S 165
S 164
S 166
MECH. EQUIP. ROOM
S167
M.T.
W.T.
JAN.
S 170
S 175
FACP Remote Annuciator
M.T.
W.T.
H.T.
S 173
S 172
S 171
S174
W.T.
Waste Cooking Oil
Dumpster
Dumpster
FIRST FLOOR PLAN
BUILDING NO. E-2
GRAPHIC SCALE IN FEET
131'
75'
64'
83'
60'
100'
236'
230'


296'
150'
220'
440'
160'
Open Court Yard
Under floor Access
FIRST FLOOR PLAN
BUILDING NO. E-109
GRAPHIC SCALE IN FEET

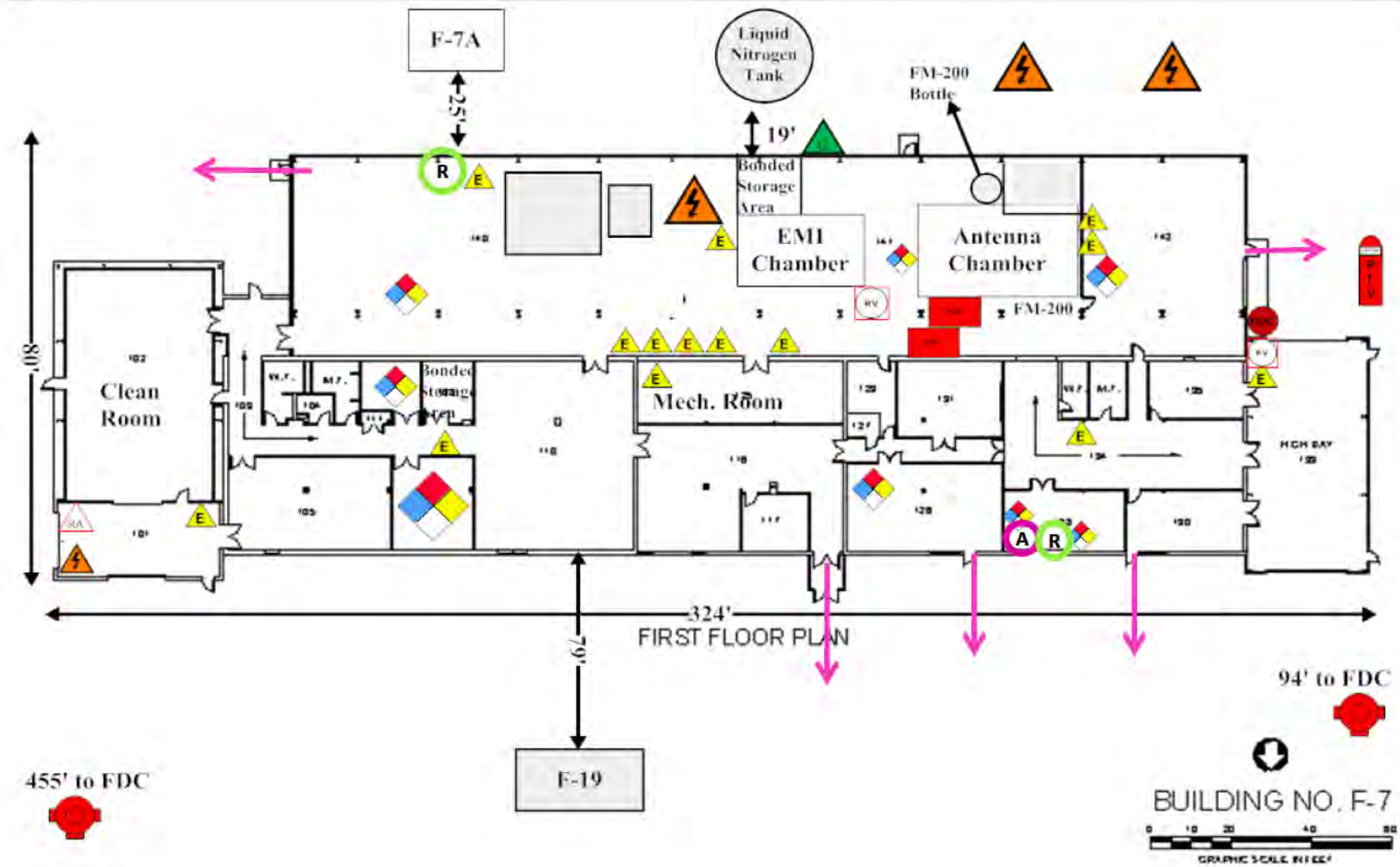


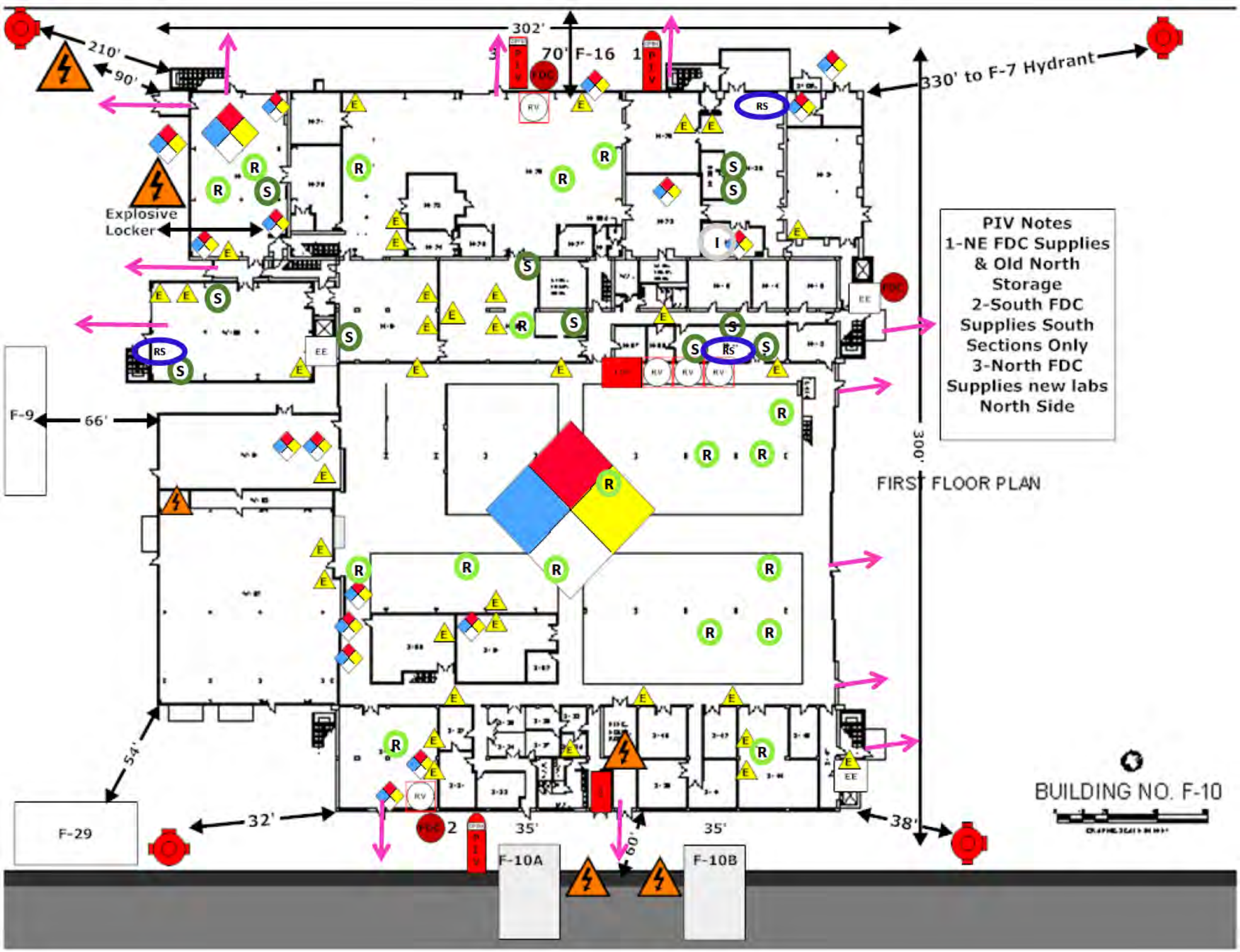
SECOND FLOOR PLAN

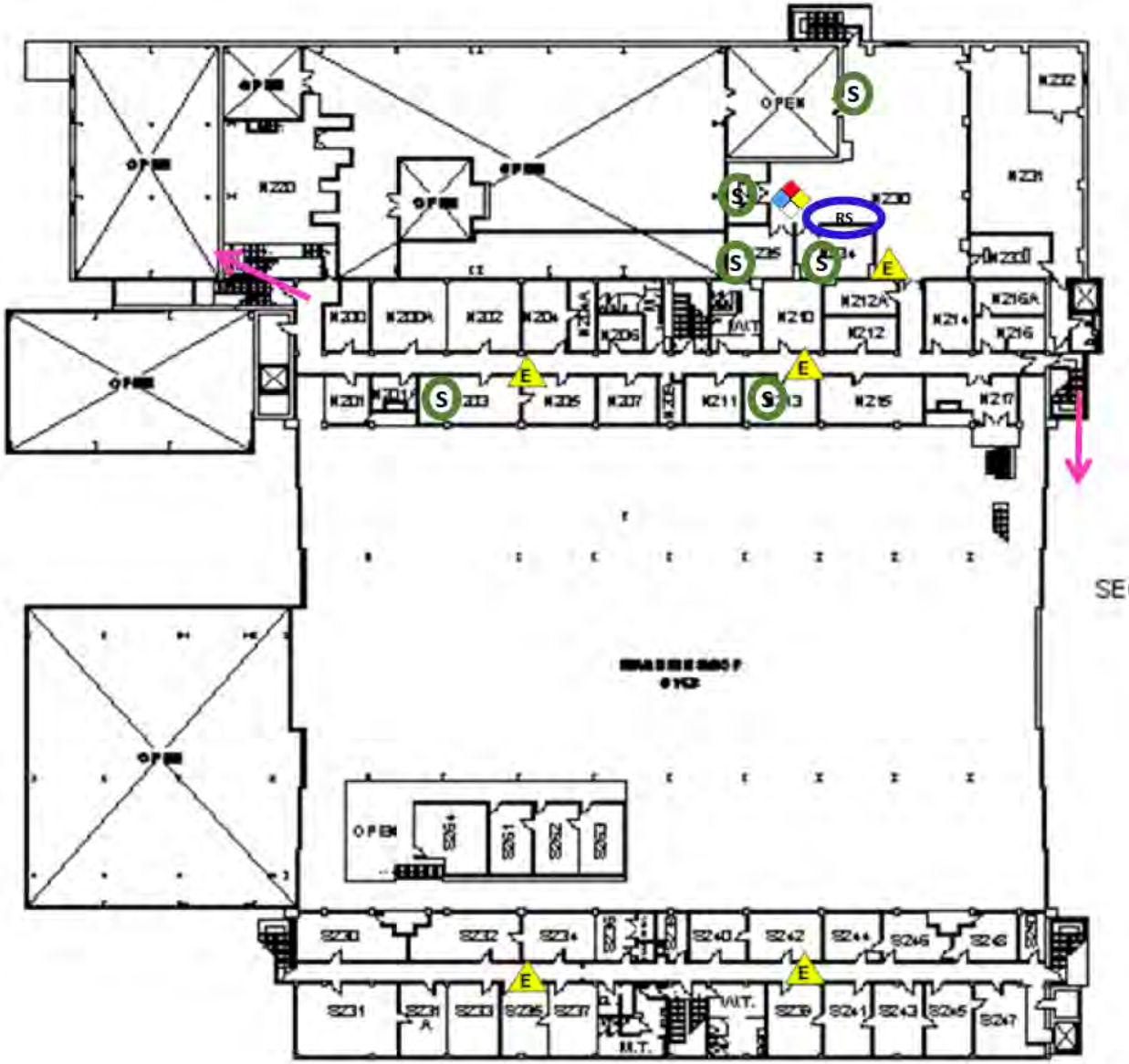
BUILDING NO. E-109

0 10 20 40 60

GRAPHIC SCALE IN FEET

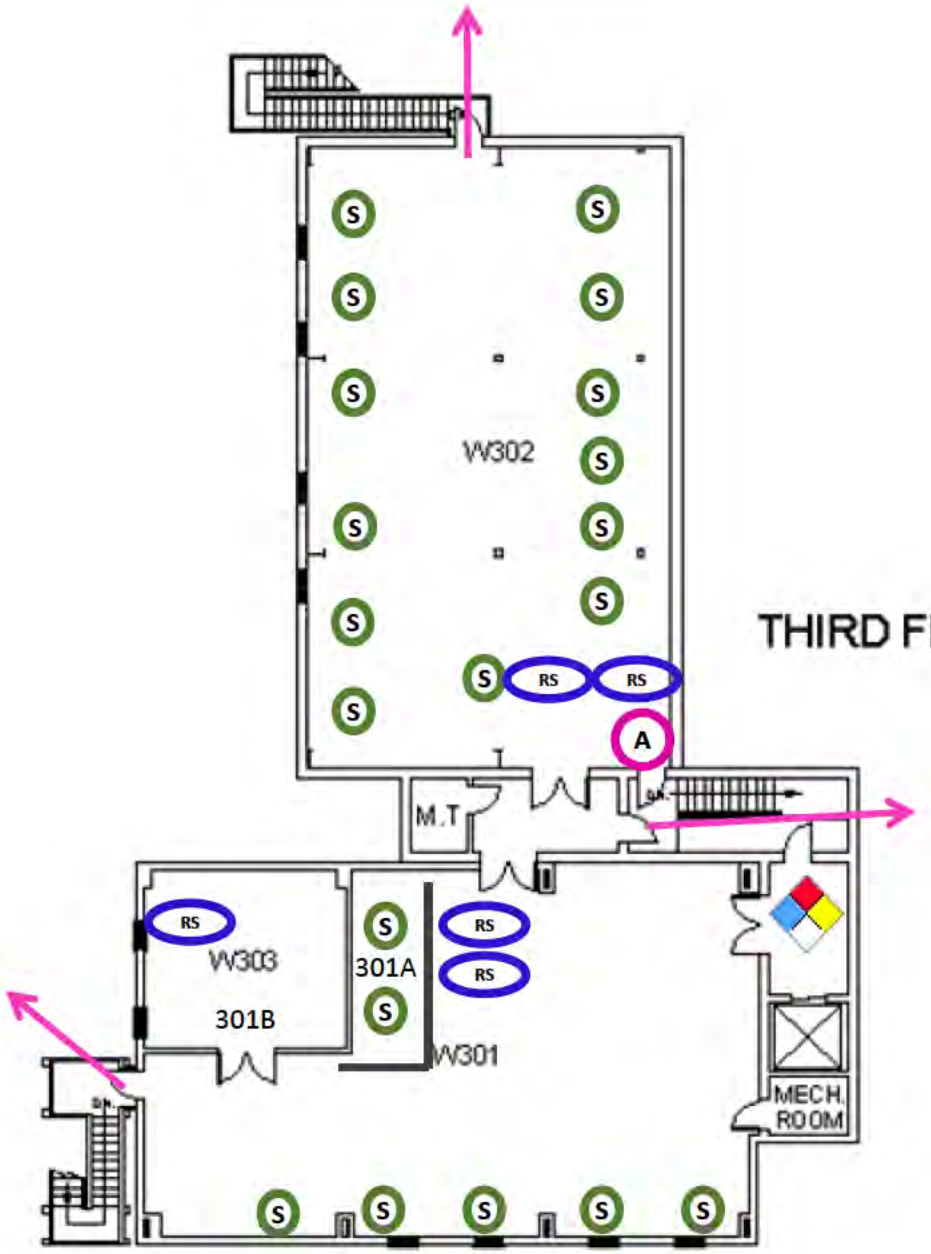

F-7A
Liquid Nitrogen Tank
FM-200 Bottle
25'
19'
Bonded Storage Area
EMI Chamber
Antenna Chamber
FM-200
Clean Room
Mech. Room
Bonded Storage
80'
324'
79'
FIRST FLOOR PLAN
F-19
455' to FDC
94' to FDC
BUILDING NO. F-7
GRAPHIC SCALE IN FEET


302'
70'
F-16
330' to F-7 Hydrant
210'
90'
Explosive Locker
PIV Notes
1-NE FDC Supplies & Old North Storage
2-South FDC Supplies South Sections Only
3-North FDC Supplies new labs North Side
F-9
66'
300'
FIRST FLOOR PLAN
54'
F-29
32'
35'
35'
38'
60'
F-10A
F-10B
BUILDING NO. F-10



SECOND FLOOR PLAN

BUILDING NO. F-10

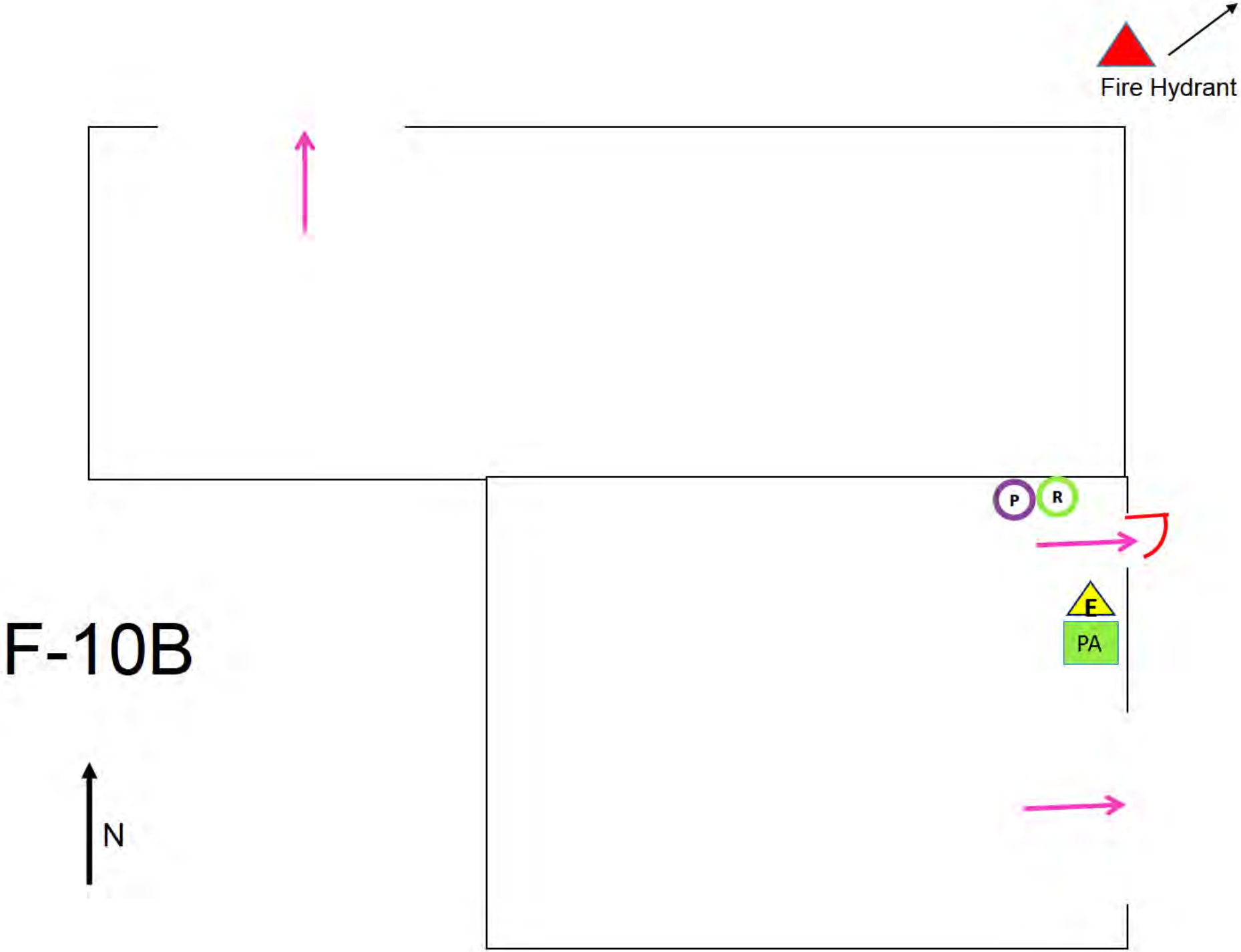


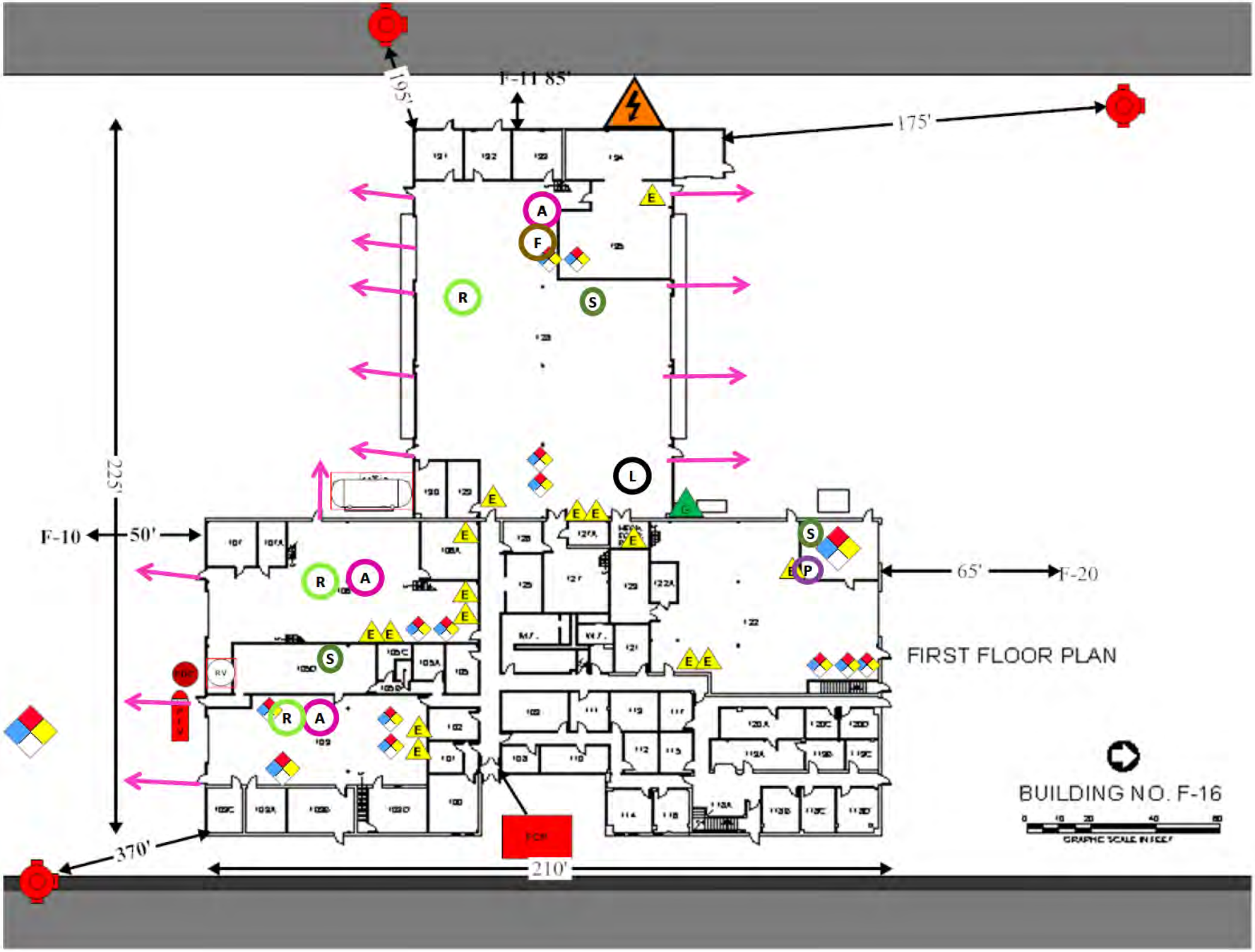
THIRD FLOOR PLAN

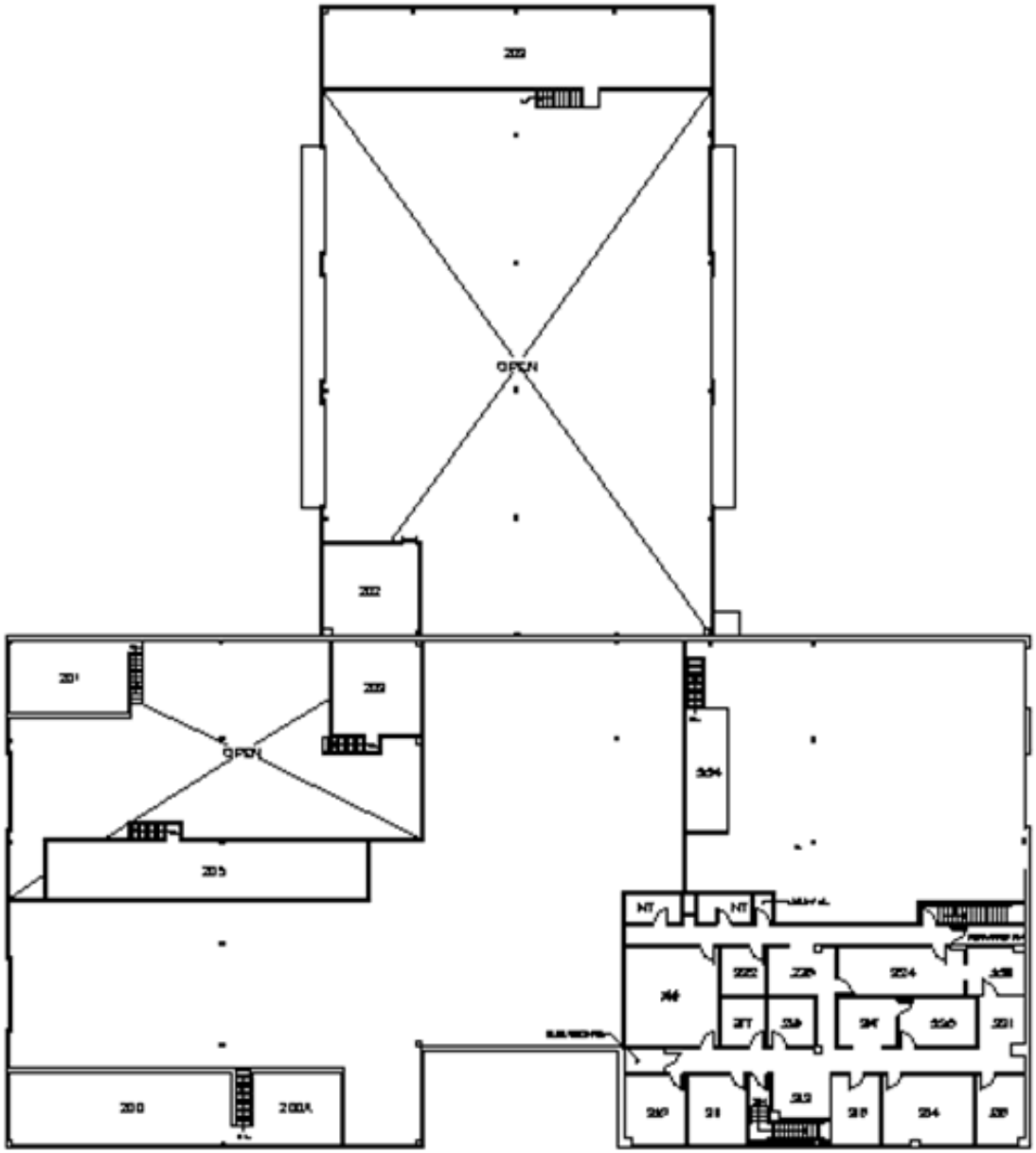
BUILDING NO. F-10

0 10 20 40

GRAPHIC SCALE IN FEET

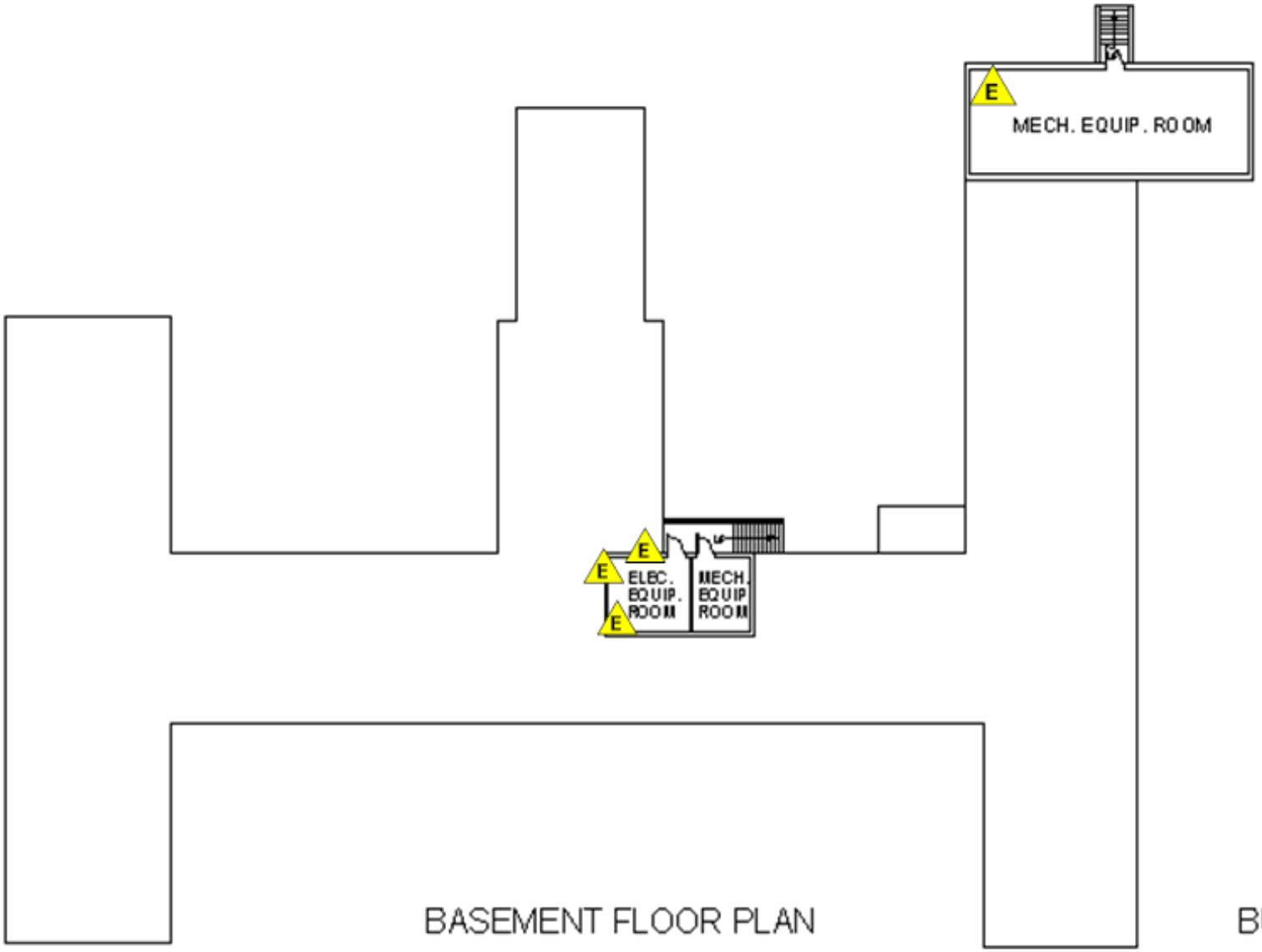

Fire Hydrant
P
R
E
PA
F-10B
N


195'
F-11 85'
175'
225'
F-10
50'
65'
F-20
370'
210'
FIRST FLOOR PLAN
BUILDING NO. F-16
GRAPHIC SCALE IN FEET
FDC
FCP



SECOND FLOOR PLAN

BUILDING NO. F-16

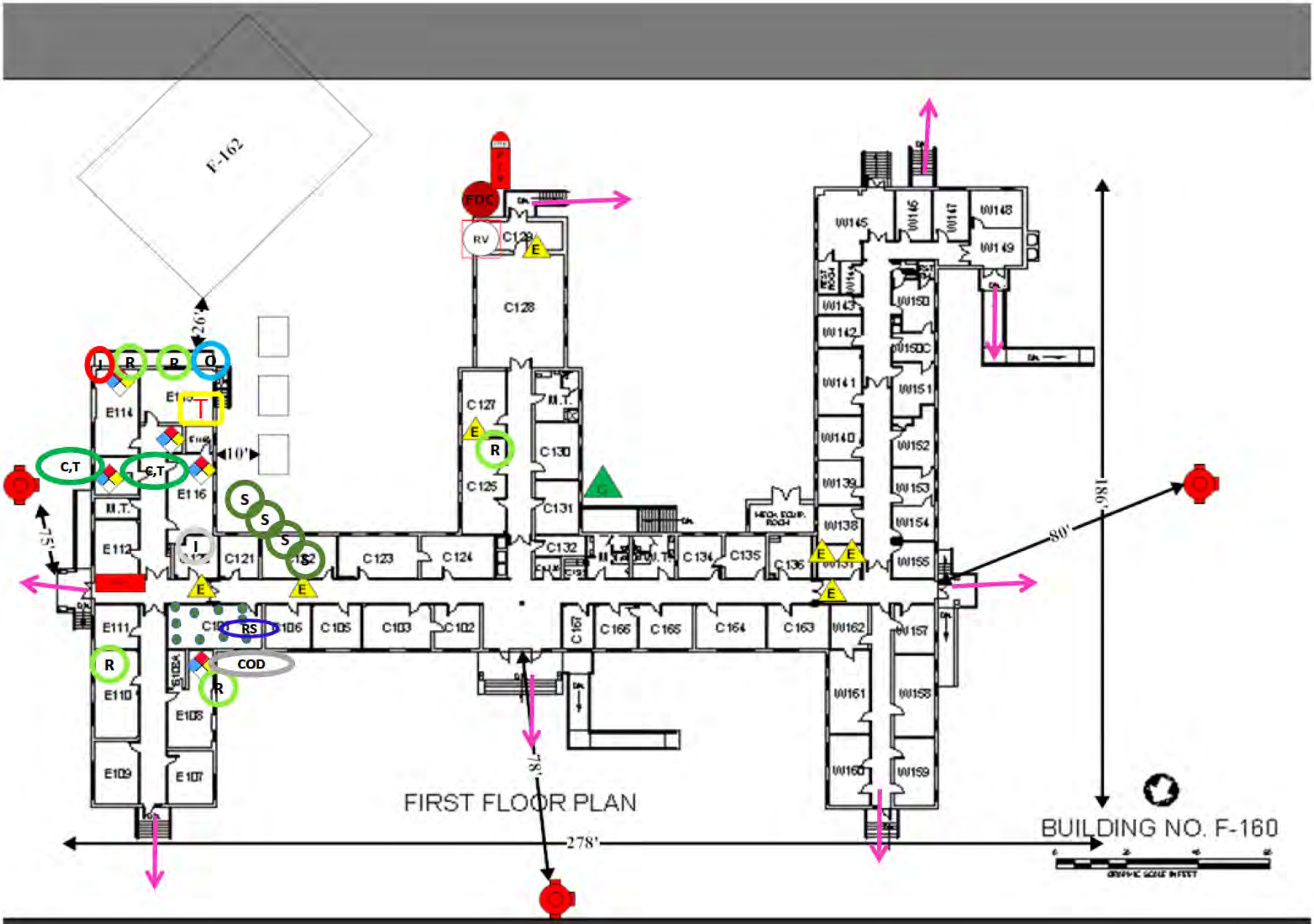


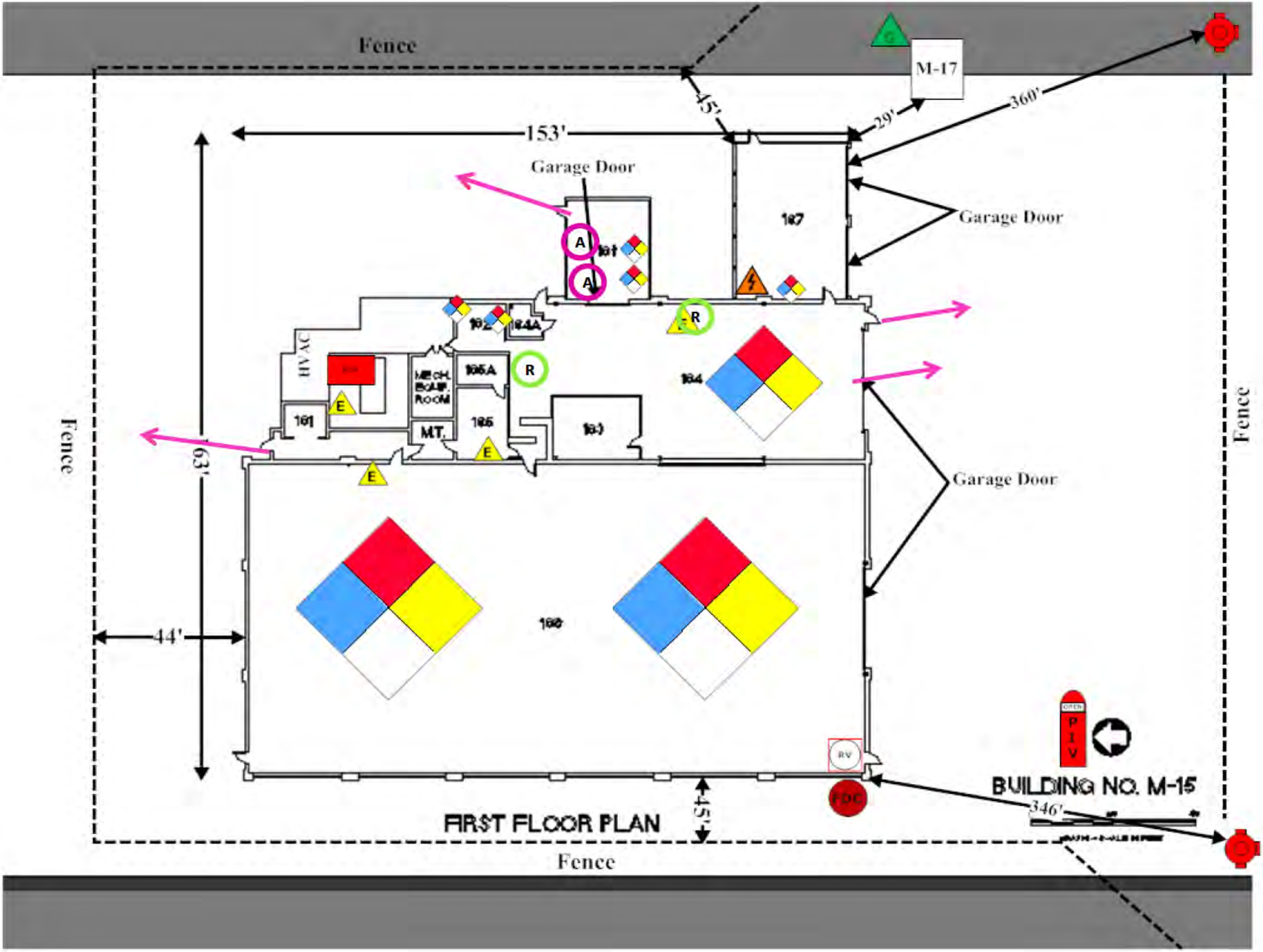
BASEMENT FLOOR PLAN

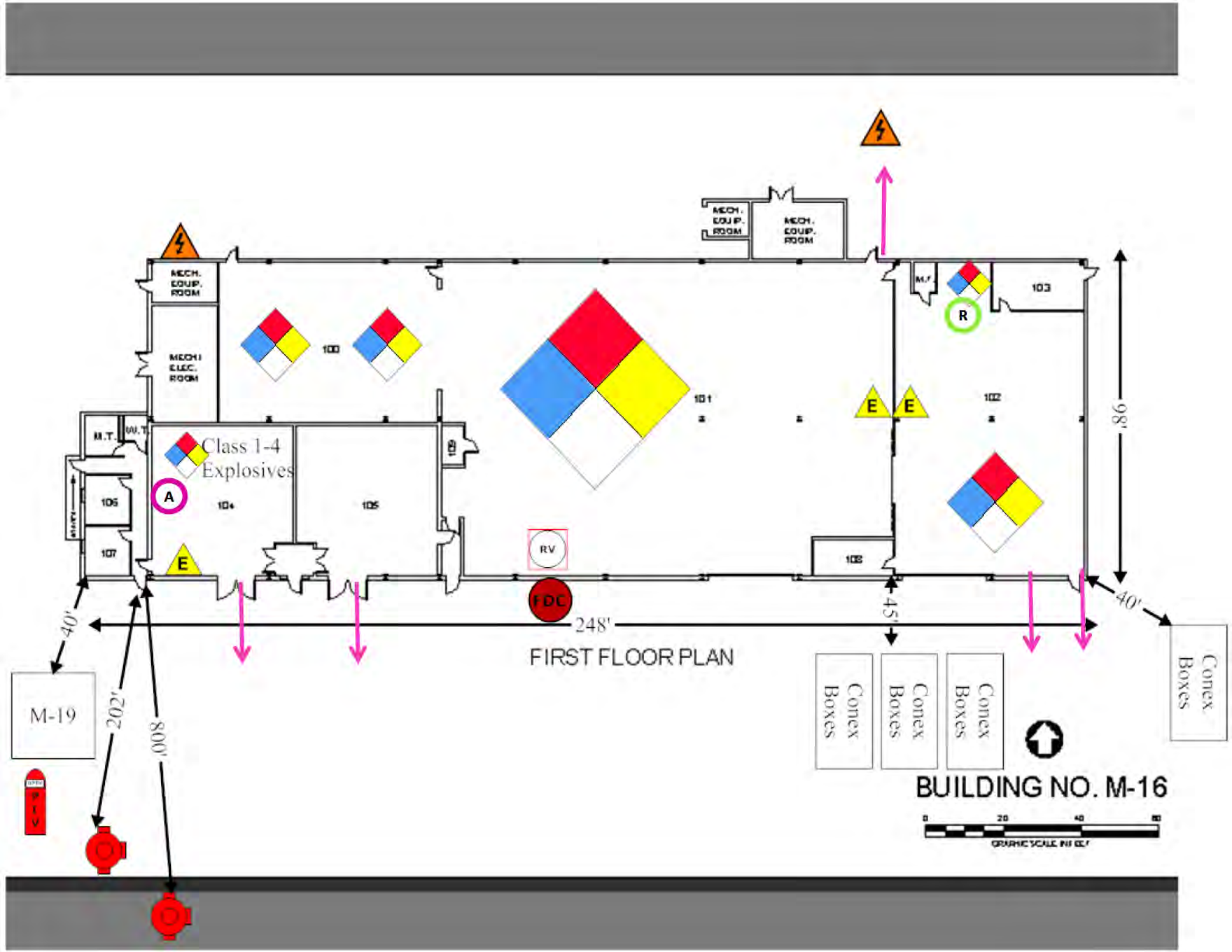
BUILDING NO. F-160

0 10 20 40 80

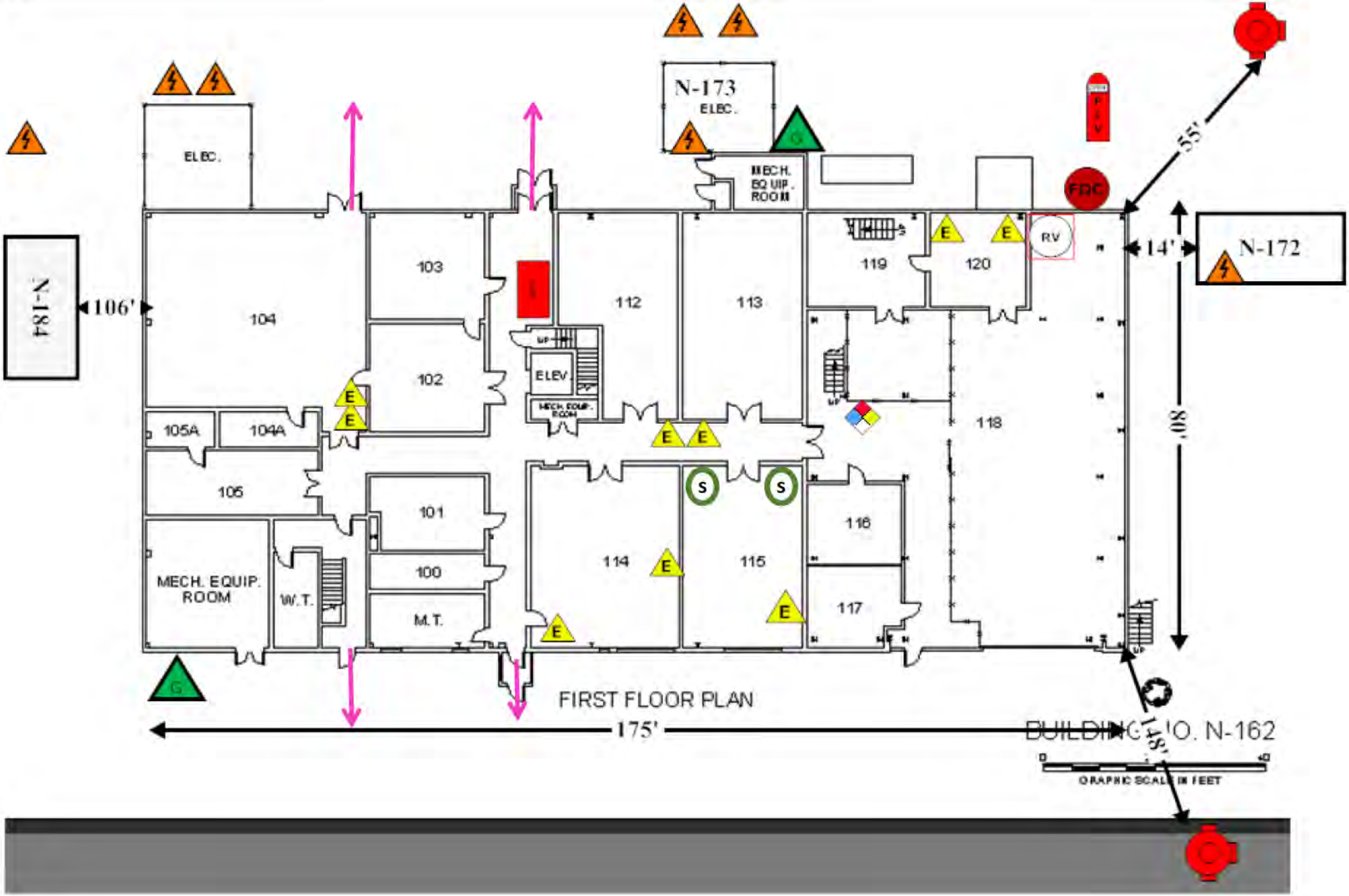
GRAPHIC SCALE IN FEET

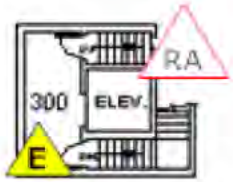

F-162
FDC
RV
C128
C127
C130
C125
C131
C132
C134
C135
C136
C123
C124
C121
C122
C106
C105
C103
C102
C167
C166
C165
C164
C163
E114
E116
E112
E111
E110
E108
E109
E107
W145
W146
W147
W148
W149
W150
W150C
W151
W152
W153
W154
W155
W157
W158
W159
W160
W161
W162
W138
W139
W140
W141
W142
W143
C,T
R
T
S
RS
COD
26'
10'
75'
78'
278'
80'
186'
FIRST FLOOR PLAN
BUILDING NO. F-160


Fence
M-17
45'
29'
360'
153'
Garage Door
Garage Door
187
A
A
191
R
192
194A
HVAC
MECH. EQUIP. ROOM
195A
R
194
E
191
MT.
195
193
E
E
Garage Door
63'
Fence
Fence
44'
190
RV
FDC
PIV
BUILDING NO. M-15
346'
45'
FIRST FLOOR PLAN
Fence

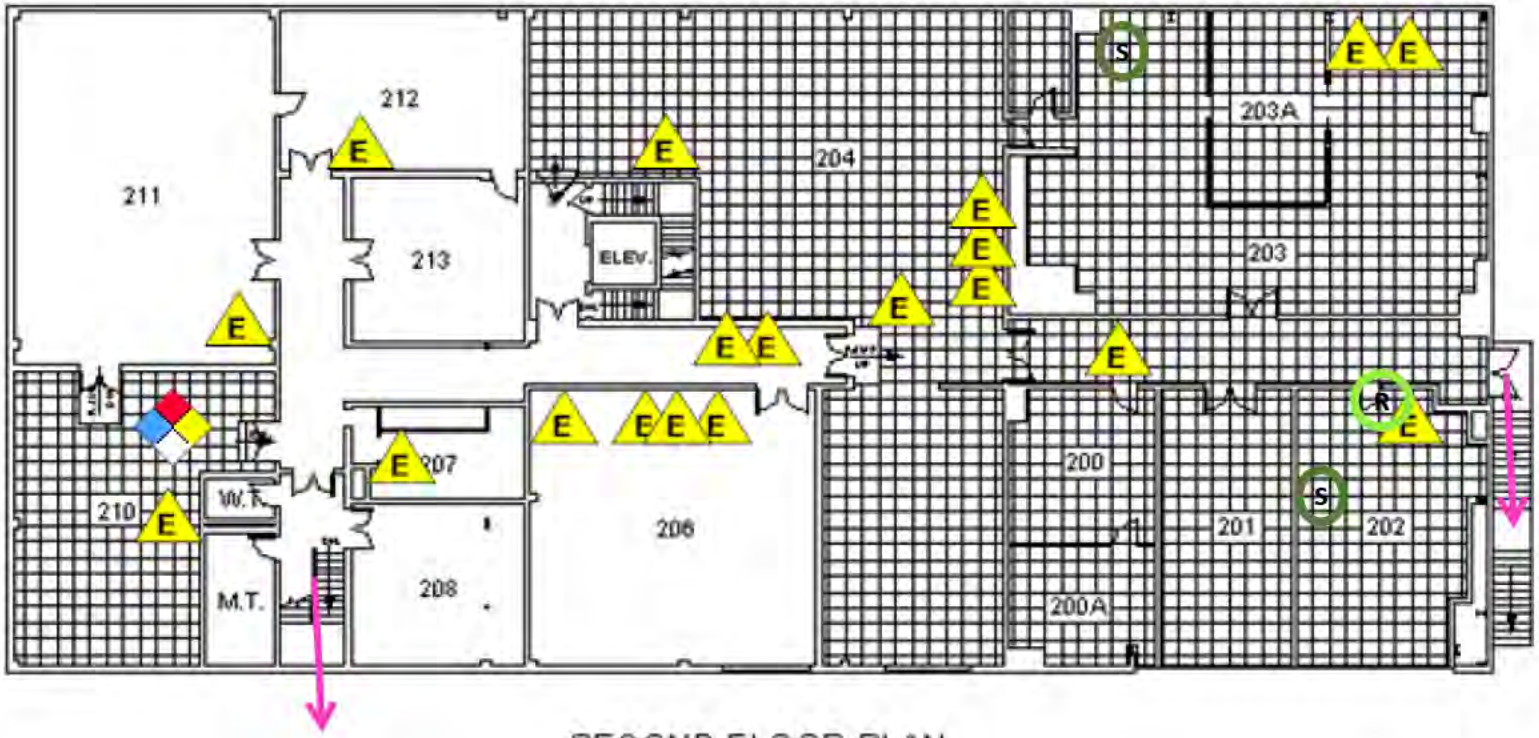

MECH. EQUIP. ROOM
MECH. EQUIP. ROOM
MECH. EQUIP. ROOM
MECH. ELEC. ROOM
M.T.
W.T.
100
101
102
103
104
105
106
107
108
109
Class 1-4 Explosives
A
E
E
E
R
RV
FDC
98'
248'
45'
40'
40'
202'
800'
M-19
Conex Boxes
Conex Boxes
Conex Boxes
Conex Boxes
FIRST FLOOR PLAN
BUILDING NO. M-16
0
20
40
80

N-150
62'
279'
266'
177'
5 NASA Aircraft
and
5 NASA Tugs
Stored in Hangar
HANGAR AREA
C100
Air
Handler
70'
142'
420'
236'
FIRST FLOOR PLAN
BUILDING NO. N-159
N-159F
EE
RV
FDC
P
A
R
S
J
E


N-173
ELEC.
ELEC.
MECH. EQUIP. ROOM
FDC
RV
55'
14'
N-172
N-184
106'
104
103
102
105A
104A
105
MECH. EQUIP. ROOM
W.T.
101
100
M.T.
ELEV
MECH. EQUIP. ROOM
112
113
114
115
116
117
118
119
120
80'
175'
FIRST FLOOR PLAN
BUILDING NO. N-162
GRAPHIC SCALE IN FEET



THIRD FLOOR PLAN

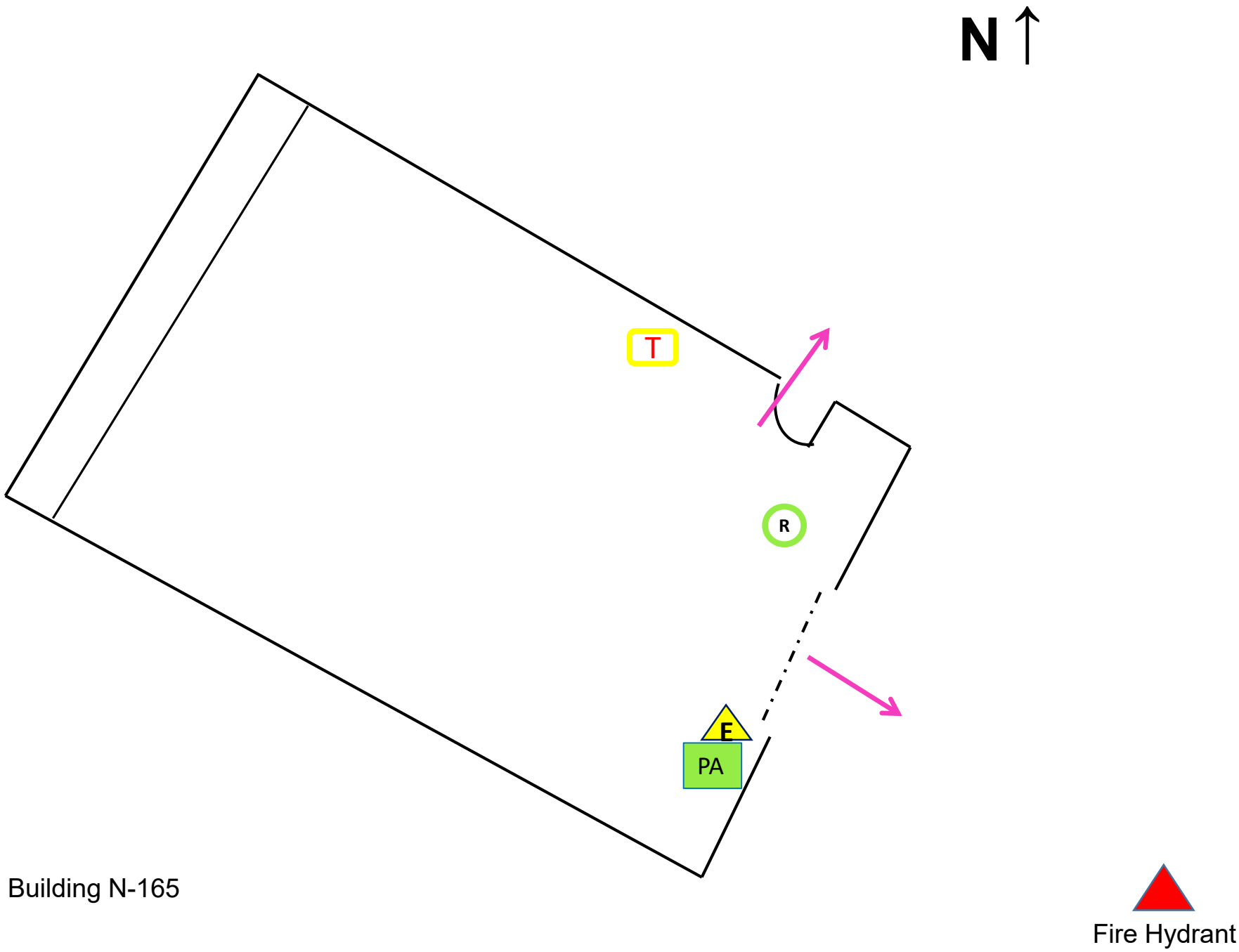


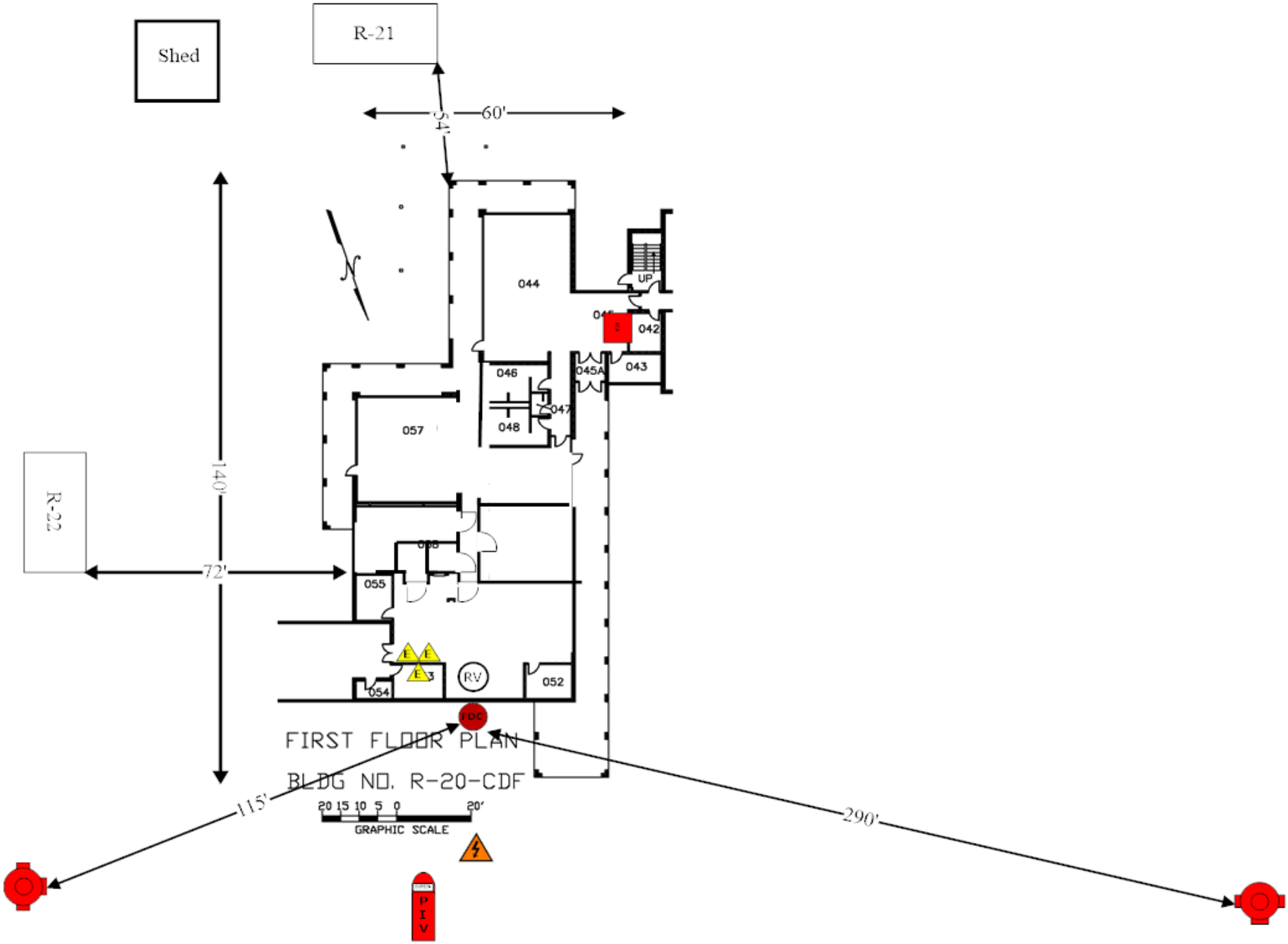
SECOND FLOOR PLAN

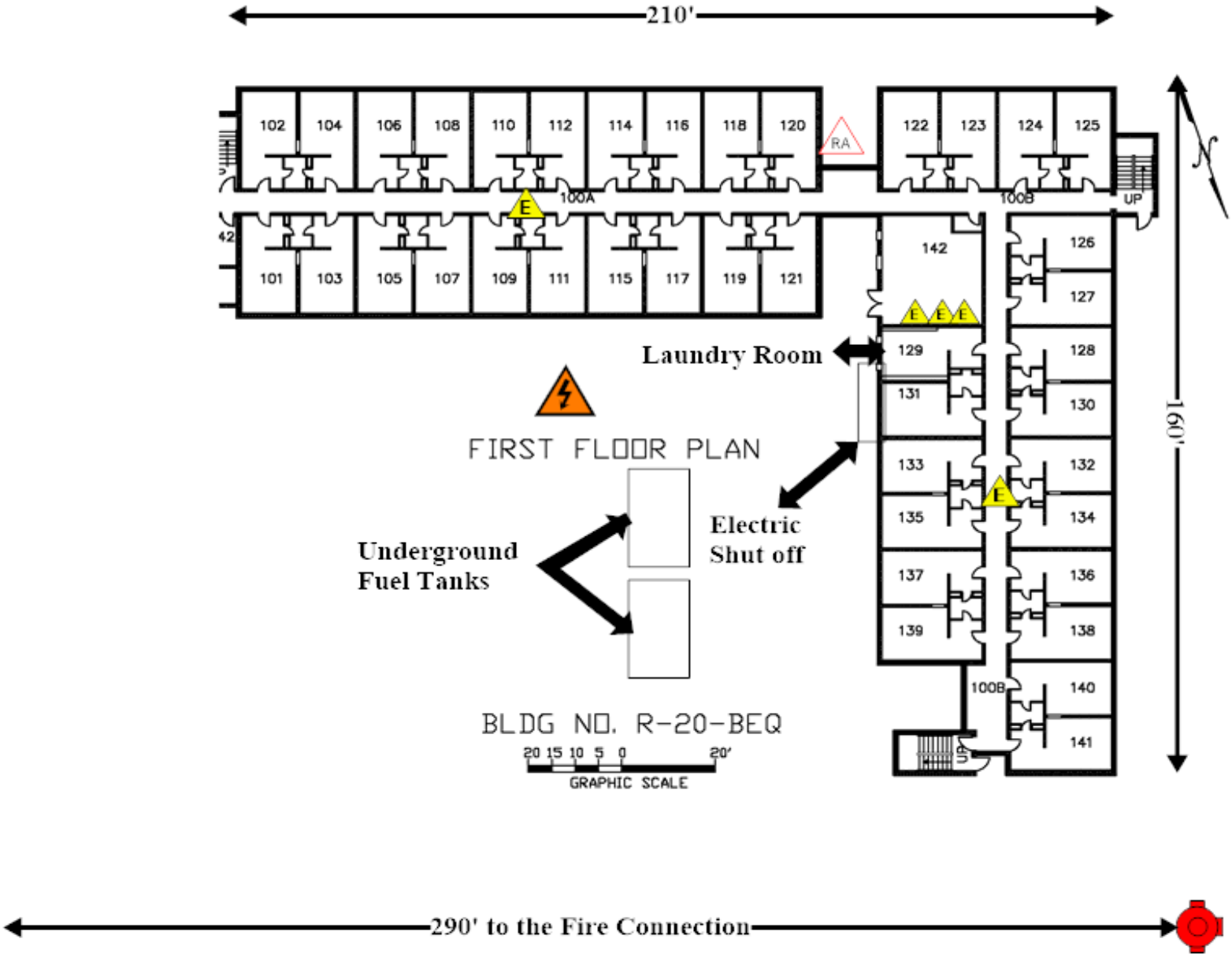
BUILDING NO. N-162

0 20 40

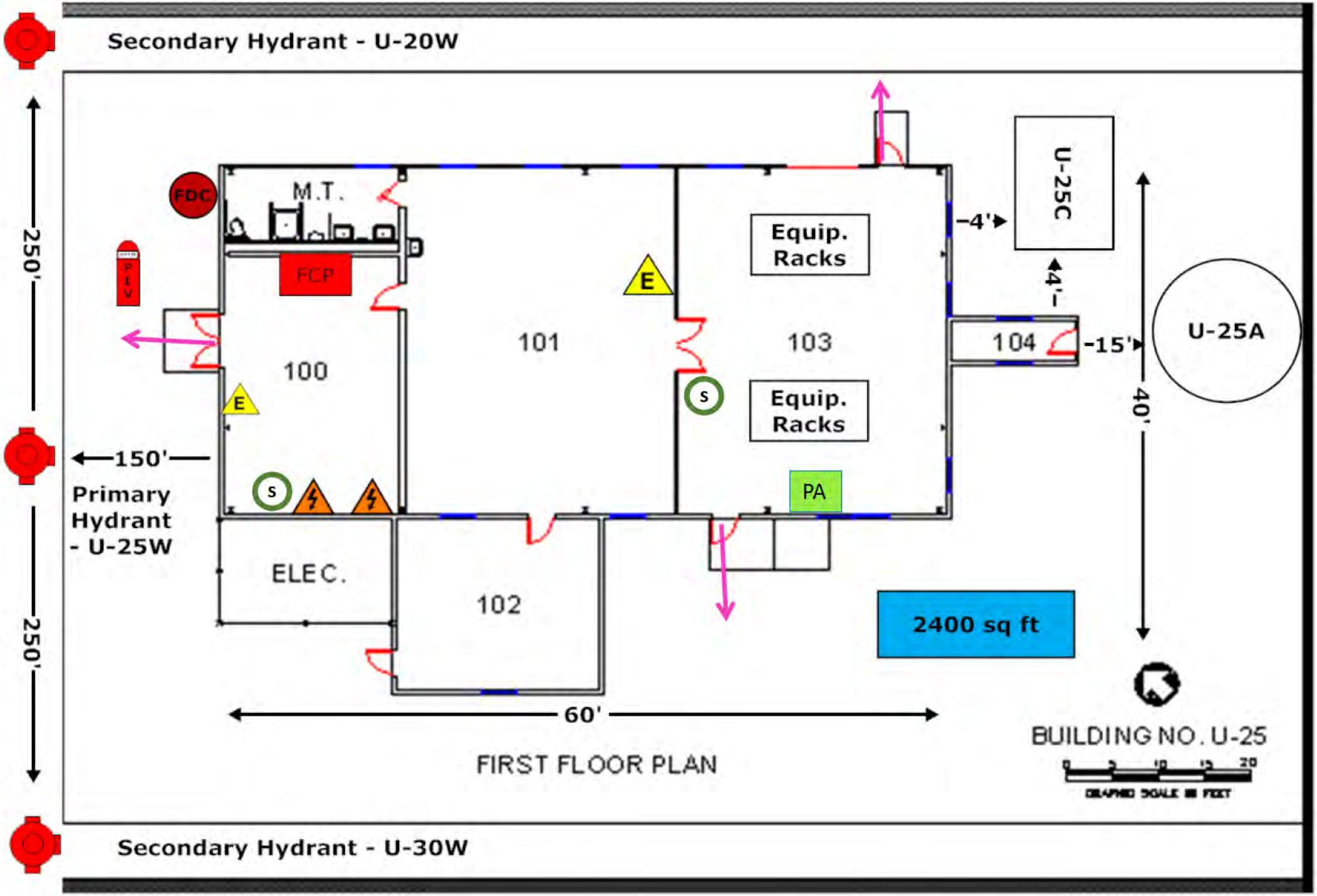
GRAPHIC SCALE IN FEET

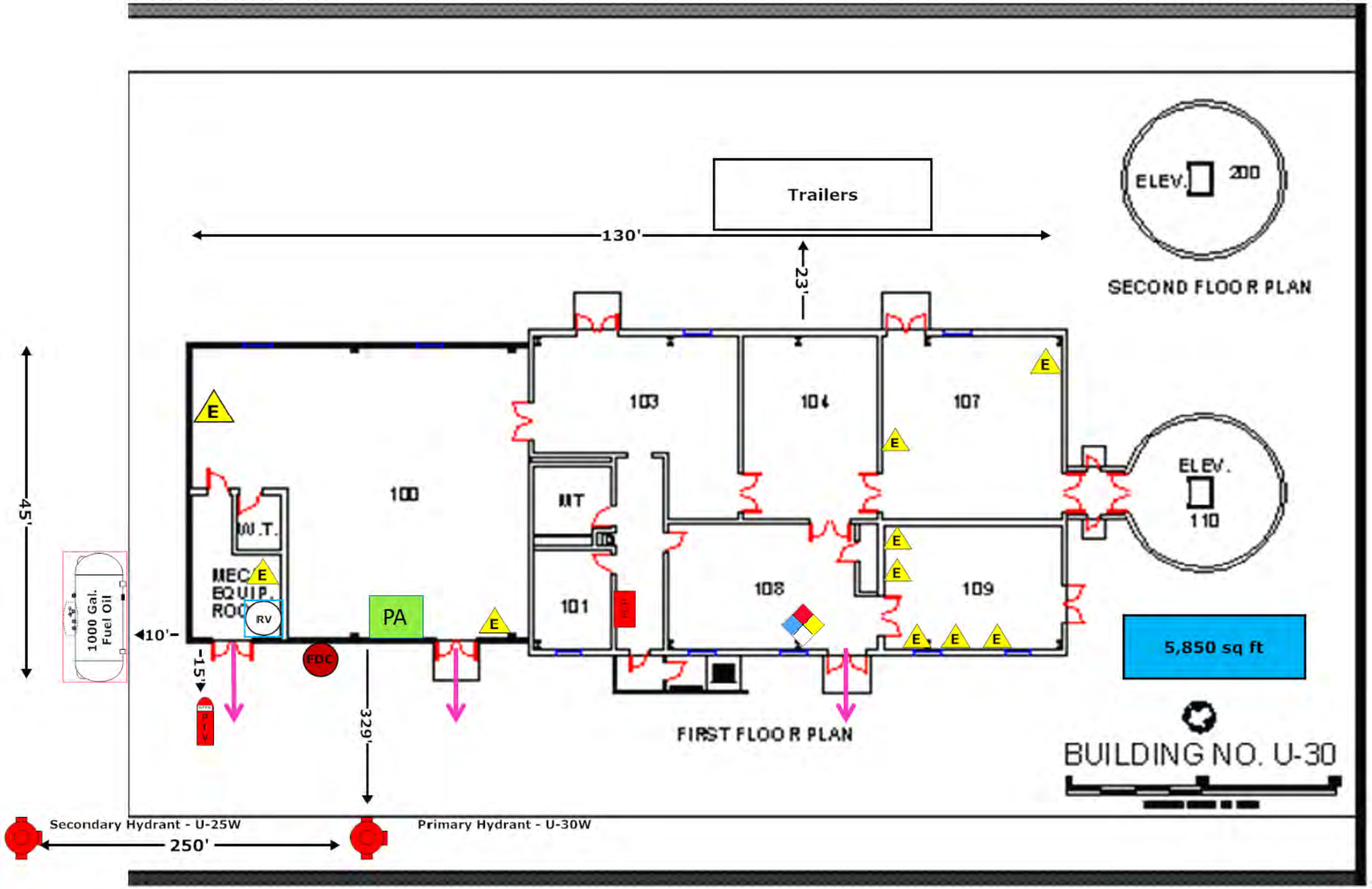

N
T
R
E
PA
Building N-165
Fire Hydrant

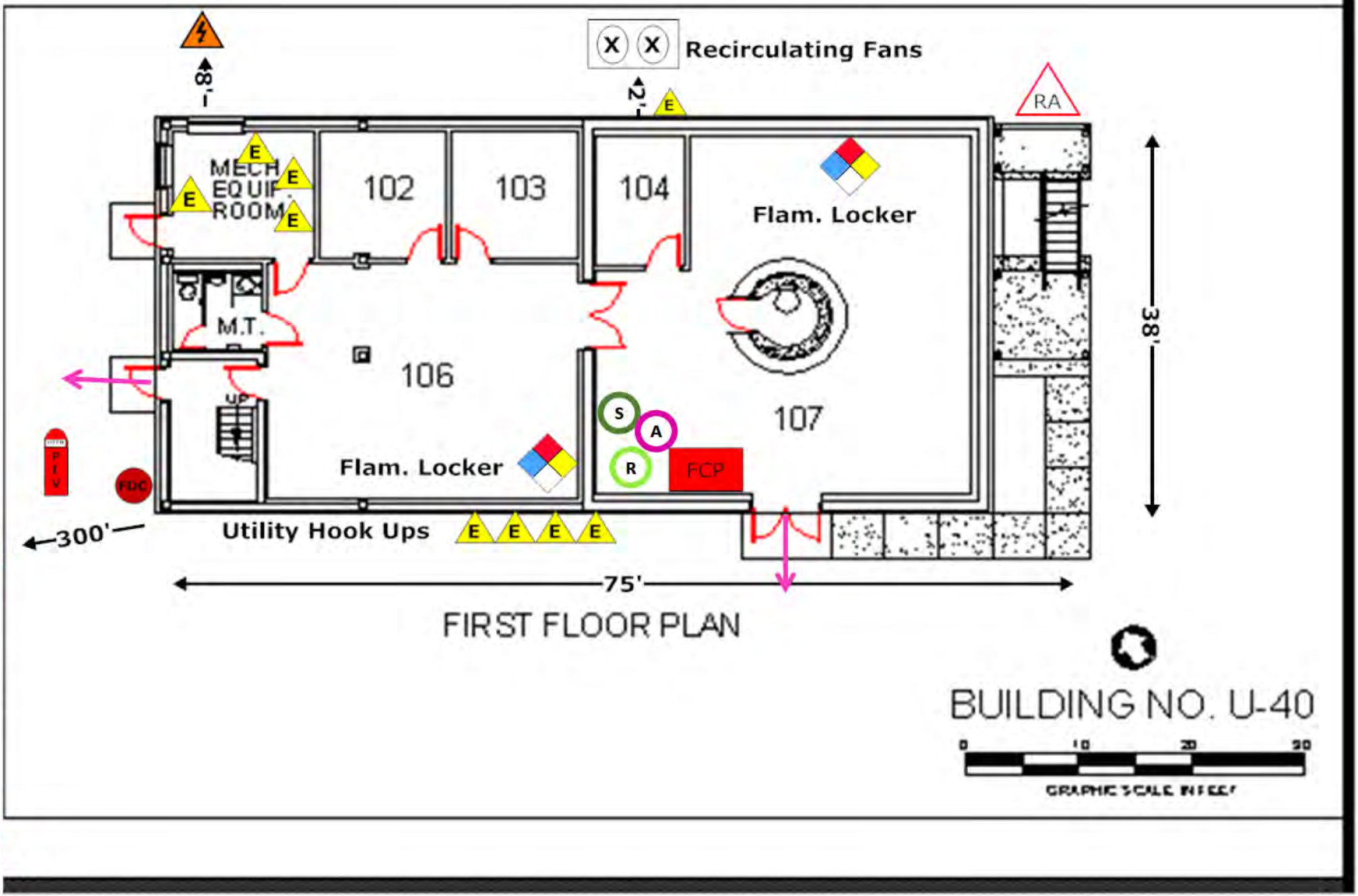

Shed
R-21
R-22
24'
60'
140'
72'
115'
290'
044
UP
042
043
046
045A
047
048
057
055
054
052
RV
FDC
FIRST FLOOR PLAN
BLDG NO. R-20-CDF
20 15 10 5 0 20'
GRAPHIC SCALE
PIV

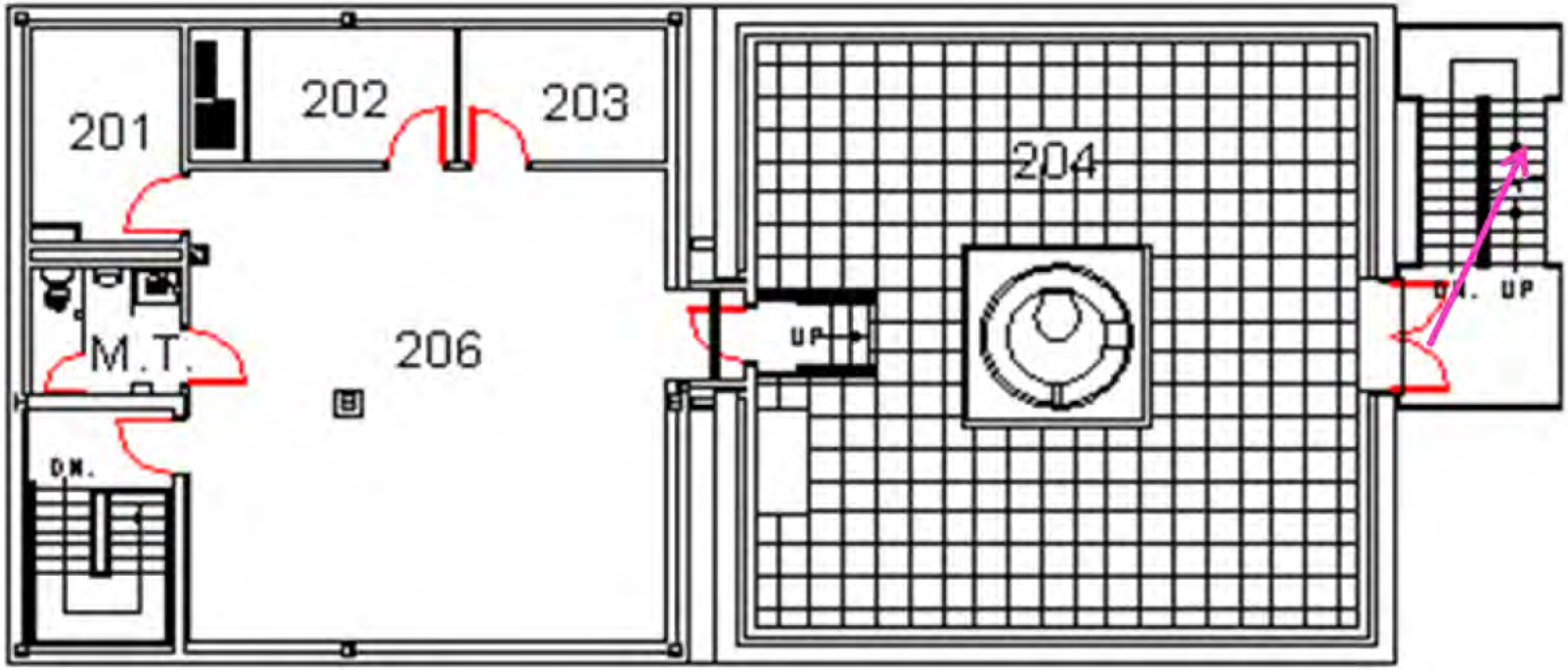

210'
102
104
106
108
110
112
114
116
118
120
RA
122
123
124
125
100A
100B
UP
101
103
105
107
109
111
115
117
119
121
142
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
Laundry Room
FIRST FLOOR PLAN
Electric
Shut off
Underground
Fuel Tanks
BLDG NO. R-20-BEQ
20 15 10 5 0 20'
GRAPHIC SCALE
160'
290' to the Fire Connection

202
204
206
208
210
212
214
216
218
220
222
223
224
225
DN
200A
200B
DN
201
203
205
207
209
211
215
217
219
221
243
226
242
229
228
231
230
233
232
200B
234
DN
Window AC
Laundry Room
SECOND FLOOR PLAN
BLDG NO. R-20-BEQ
20 15 10 5 0 20'
GRAPHIC SCALE


Secondary Hydrant - U-20W
FDC
M.T.
FCP
PIV
100
101
103
104
102
ELEC.
E
S
Equip. Racks
Equip. Racks
PA
U-25C
U-25A
-4'
4'
-15'
40'
60'
250'
250'
150'
Primary Hydrant - U-25W
2400 sq ft
BUILDING NO. U-25
FIRST FLOOR PLAN
Secondary Hydrant - U-30W


Trailers
130'
23'
ELEV.
200
SECOND FLOOR PLAN
45'
E
100
W.T.
MECH
EQUIP.
ROOM
RV
PA
FDC
10'
15'
329'
1000 Gal.
Fuel Oil
103
104
107
MT
101
108
109
ELEV.
110
5,850 sq ft
FIRST FLOOR PLAN
BUILDING NO. U-30
Secondary Hydrant - U-25W
Primary Hydrant - U-30W
250'


Recirculating Fans
X
X
8'
2'
E
RA
MECH EQUIP. ROOM
E
E
E
E
102
103
104
Flam. Locker
M.T.
106
107
38'
UP
S
A
R
FCP
Flam. Locker
FDC
PIV
300'
Utility Hook Ups
E
E
E
E
75'
FIRST FLOOR PLAN
BUILDING NO. U-40
0
10
20
30
GRAPHIC SCALE IN FEET
393'

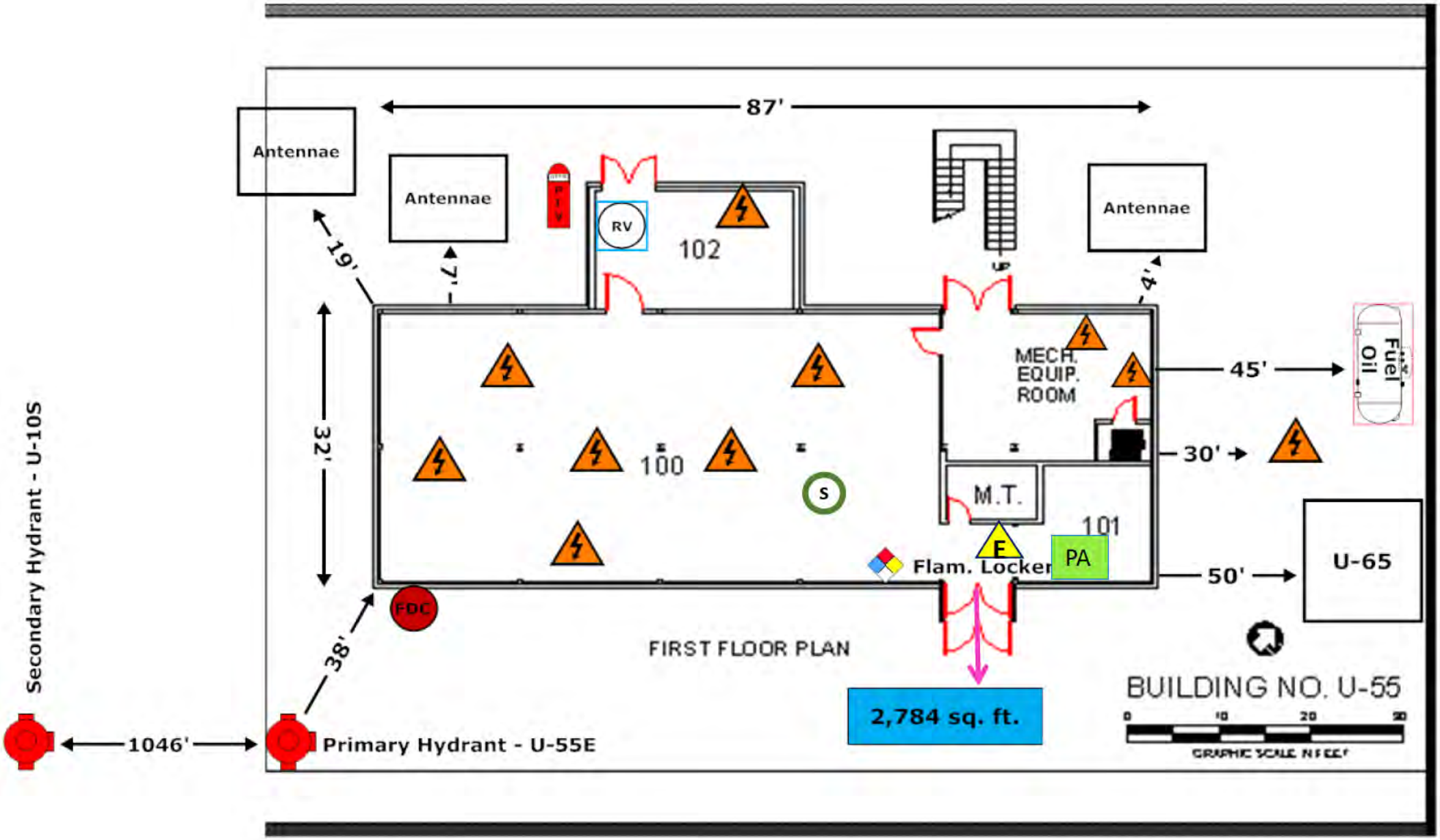


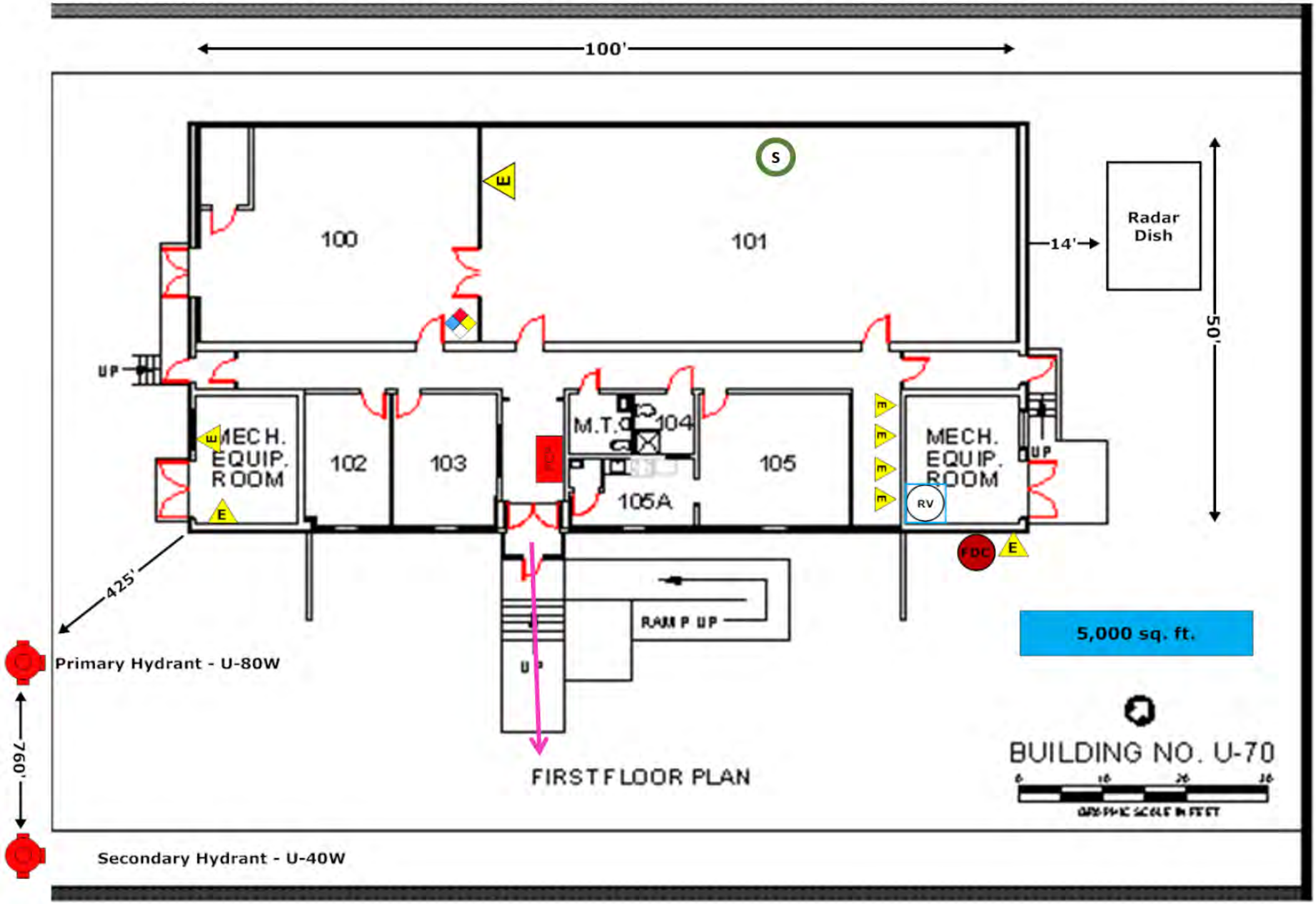
SECOND FLOOR PLAN

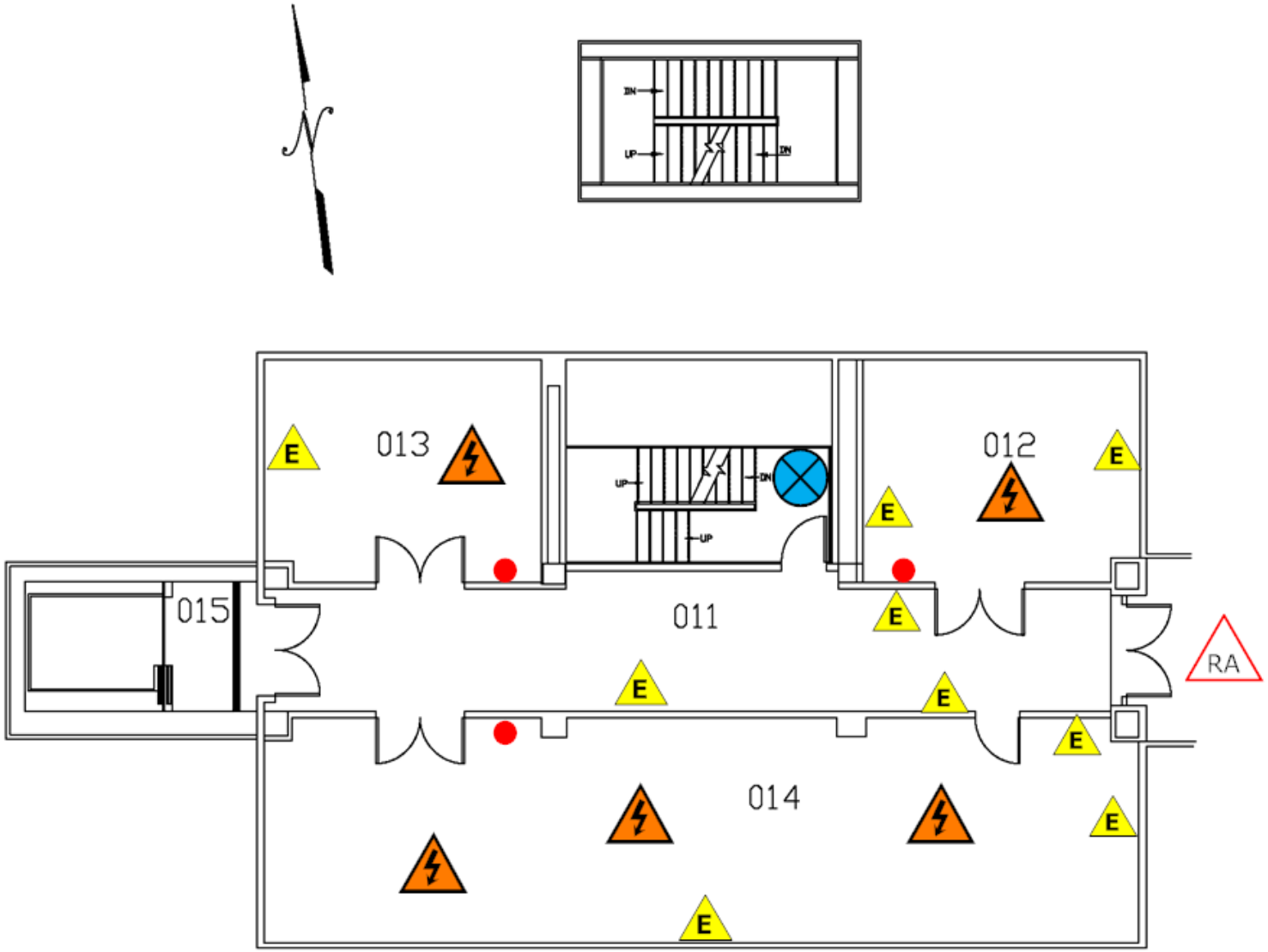
BUILDING NO. U-40

0 10 20 30

GRAPHIC SCALE IN FEET


87'
Antennae
Antennae
Antennae
RV
102
19'
7'
4'
MECH.
EQUIP.
ROOM
45'
Fuel
Oil
32'
100
S
30'
M.T.
101
E
PA
Flam. Locker
50'
U-65
FDC
38'
FIRST FLOOR PLAN
2,784 sq. ft.
BUILDING NO. U-55
0
10
20
30
GRAPHIC SCALE IN FEET
Secondary Hydrant - U-10S
1046'
Primary Hydrant - U-55E

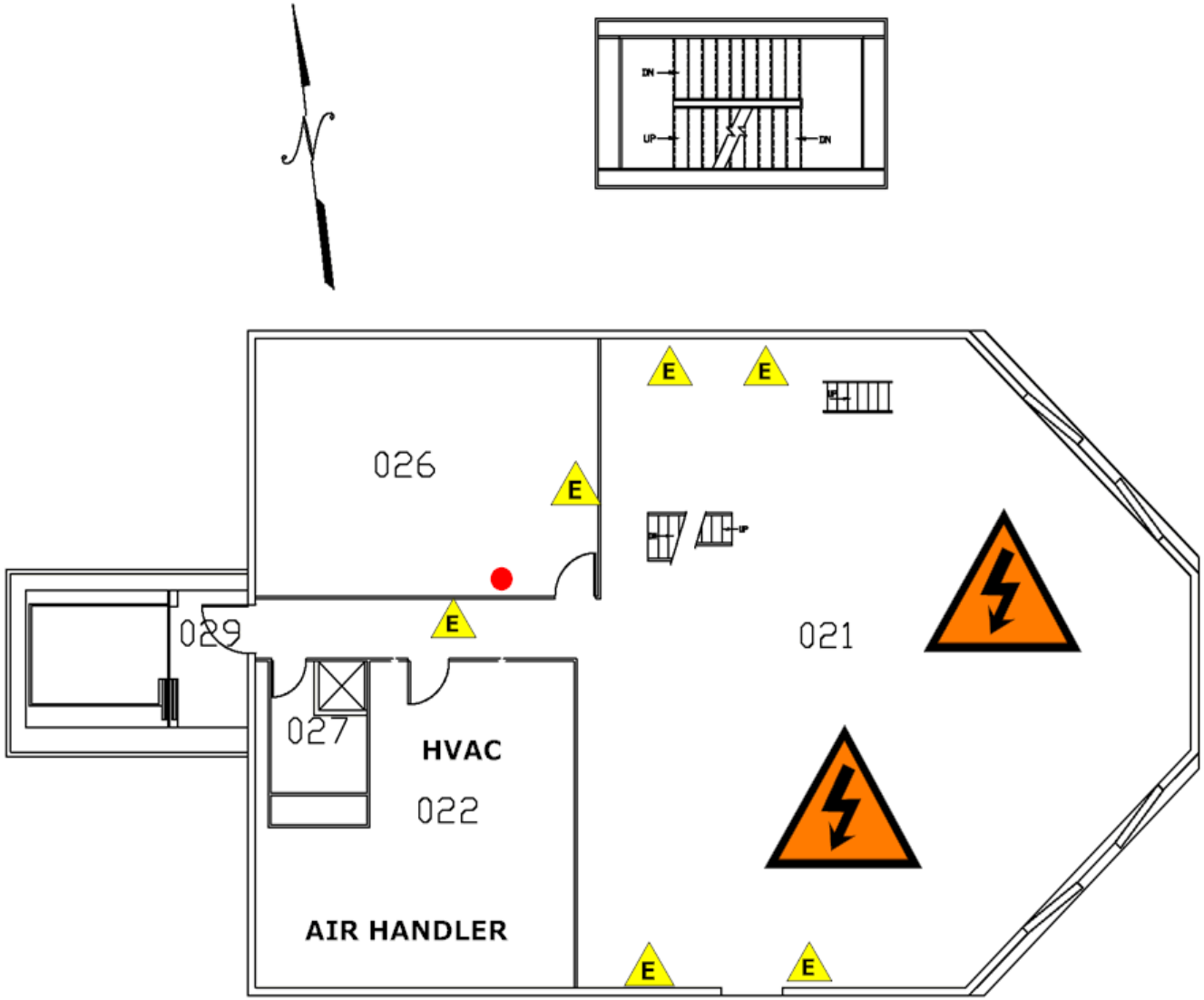

100'
100
101
S
E
14'
Radar Dish
50'
UP
MECH. EQUIP. ROOM
102
103
M.T.
104
105
105A
MECH. EQUIP. ROOM
RV
FDC
RAMP UP
425'
Primary Hydrant - U-80W
760'
Secondary Hydrant - U-40W
5,000 sq. ft.
BUILDING NO. U-70
FIRST FLOOR PLAN



01 DECK LEVEL

5' 0' 5' 10'
GRAPHIC SCALE

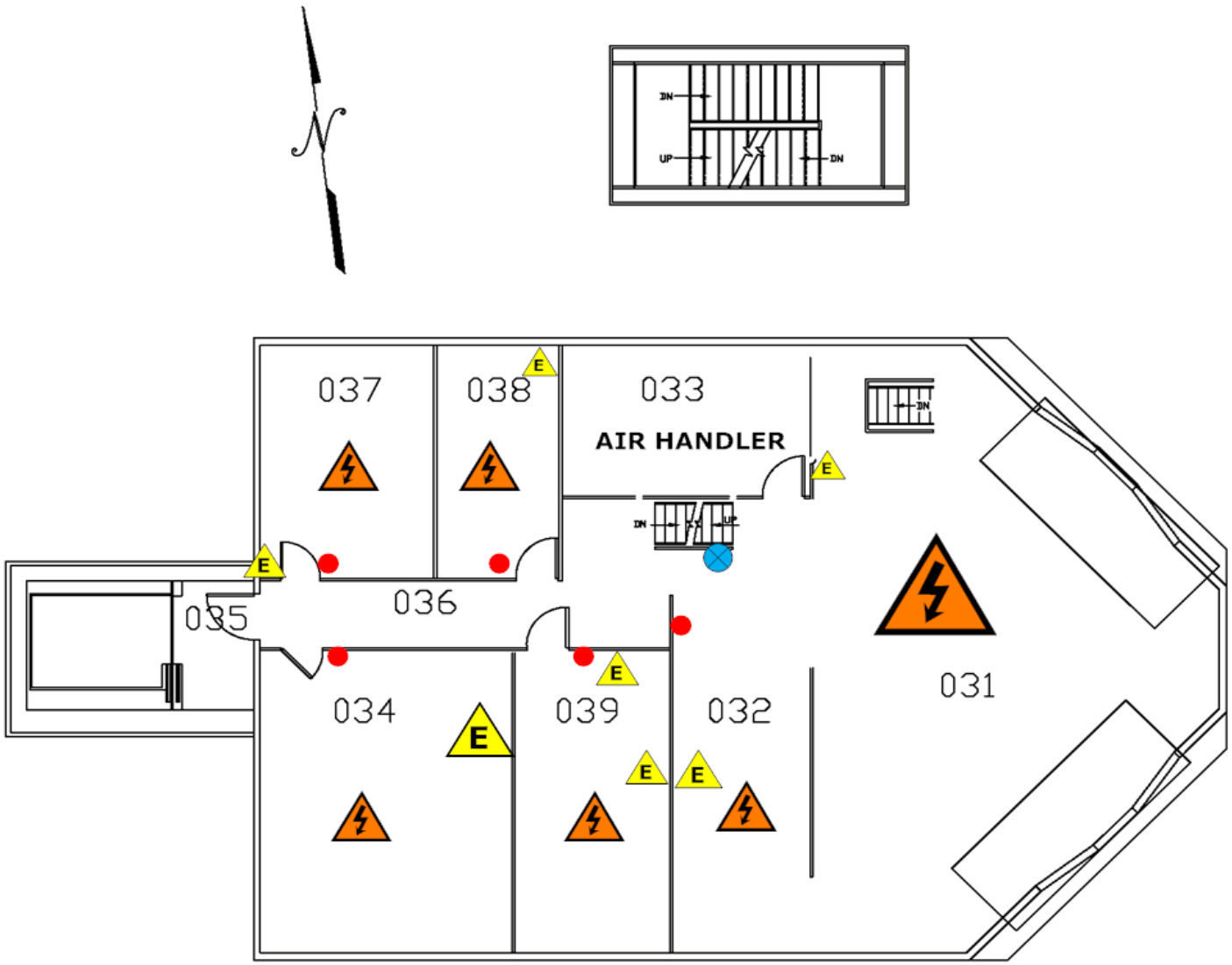
BLDG NO. V-10



02 DECK LEVEL

5′ 0′ 5′ 10′
GRAPHIC SCALE

BLDG NO. V-10

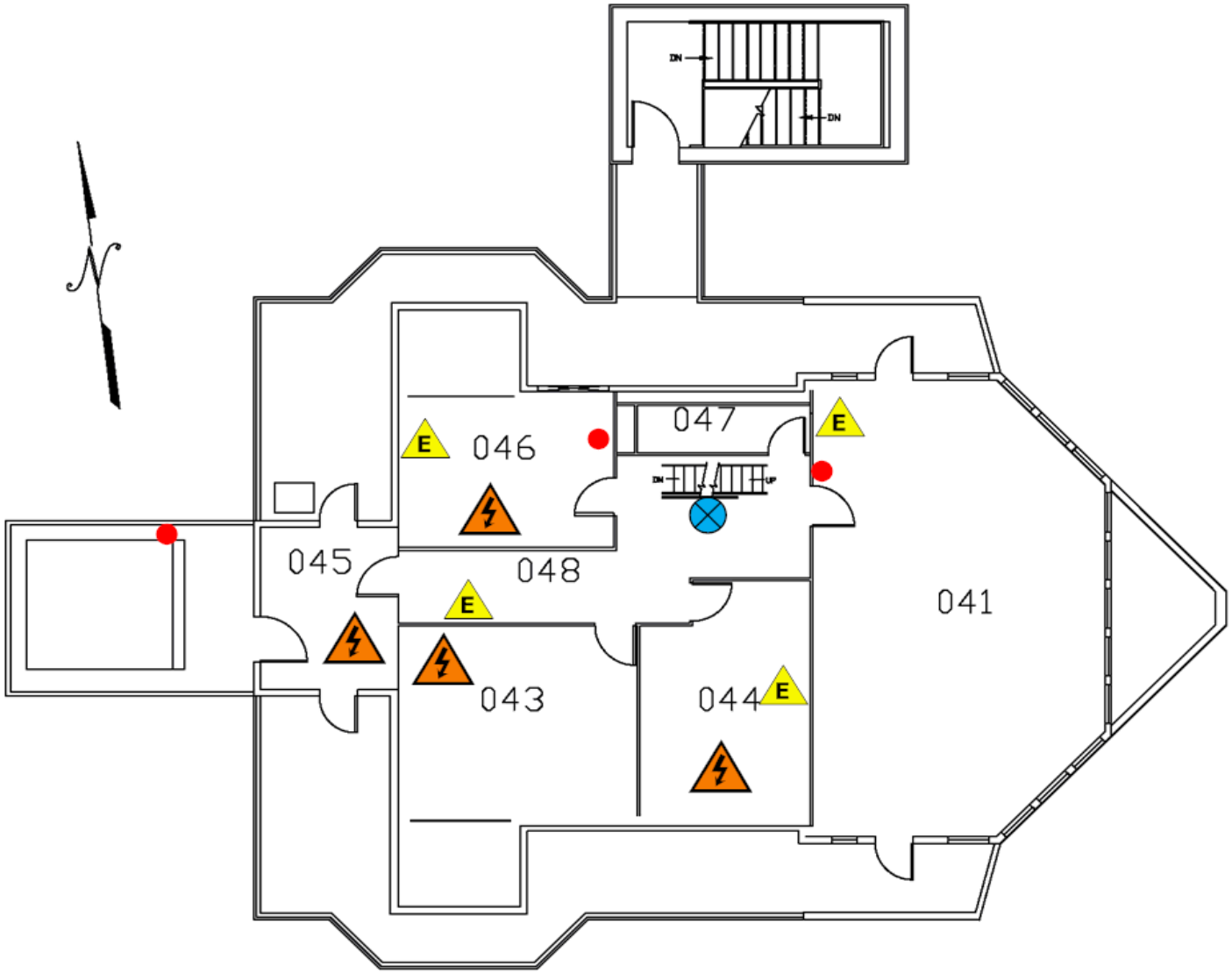


03 DECK LEVEL

5′ 0′ 5′ 10′

GRAPHIC SCALE

BLDG NO. V-10

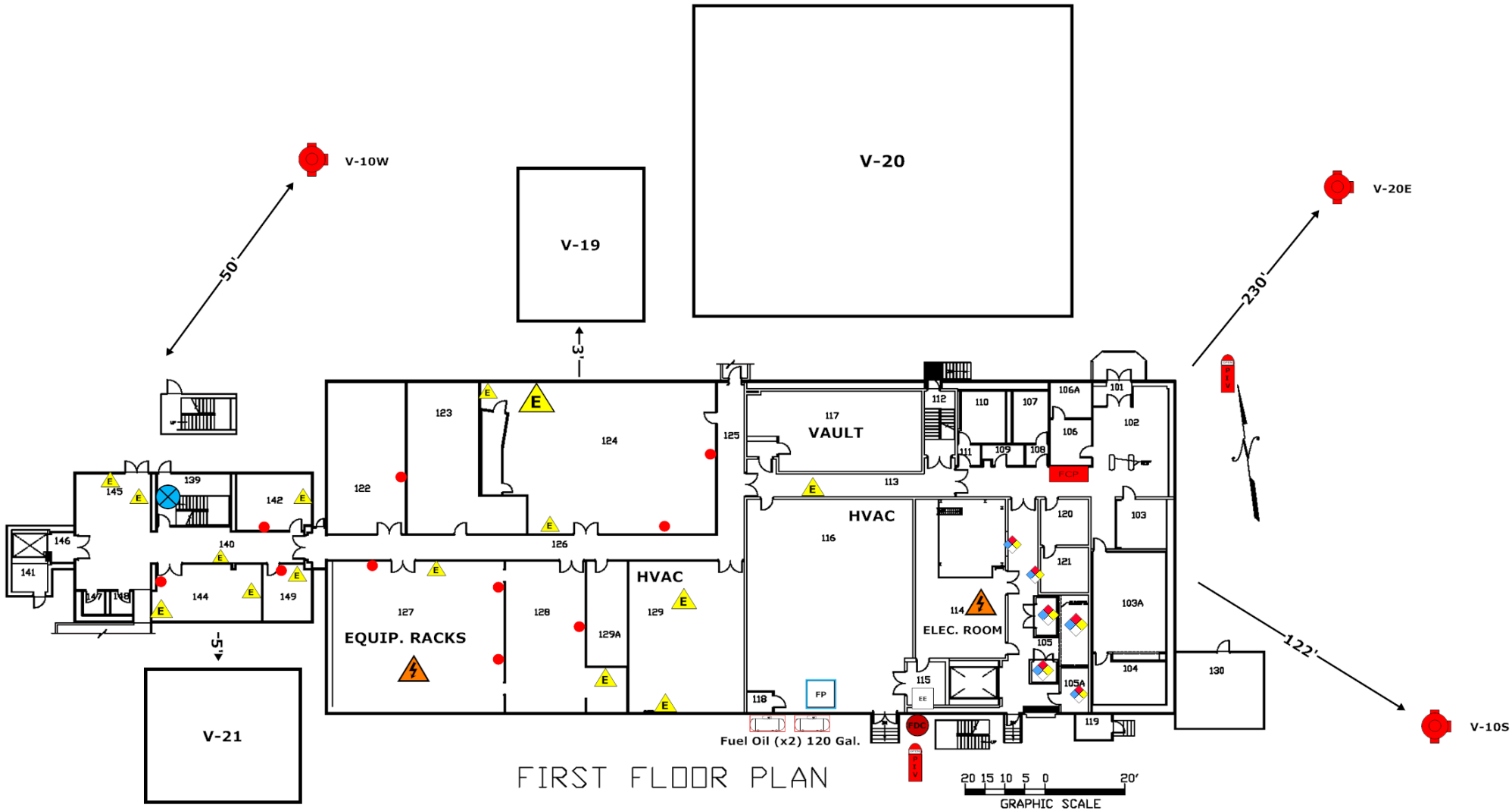


04 DECK LEVEL

5′ 0′ 5′ 10′

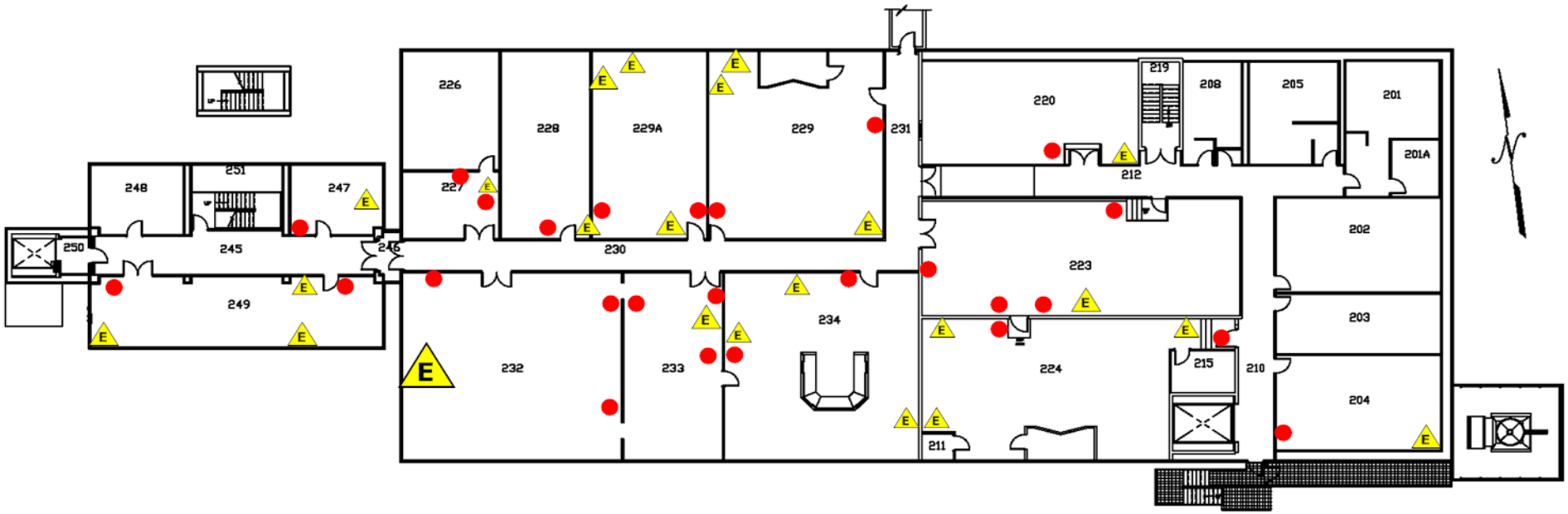
GRAPHIC SCALE

BLDG NO. V-10



FIRST FLOOR PLAN

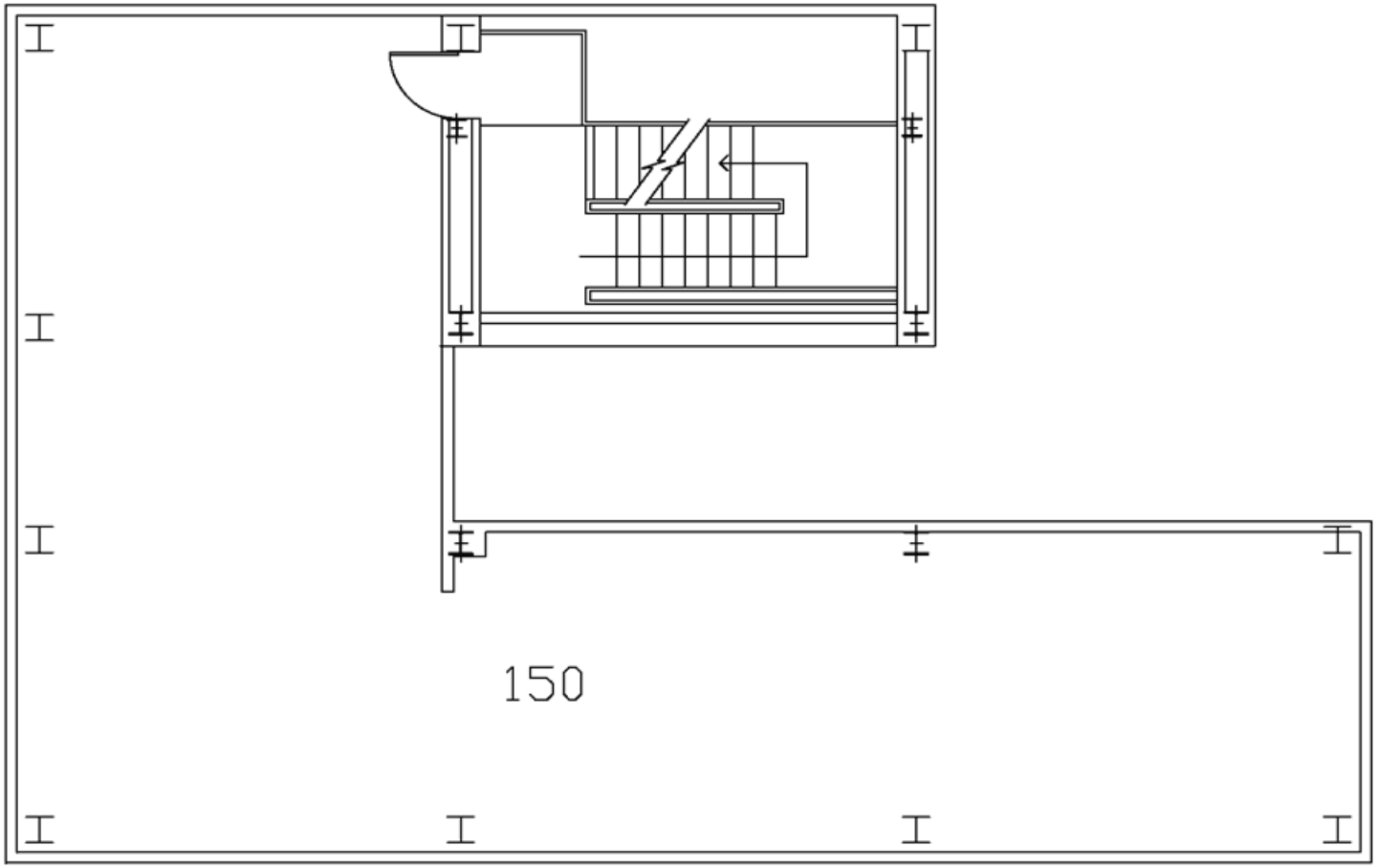
BLDG NO. V-10



SECOND FLOOR PLAN

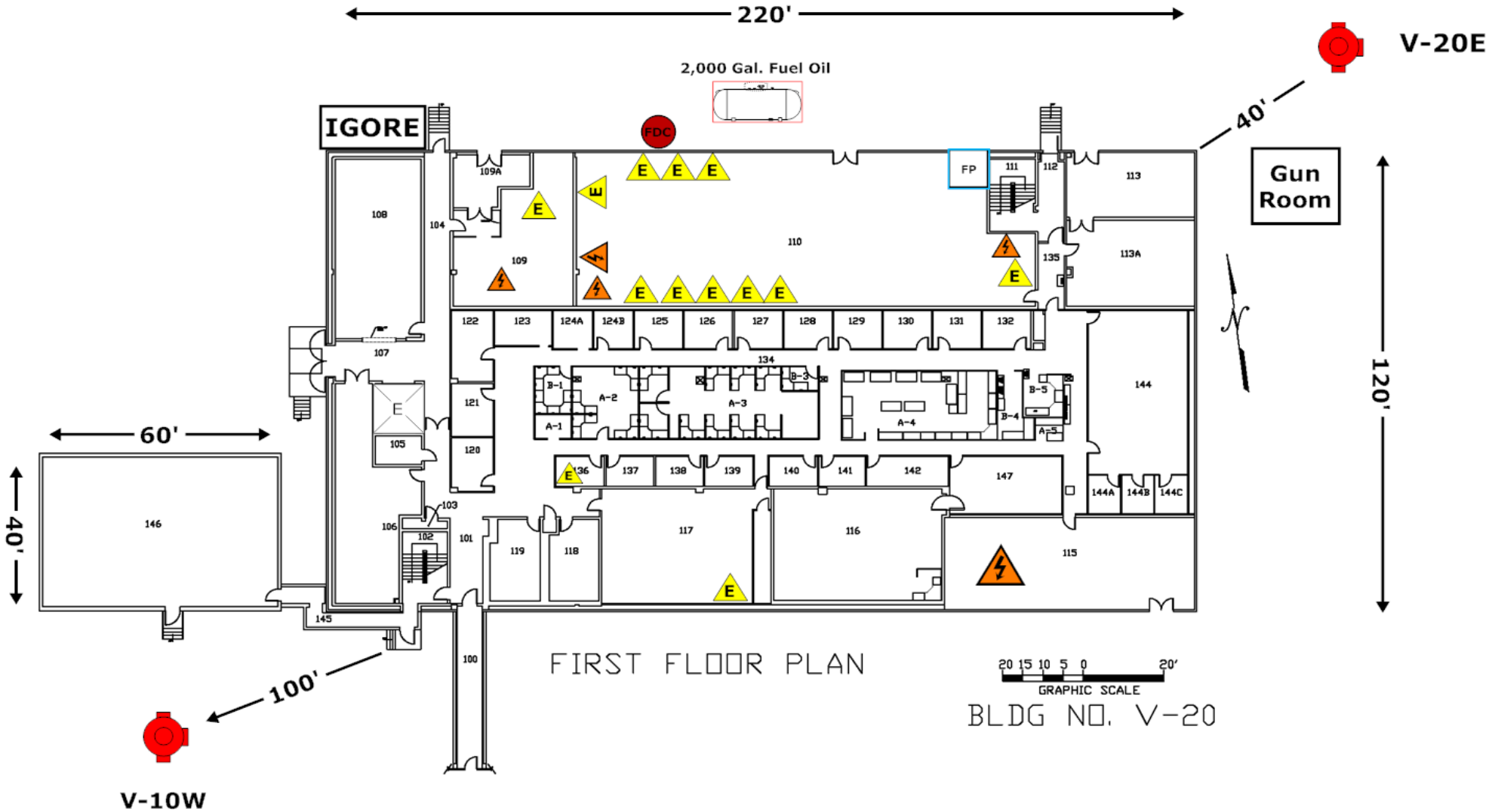
20 15 10 5 0 20'
GRAPHIC SCALE

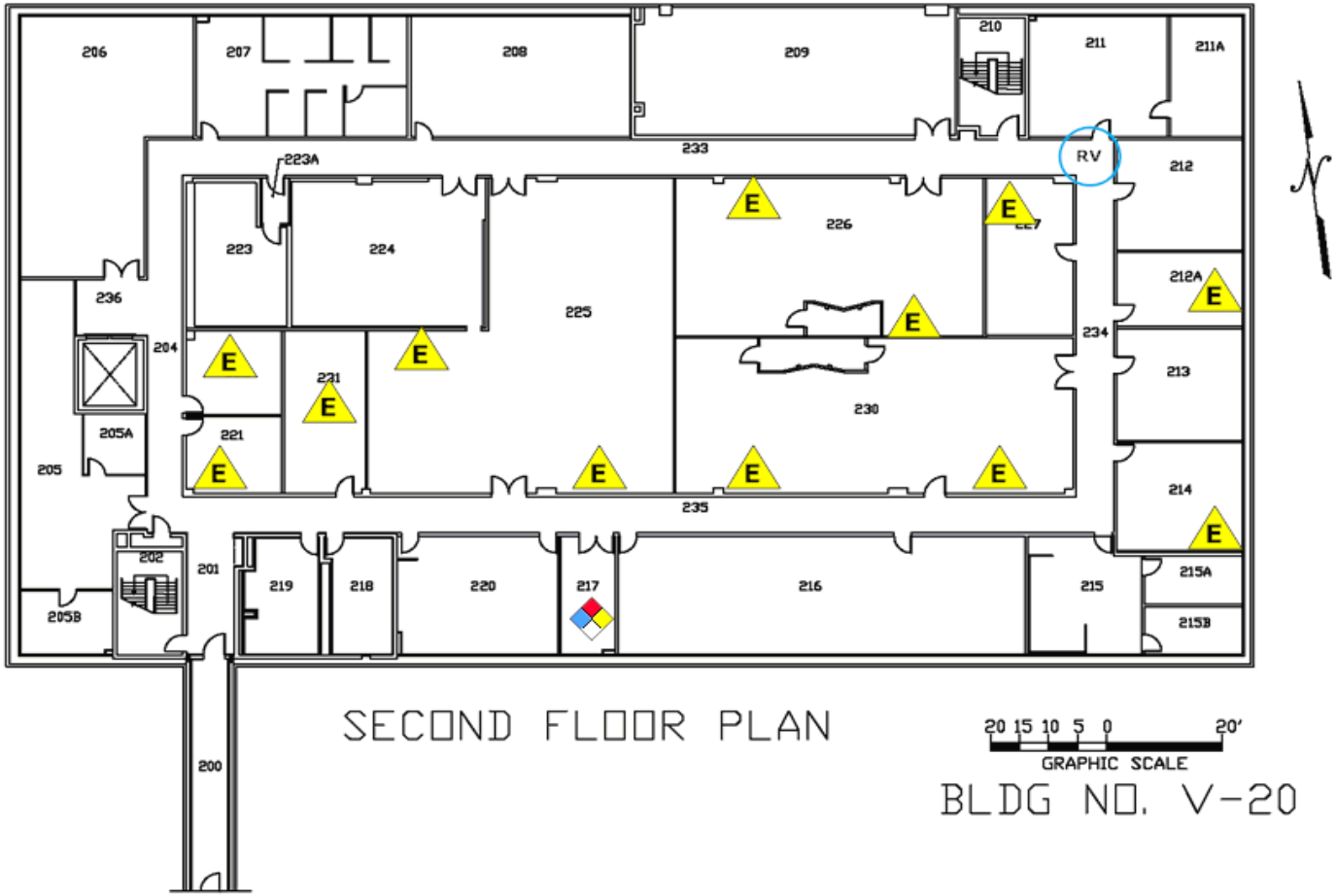
BLDG NO. V-10



MEZZANINE FLOOR PLAN
BETWEEN 1st AND 2nd FLOORS

BLDG NO. V-10

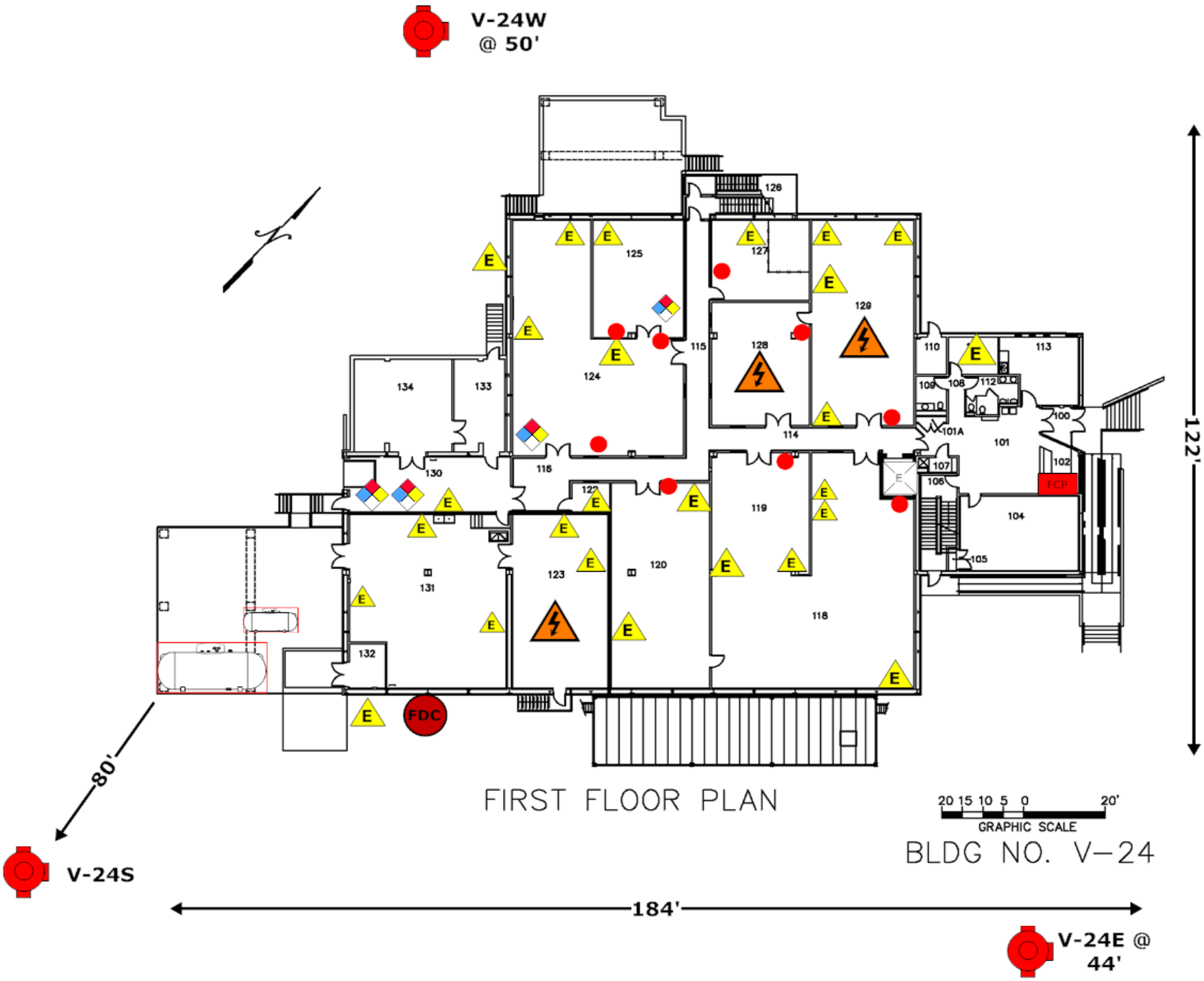

220'
V-20E
2,000 Gal. Fuel Oil
IGORE
FDC
40'
Gun Room
120'
60'
40'
100'
V-10W
FIRST FLOOR PLAN
20 15 10 5 0 20'
GRAPHIC SCALE
BLDG NO. V-20

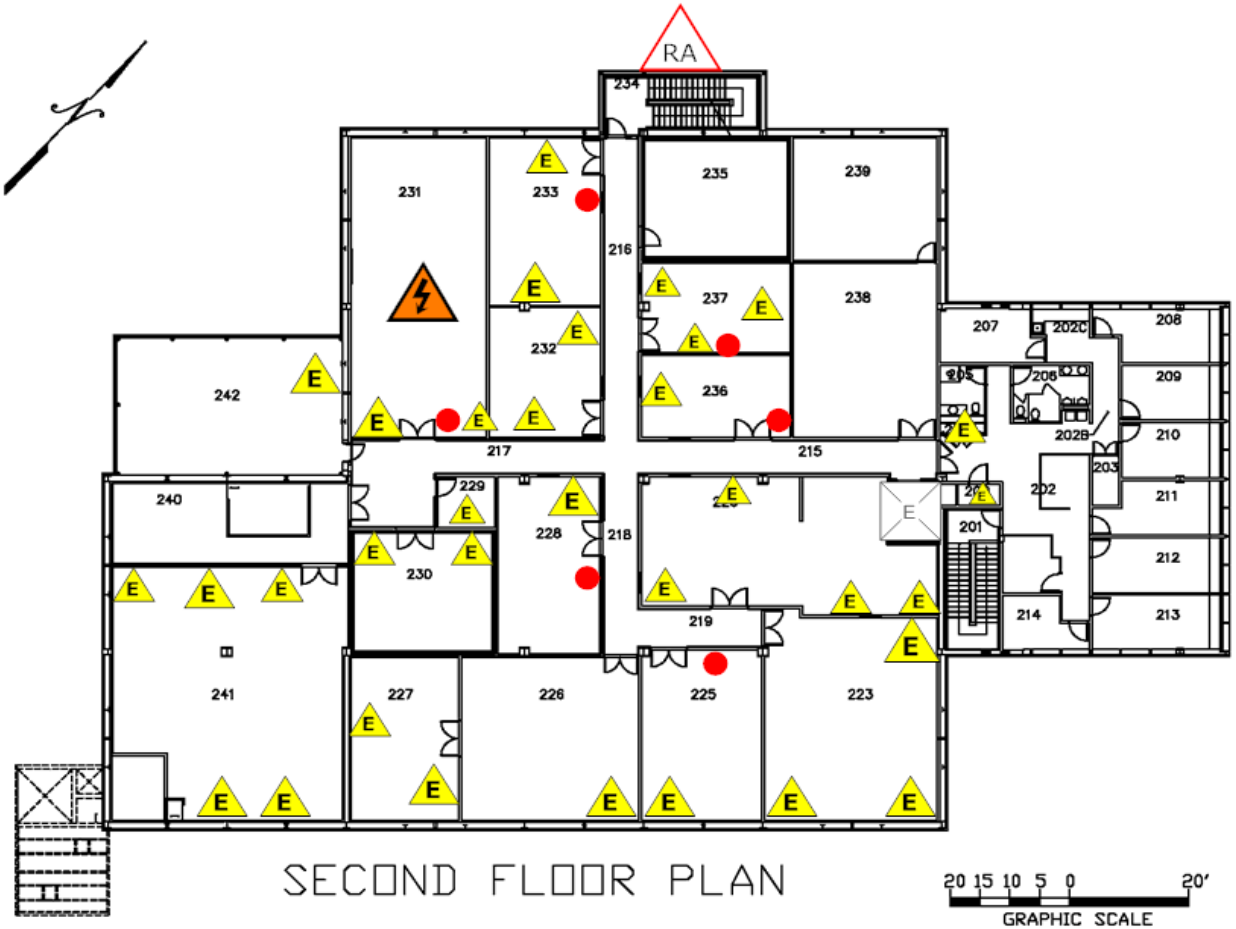


SECOND FLOOR PLAN

20 15 10 5 0 20'
GRAPHIC SCALE

BLDG NO. V-20

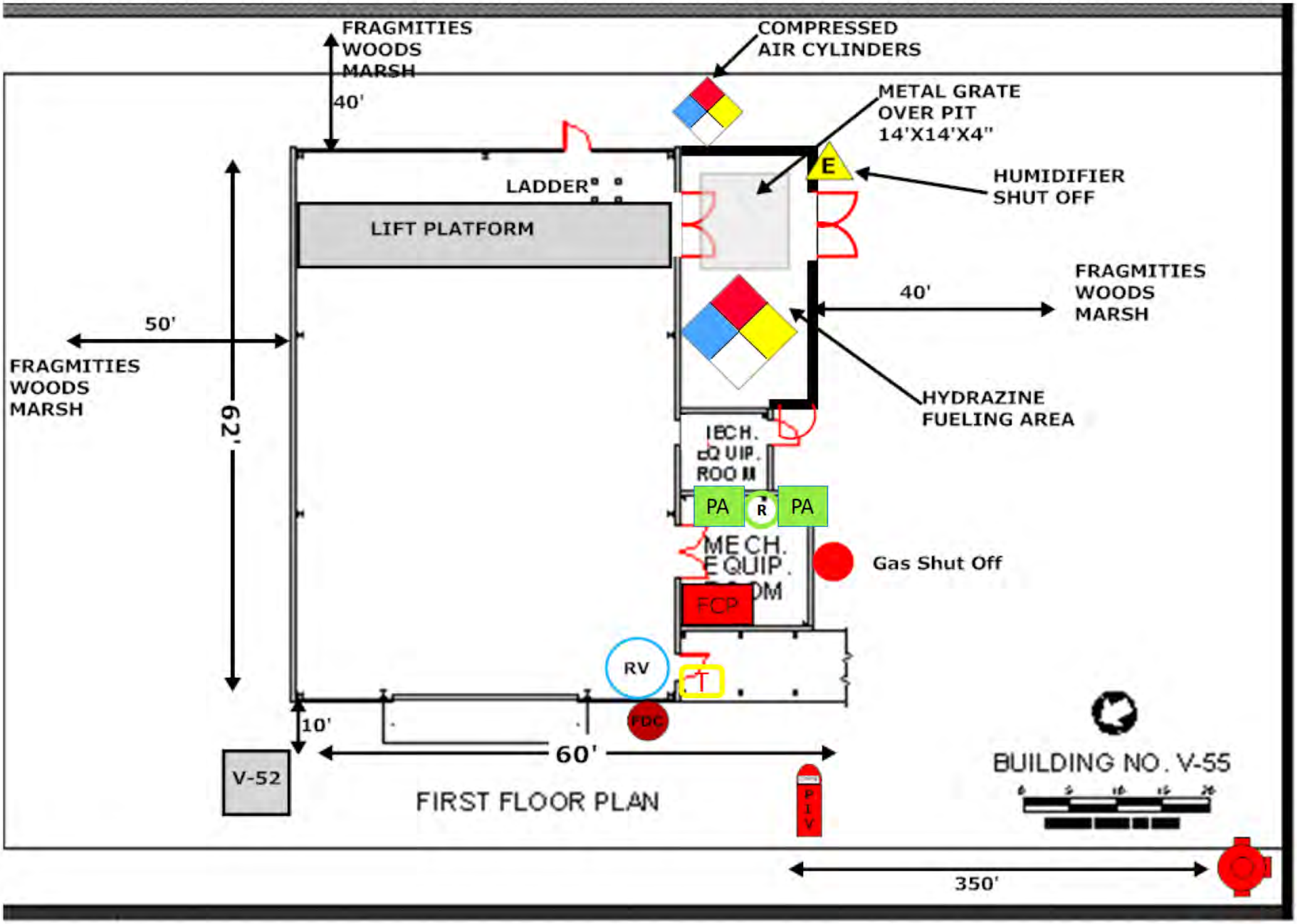

V-24W
@ 50'
122'
80'
184'
V-24S
V-24E @
44'
FDC
FCP
FIRST FLOOR PLAN
20 15 10 5 0 20'
GRAPHIC SCALE
BLDG NO. V-24

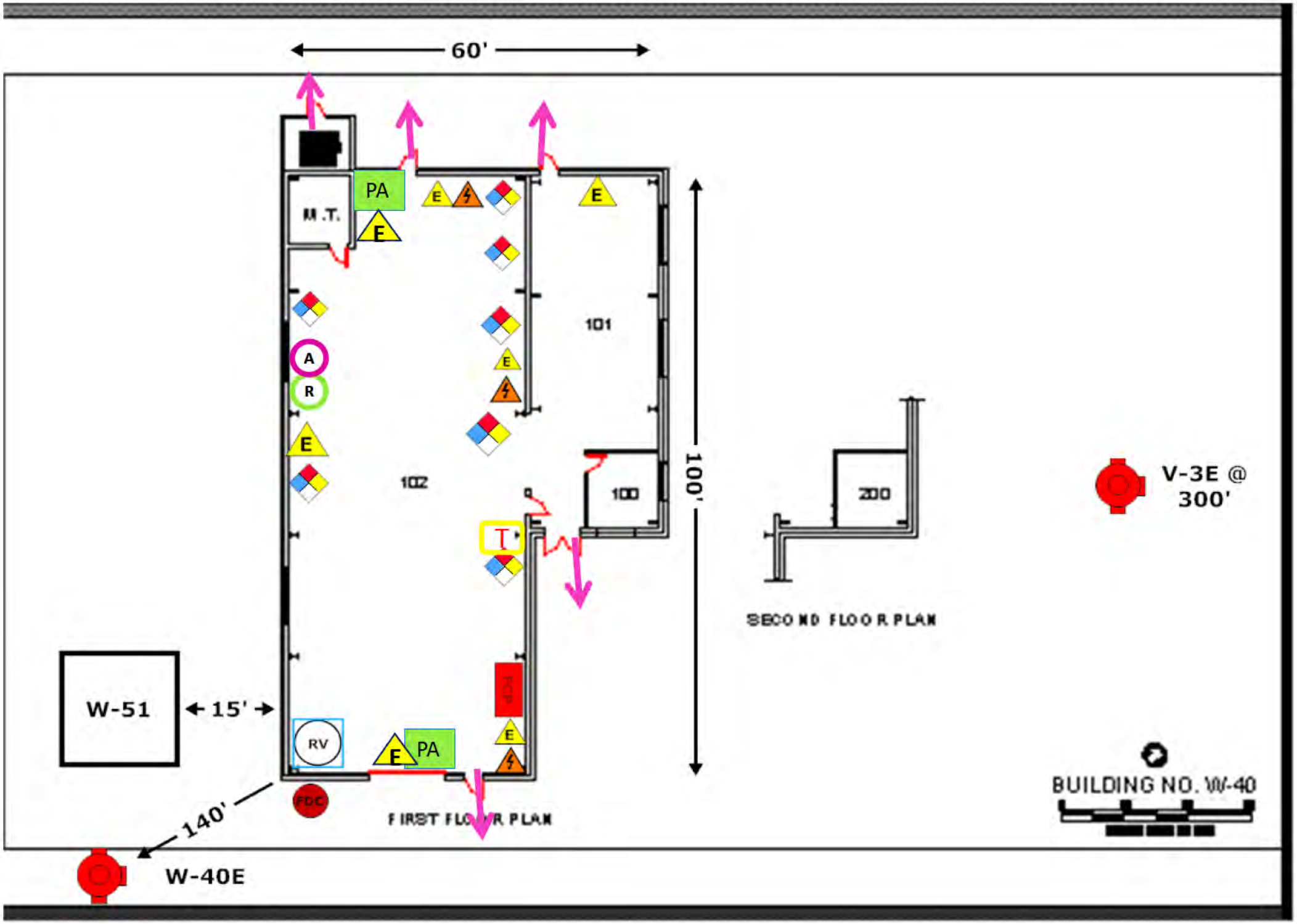


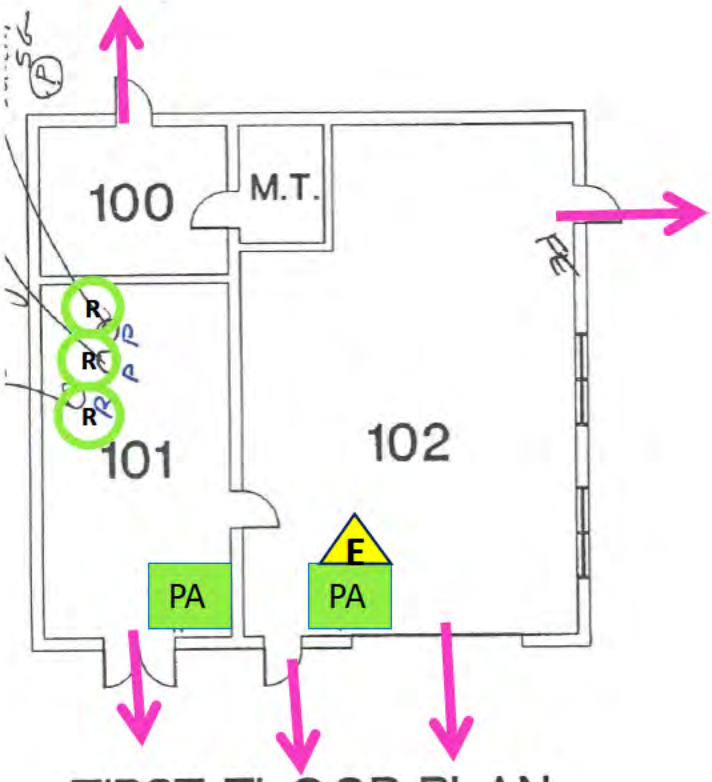
SECOND FLOOR PLAN

20 15 10 5 0 20'
GRAPHIC SCALE

BLDG NO. V-24


FRAGMITIES
WOODS
MARSH
40'
COMPRESSED
AIR CYLINDERS
METAL GRATE
OVER PIT
14'X14'X4"
E
HUMIDIFIER
SHUT OFF
LADDER
LIFT PLATFORM
FRAGMITIES
WOODS
MARSH
40'
50'
FRAGMITIES
WOODS
MARSH
62'
HYDRAZINE
FUELING AREA
TECH.
EQUIP.
ROOM
PA
R
PA
MECH.
EQUIP.
ROOM
Gas Shut Off
FCP
RV
T
FDC
10'
60'
V-52
FIRST FLOOR PLAN
P
I
V
BUILDING NO. V-55
350'


60'
100'
M.T.
PA
E
101
A
R
102
100
T
FCP
RV
PA
FDC
FIRST FLOOR PLAN
200
SECOND FLOOR PLAN
W-51
15'
140'
W-40E
V-3E @
300'
BUILDING NO. W-40

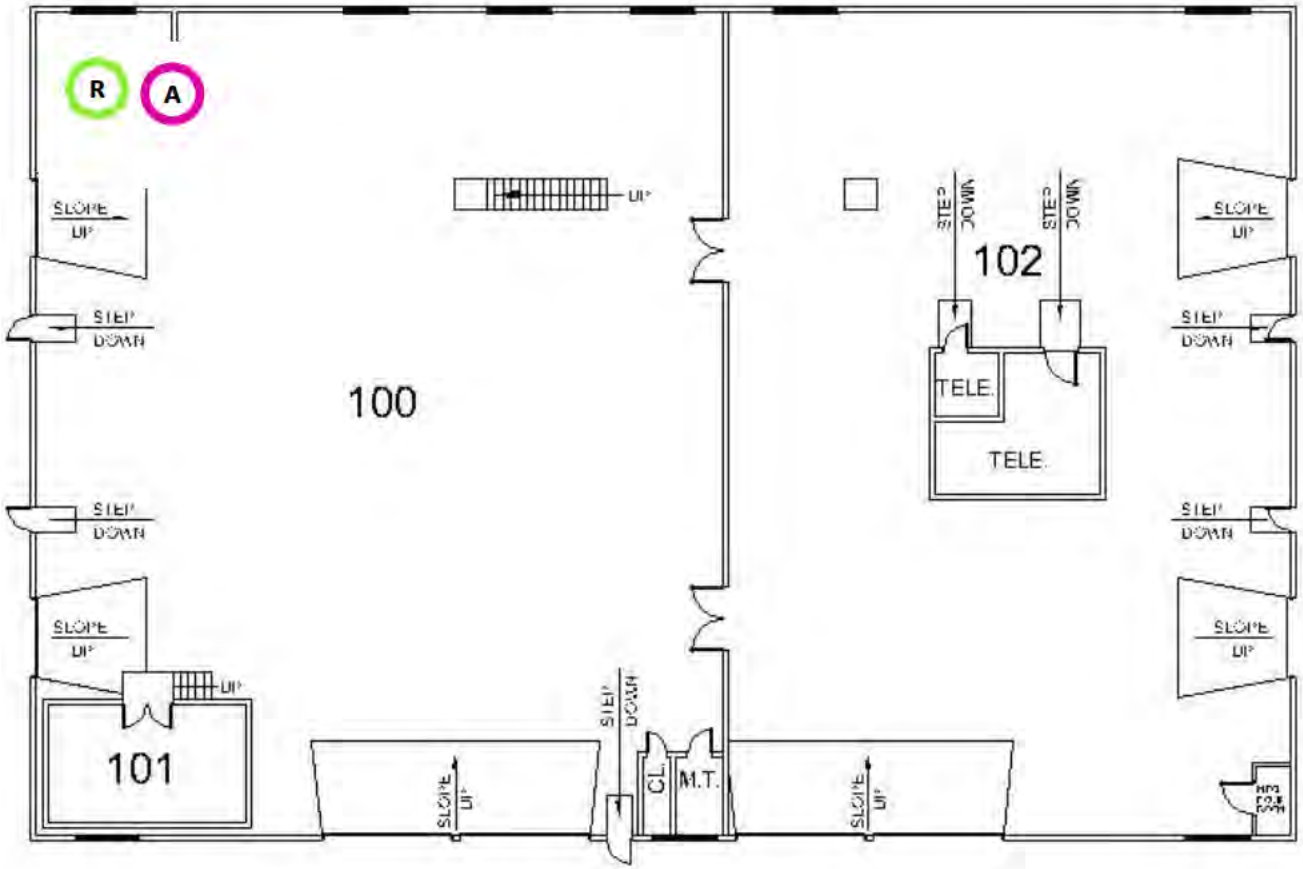


FIRST FLOOR PLAN

BUILDING NO. X-30

0 5 10 15 20 40

GRAPHIC SCALE IN FEET

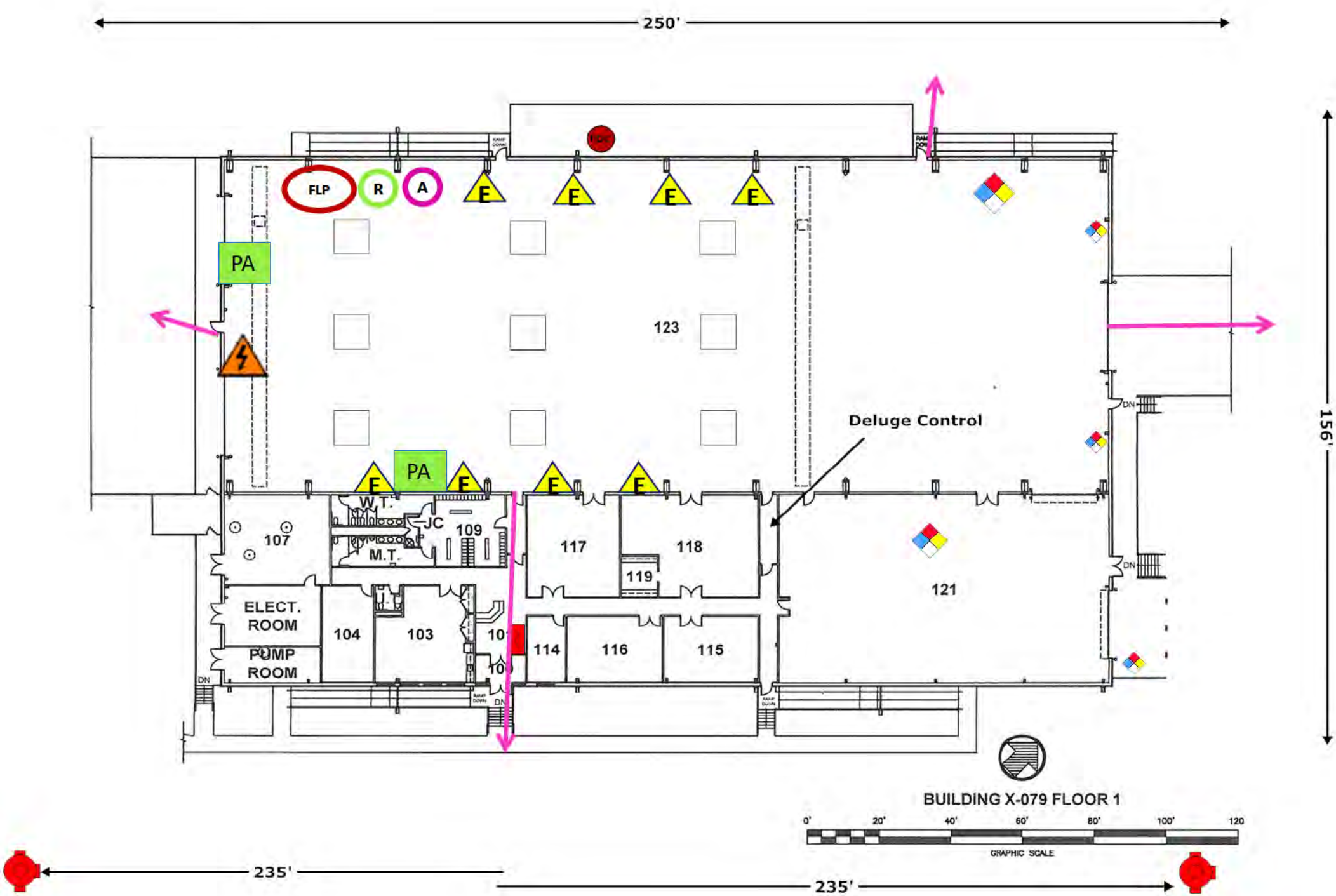


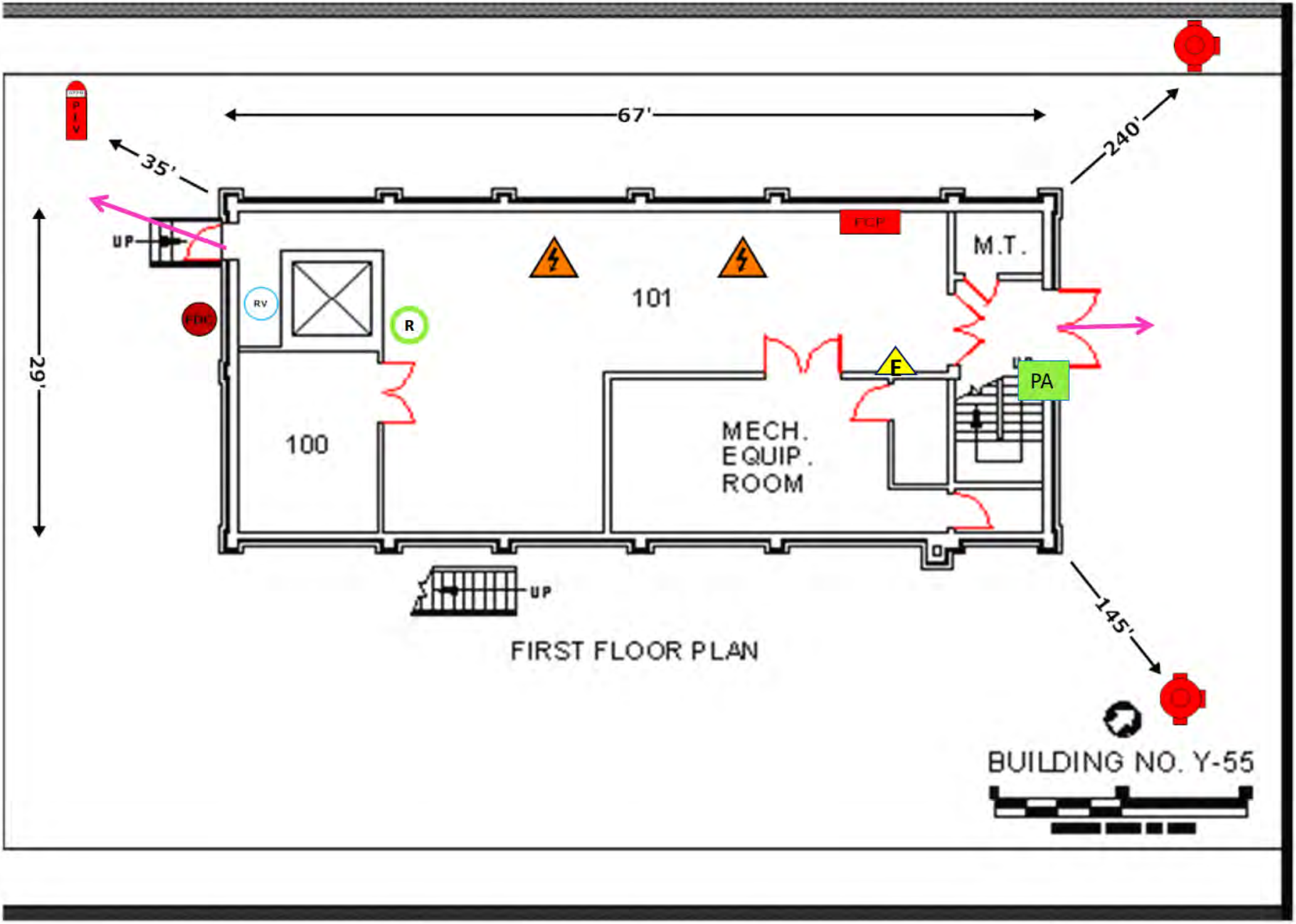
FIRST FLOOR PLAN

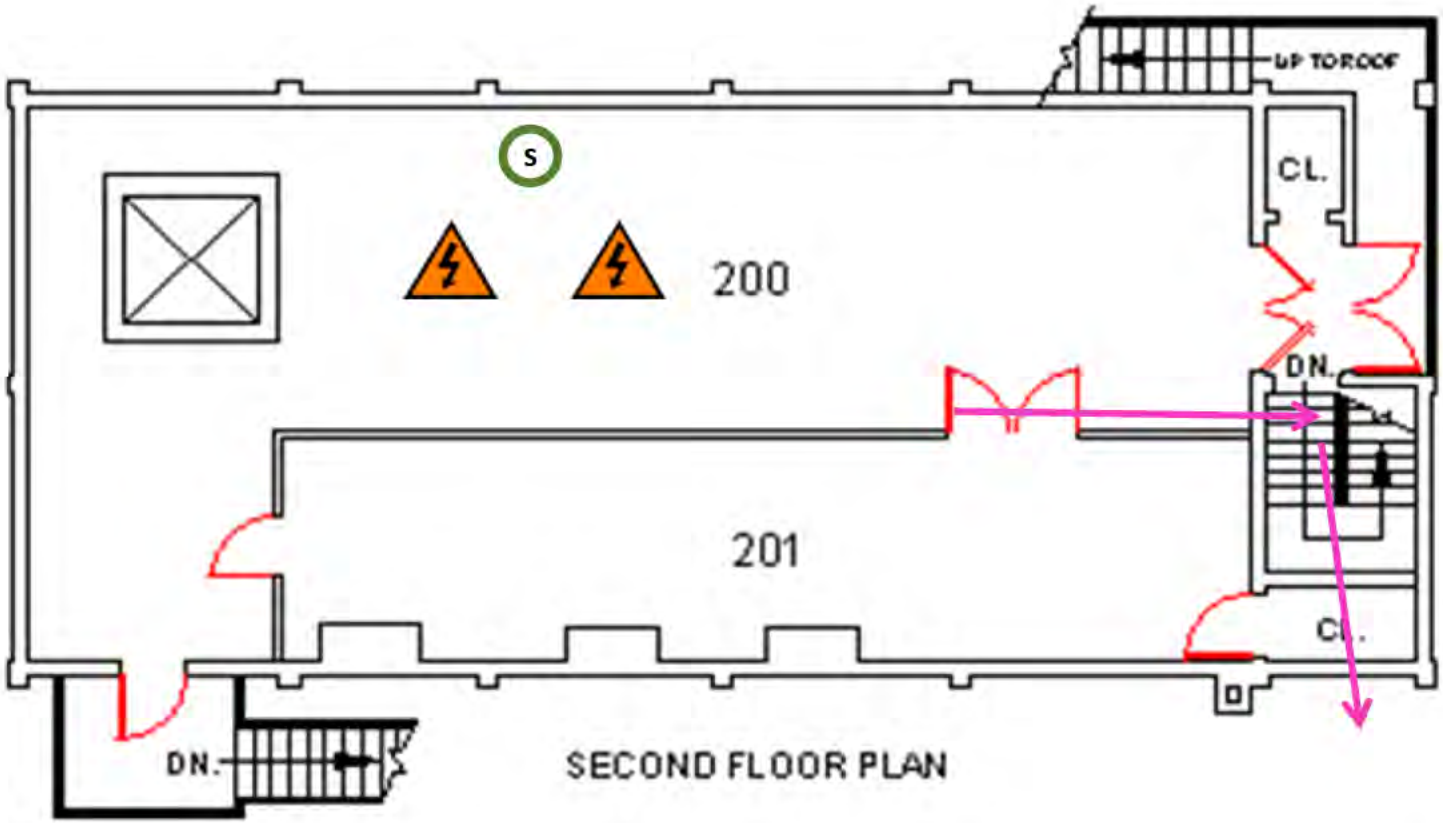
BUILDING NO. X-35

0 20 40 60

GRAPHIC SCALE IN FEET

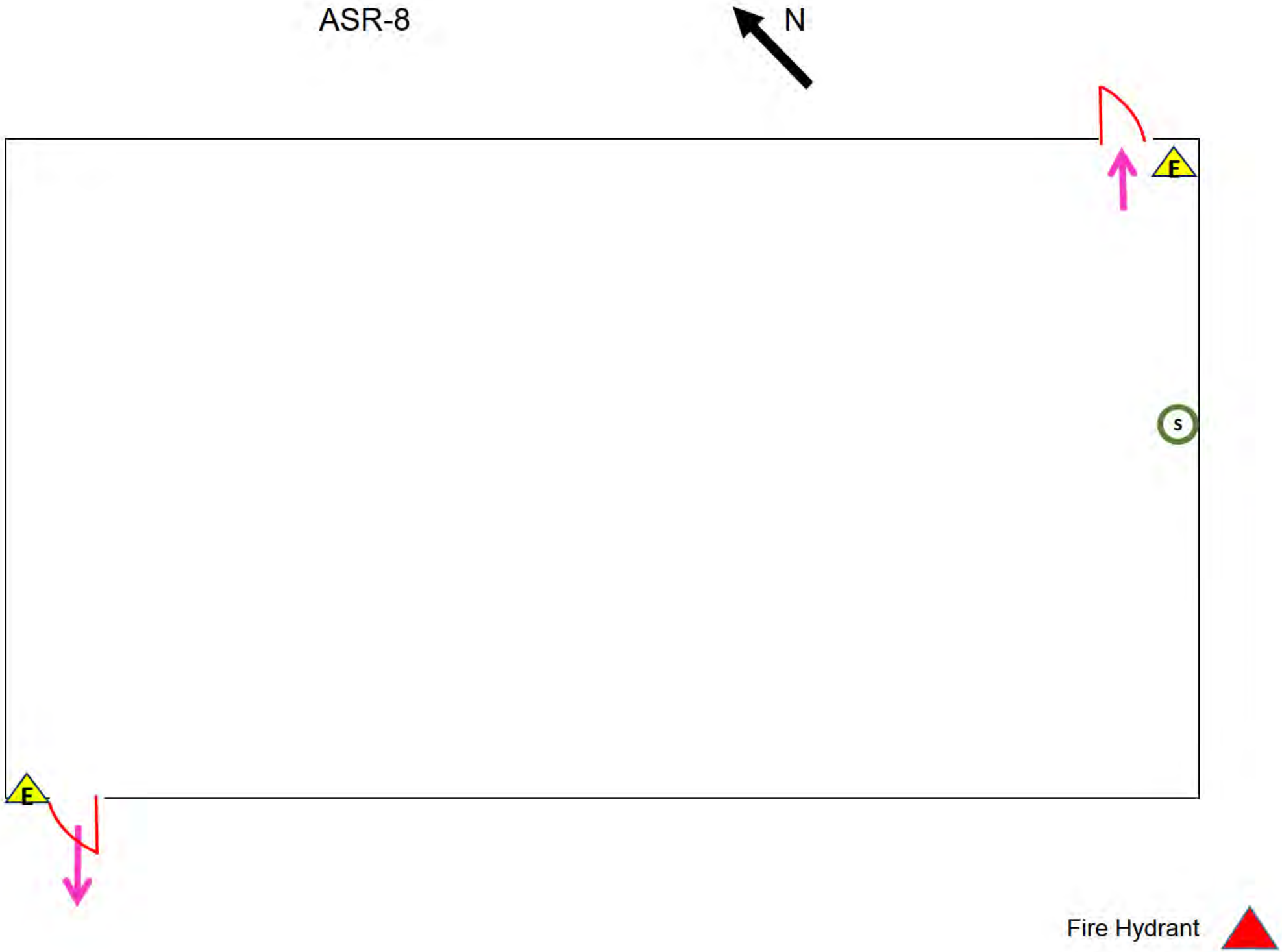

250'
156'
235'
235'
FLP
R
A
E
PA
123
Deluge Control
107
W.T.
M.T.
JC
109
117
118
119
121
ELECT. ROOM
PUMP ROOM
104
103
114
116
115
DN
BUILDING X-079 FLOOR 1
0'
20'
40'
60'
80'
100'
120
GRAPHIC SCALE


67'
35'
240'
29'
145'
UP
FDC
RV
R
101
100
FCP
M.T.
E
PA
MECH.
EQUIP.
ROOM
UP
FIRST FLOOR PLAN
BUILDING NO. Y-55

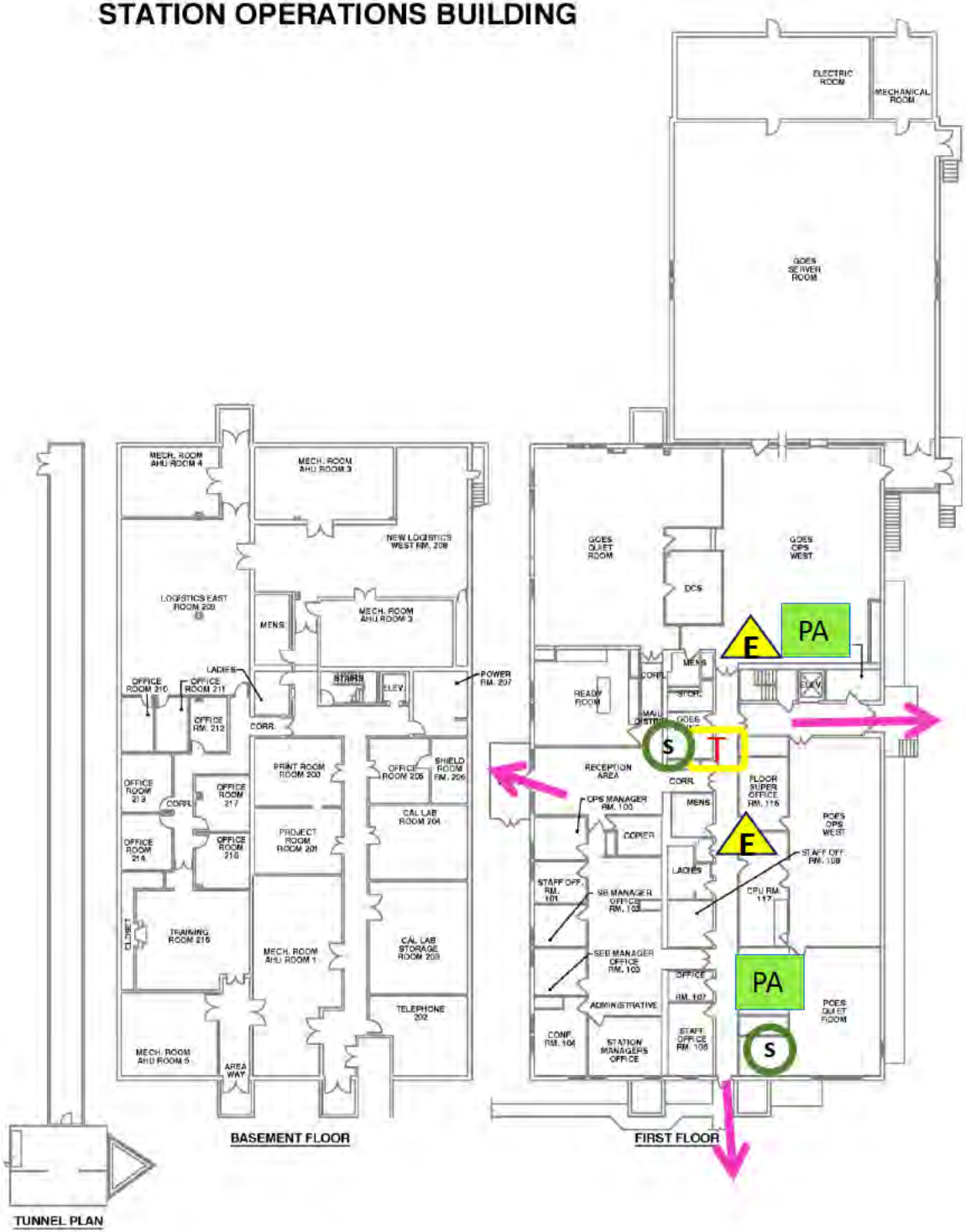


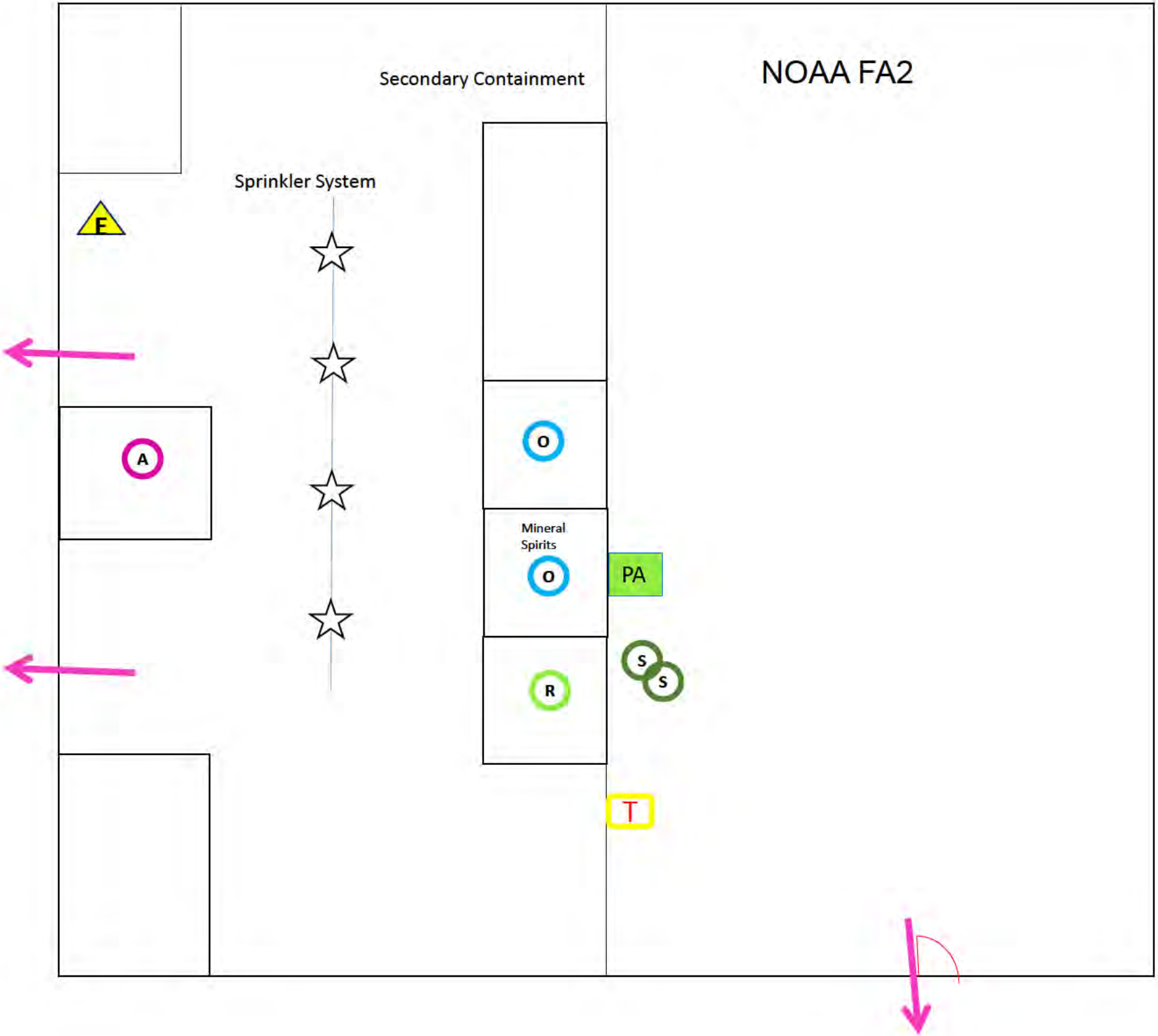
BUILDING NO. Y-55

ASR-8



WALLOPS CDA
STATION OPERATIONS BUILDING




Secondary Containment
NOAA FA2
Sprinkler System
F
A
O
Mineral
Spirits
O
PA
S
S
R
T

APPENDIX F

CONTROLLED DRAINAGE DISCHARGE LOG

Water Discharge Tank Berms						
Tank Identification	**Date**	**Estimated Gallons Discharged**	**Oil Sheen**	**Operator Performing Task**		

APPENDIX G

INVENTORY OF SPILL RESPONSE SUPPLIES AND EQUIPMENT

APPENDIX G

INVENTORY OF SPILL RESPONSE SUPPLIES AND EQUIPMENT

The discharge response equipment inventory for the Facility is summarized below. The inventory is maintained at proper levels and replenished as needed.

WFF Fire Department Number 1 Spill Response Equipment

Quantity	Item	Storage Capacity (gal)
40	Pillows, small	20
26	Pillows, large	26
440	Socks, 3" x 48"	220
72	Socks, 3" x 24"	18
46	Socks, 3" x 120"	92
16	Socks, 5" x 120"	128
12	Pans	36
4	Skimmer pulp, 5 lb bag	16
20	Skimmer pillow	10
24	Skimmer socks, 3" x 120"	24
8	Skimmer booms, 5" x 120"	48
6	Skimmer booms, 8" x 240"	144
400	Skimmer pads	60
3	Absorbent roll	54
12	Aggressive socks, 3" x 120"	24
4	Aggressive dikes, 5" x 120"	36
20	Aggressive pillow, small	5
10	Aggressive pillow, large	10
2	Aggressive pulp, 5 lb bag	10
4	Clay absorbent, 50 lb bag	40

WFF Fire Department Number 2 Spill Response Equipment

Quantity	Item	Storage Capacity (gal)
6	Absorbent clay (50 pound bag)	80
0	Pig putty (12oz tube)	N/A
321	Absorbent Pads	50.2
3	Pig Pillows	1.5
6	Pig Pans	3
2 (20 ft)	10-foot Booms	4

Building B-29 Spill Response Equipment

Quantity	Item	Storage Capacity (gal)
2	Absorbent clay (50 pound bag)	20
100	Absorbent Pads	15.6
3 (30 feet)	4, 6 and 10 foot Booms	6
2	Drain Covers	N/A

Buildings N-223 and U-81 Spill Response Equipment

Quantity	Item	Storage Capacity (gal)
1	Absorbent clay (50 pound bag)	10
25	Absorbent Pads	3.9
1 (10 feet)	4, 6 and 10 foot Booms	2

WFF Fire Department #2 (Island) Hazmat Trailer

Quantity	Item	Storage Capacity (gal)
4	8" x 8" Pillows	4
30	12" x 12" Pillows	75
7	16" x 8" Pillows	14
9	16" x 17" Pillows	36
3	Socks, 3" x 36"	5
90	Socks, 3" x 120"	450
12	Socks, 3" x 72"	36
4	Socks, 4" x 120"	26
16	Socks, 4" x 72"	64
1	Skimmer pulp, 5 lb bag	4
8	8" x 120" Boom (Oil Only)	72
24	Skimmer socks, 3" x 120"	24
8	Skimmer booms, 5" x 120"	48
6	Skimmer booms, 8" x 240"	144
600	Skimmer pads	90
2	Absorbent pads rolls	36
6	Aggressive socks, 3" x 36"	9
6	Aggressive socks, 3" x 120"	30
8	Aggressive dikes, 5" x 120"	48
100	Aggressive pillow, 8" x 8"	100
4	Aggressive pillow, 16" x 17"	36
7	Aggressive pulp, 5 lb bag	10
3	Clay absorbent, 40 lb bag	37

APPENDIX H

INCIDENT PLAN / BRIEFING REPORT

APPENDIX H

INCIDENT PLAN / BRIEFING REPORT

The 3-page Incident Plan/Briefing provides a good method of developing an Incident Action Plan. The author of an Incident Action Plan will need to have completed the Incident Command 100 course as a minimum in order to fully appreciate the incident command processes contained in the three-page plans.

Block 1 should be filled in with an incident name that succinctly defines the location and event. This is the **Where**.

Blocks 2 & 3 may be left blank for planning purposes or filled in with the actual time of the event. This is the **When**.

Block 4 should be a sketch of the event with critical exposures and control points identified. This helps to identify **What** it is and **Why** the actions are being taken.

Block 5 is one of the most critical elements. Identify who is in charge of the various functions and how you communicate with them. Not all elements are required for simple events. This identifies **Who** is responsible.

Block 6 shall identify the scope for which this plan is applicable. The three-page plan format is generally only good for one operational period or for one operational unit in a Unified Command.

Block 7 is used to develop the objectives and the actions necessary to accomplish the objectives. This identifies **What** is to be done.

Block 8 should identify the weather forecast for the operational period. This is important for toxic plume as well as evaluating responder heat stress. This will also indicate possible run-off concerns if heavy rains are expected. Significant changes in the weather forecast are also important.

Block 9 is used to identify any significant safety issues for responders.

Block 10 is used to identify any attachments to the plan.

Block 11 identifies the resources used or planned and where they are located.

Block 12 is a summary of the actions taken.

Blocks 13 & 14 are approvals.

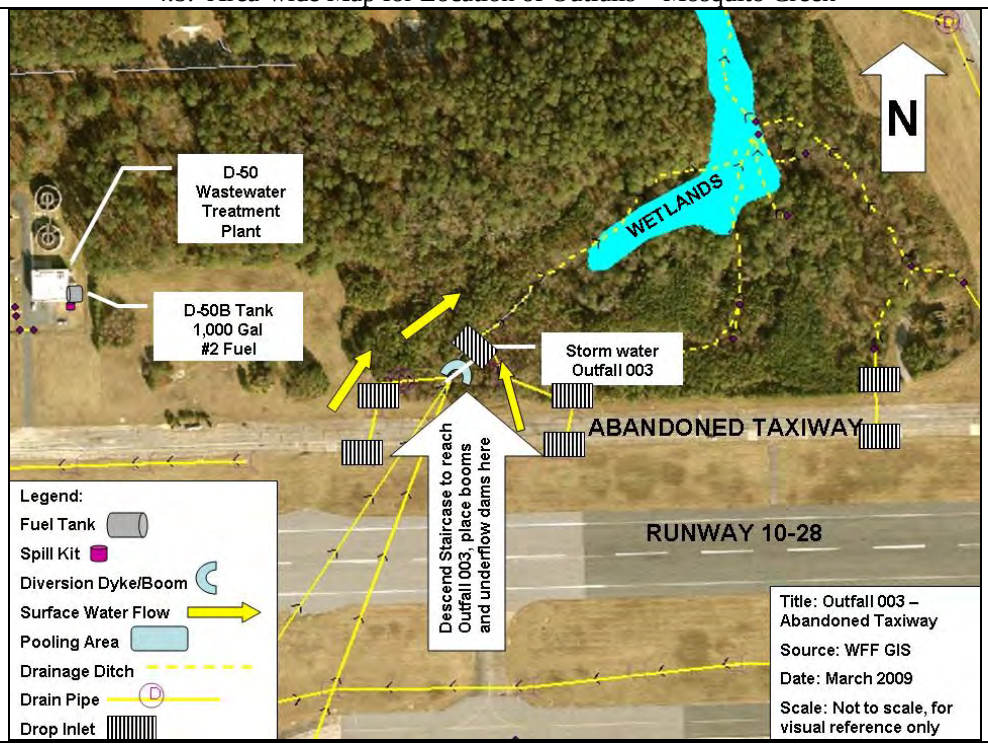
The completed document serves as a valuable tool for briefing your actions when you turn over command. It is also a valuable tool for lessons learned and training purposes

Incident Plan/Briefing	1. Incident Name **Petroleum Release from the D-9A, D-9B 20,000 Gallon Aboveground Storage Tank**	2. Date	3. Time

4.a. Site Sketch Map

For Large Quantity Spills (greater than 2 drums or 110 gallons), please refer to the Area-Wide Map in 4.b.

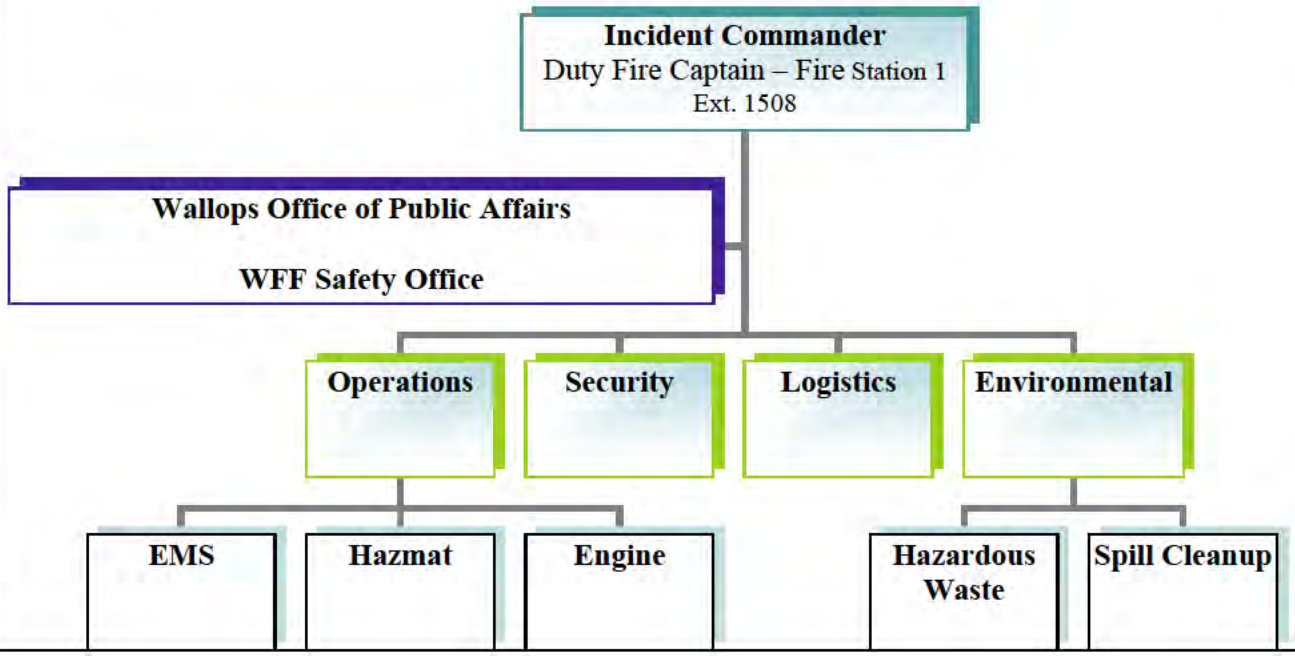
4.b. Area-wide Map for Location of Outfalls – Mosquito Creek



4.c. Booming and Collection Strategies

Status	Location	Response Strategy	Type/Length Spill Material	Implementation Strategy	Staging Area	Site Access	Resources Protected
Large Quantity Release, 2 Drums (110 Gallons) or more.	**Abandoned Taxiway – Outfall 003 near D-50 (WWTP)**	Exclusion – keep oil out of Mosquito Creek	Please see Inventory List By Capacity in the Appendix	1. Deploy sausage booms across drain culverts. 2. Create diversions. 3. Field construct underflow dam if necessary.	Abandoned Taxiway – Outfall 003 near D-50 (WWTP)		Wetlands, Marshes, Inland Bays

5. Current Organization



INCIDENT OBJECTIVES

6. Operational Period

7. General Control Objectives for the Incident (include alternatives)

- Ensure safety of public and response personnel
  - Isolate Area
  - Deny Entry
  - Evacuate as needed
- Complete Notifications
- Assemble materials and equipment for handling spills described in Section 11, Resources Summary
- Control the source of the spill (Deploy booms, and create diversions at areas indicated on the maps in Section 4, Site Sketch Map)
- Manage response in a coordinated manner
- Protect environmentally sensitive areas (For oil spills greater than 2 drums or 110 gallons, deploy booms, absorbent materials as indicated at Outfall 003 along the Abandoned Taxiway)
- Control and recover spilled material
- Contact USDA Representative at Ext. 1254 for wildlife concerns
- Cleanup product from impacted areas
- Keep WFF Management informed of response activities

8. Weather Forecast for Period

Request periodic weather updates from Emergency Operations Center (EOC) at Fire Station 1.

9. General Safety Message

10. Attachments (mark if attached)

☐ Organization List - ICS 203	☐ Medical Plan - ICS 206	☐ (0ther)
☐ Div. Assignment Lists - ICS 204	☐ Incident Map	☐
☐ Communications Plan - ICS 205	☐ Traffic Plan	☐

11. Resources Summary			
Resources Ordered	Resource Identification	ETA On Scene	Location/Assignment
Engine	25-3		
Ambulance	25-1		
HAZMAT & Trailer	25		
Security	Patrol-1		Traffic control, access control
Security	Patrol-3		Traffic control, access control
Environmental Office	Hazwaste Pickup		
Spill Cleanup Materials	**Diversion Boom Materials:** Inventory on Hand in the Hazmat Trailer		

12. Summary of Current Actions	
13. Prepared by (Planning Section Chief)	14. Approved by (Incident Commander)

APPENDIX I

INCIDENT REPORT FORM AND FOLLOW-UP REPORT TEMPLATE

INCIDENT REPORT

TIME INCIDENT DISCOVERED:	DATE:
TIME INCIDENT REPORTED:	DATE:
TIME INCIDENT CONTAINED:	DATE:
APPROXIMATE LOCATION AND TYPE OF ACCIDENT (E.G., FIRE, EXPLOSION, RELEASE):	
MATERIAL RELEASED:	APPROXIMATE QUANTITY:
EXTENT OF INJURIES (IF ANY):	
ASSESSMENT OF ACTUAL OR POTENTIAL HAZARDS TO HUMAN HEALTH OR THE ENVIRONMENT (IF APPLICABLE):	
ESTIMATED QUANTITY AND DISPOSITION OF MATERIAL RECOVERED FROM THE INCIDENT:	
CORRECTIVE ACTION TO CONTROL THE INCIDENT AND PREVENT FURTHER INCIDENTS:	

REGULATORY AGENCY NOTIFICATION: ↑CHECK HERE IF NONE REQUIRED

Agency	*Person contacted*	*Date*	*Time*

SIGNATURE OF REPORTER:	DATE:
SIGNATURE OF SUPERVISOR:	DATE:

FOLLOW-UP REPORT TEMPLATE

The letter template on the next page is used when preparing incident reports to be submitted to the Tidewater Regional Office, the Virginia DEQ, and/or the EPA Regional Administrator. The address of each agency is provided below:

Director, Tidewater Regional Office Commonwealth of Virginia Department of Environmental Quality 5636 Southern Boulevard Virginia Beach, VA 23462	**Director, Department of Environmental Quality** Commonwealth of Virginia Attn: OWP Staff PO Box 10009 Richmond, VA 23240-0009	**United States Environmental Protection Agency** Region 3 1650 Arch Street Philadelphia, PA 19103-2029

250.W

Tidewater Regional Office
Attn: Mr. John Settle
PReP Coordinator
Virginia Department of Environmental Quality
5636 Southern Boulevard
Virginia Beach, VA 23462

Subject: Five-Day Letter Regarding Spill at NASA Goddard Space Flight Center's Wallops Flight Facility, at Building

Ref: VDEQ Incident Report Number No.

The following information regarding the subject spill is reported in the Five-Day Letter format.

A. Responsible Party Name, Address, Telephone Number, Email:

B. Incident Response (IR) Number
National Response Center Number
Wallops Flight Facility Incident Number

C. Incident Information

1. Spill date and time: Spill controlled
2. Type of incident ☐spill ☐fire ☐explosion ☐
3. Type of material released:
4. Cause of release: .
5. Specific location of spill: (See Enclosures)
6. Volume of product released:
7. Volume of product reaching state waters, including storm drain systems:
8. Name of waterway the spill discharged into:

9. Extent of Injuries:

10. Description of cleanup measures that were performed:

11. Estimated quantity of material recovered from the incident:

12. Name of agencies that were notified:

    ☐ Virginia Department of Environmental Quality

    ☐ National Response Center

    ☐

13. Corrective actions taken to prevent further releases:

14. Remediation procedures and results obtained:

15. Decontamination procedures employed:

If you need additional information, please call me. The original letter is forwarded to you by mail.

Theodore J. Meyer
Associate Chief
Medical and Environmental Division

Enclosures

APPENDIX J

DECONTAMINATION OF EMERGENCY EQUIPMENT

APPENDIX J

DECONTAMINATION OF EMERGENCY EQUIPMENT

The decontamination wash waters (wastewaters), rinseates, soils, and residues collected in the decontamination areas will be managed as potentially contaminated with hazardous waste until characterized All hazardous wastes will be disposed of in accordance with state and federal regulations.

Any disposable items, such as protective clothing, sampling equipment, filters, clean-up materials, decontamination liner materials, etc., will be containerized, characterized and disposed of in accordance with state and federal regulations.

Small Equipment

A decontamination area is set up for all non-disposable response equipment decontamination. The area is set up down gradient of the release and lined with plastic. Buckets or other appropriate containers will be used for capturing the rinseate and holding the wash water during the cleaning process.

The decontamination procedures for equipment (*EPA Region IV, Standard Operating Procedures and Quality Assurance Manual*, 1986) are follows:

1. Remove loose material by brushing or scraping. The material removed is properly containerized and disposed of in accordance with all applicable state and federal hazardous and solid waste regulations.
2. The equipment is washed with a non-phosphate detergent. All decontamination wash waters are collected and containerized for proper disposal in accordance with state and federal regulations.
3. Rinse with tap water, methanol or propanol, then with distilled or de-ionized water. These decontamination rinse waters are collected and containerized for proper disposal in accordance with state and federal regulations.
4. If metal contamination is present, a rinse with 10 percent nitric acid is needed. This acid rinse is followed by another distilled or de-ionized water rinse. The rinseate is collected and containerized for proper disposal in accordance with state and federal regulations.
5. Equipment is allowed to air dry then stored in aluminum foil or plastic bags to prevent contamination.

In addition, the following procedures are established for the proper decontamination of personal protective equipment (PPE):

1. PPE is decontaminated between uses/areas and upon completion of work.
2. All decontamination takes place in the temporary decontamination area.

Large Equipment

If the decontamination of heavy equipment is necessary, a temporary decontamination area for this heavy equipment is constructed. The area is graded to at least a 2 percent slope toward one corner. A berm constructed of sand bags, or equivalent material, is placed around the edges. A plastic liner is placed within the area to prevent infiltration of decontamination waters into the underlying soils. The liner must be able to sustain the stress caused by the moving of heavy equipment in and out of the area. The decontamination waters must drain to an appropriate container; no accumulation of liquids on the liner is allowed. The collected liquid is tested and disposed of in accordance with state and federal regulations.

The decontamination procedures for heavy equipment are as follows:

1. Heavy equipment used to remove contaminated soil is decontaminated by appropriate abrasive methods (i.e., scraping and/or brushing). The material removed is properly containerized and disposed of in accordance with all applicable state and federal hazardous and solid waste regulations.
2. Equipment is cleaned with a high-pressure wash. A non-phosphate detergent is used. All decontamination wash waters are collected and containerized for proper disposal in accordance with state and federal regulations.
3. The heavy equipment is rinsed with water, methanol or propanol, then with distilled or de-ionized water. This decontamination rinseate is collected and containerized for proper disposal in accordance with state and federal regulations.
4. If heavy metal contamination is present, a rinse with 10 percent nitric acid is needed. This acid rinse is followed by another water rinse. These rinse waters are collected and containerized for proper disposal in accordance with state and federal regulations.
5. Equipment is allowed to air dry then covered in plastic sheeting to prevent contamination.

Before the operations are resumed, the decontamination of emergency equipment and the disposal of generated wastes are documented in the follow-up reports. In addition, the Environmental Coordinator will make appropriate notifications as required by 40 CFR 265.56(i).

APPENDIX K

SPILL RESPONSE CONTRACTORS AND AGREEMENTS

APPENDIX K

SPILL RESPONSE CONTRACTORS AND AGREEMENTS

The following table provides spill response contractors available to service the NASA GSFC's WFF area. These contractors are available on a 24-hour basis unless otherwise noted. This list is maintained to provide contacts in the event that an oil or hazardous waste emergency exceeds Wallops Flight Facility's resources.

Company	Telephone	Capabilities
SPILL RESPONSE		
Clean Venture, Inc. 2031 Inverness Ave. Baltimore, MD 21230	(410) 368-9170 (800) 347-7672 (410) 368-9171 (Fax)	Oil, hazardous materials, TSD facility, underground storage tanks, explosives
MARCOR Remediation, Inc. 308 Mill Street Salisbury, MD 21801-4242	(410) 742-6161 800-247-0369 (410) 742-3029 (Fax)	Oil, hazardous materials, underground storage tanks, soil remediation
Reactives Management Corp. 1025 Executive Blvd. Suite 101 Chesapeake, VA 23320	(757) 436-1033 (757) 498-2539 (757) 548-2808 (Fax)	Explosives, reactives, medical wastes, hazardous wastes, small oil
EMERGENCY SERVICES		
LJT & Associates/ Wallops Fire Department/ Accomack Fire and Rescue Commission	911	Emergency services including firefighting, rescue, HazMat and emergency medical services
Emergency Service Associates Peninsula Regional Medical Center 100 East Carroll Street Salisbury, MD 21801	(410) 543-7742	Emergency services relating to hazardous materials exposure
Maryland State Police Aviation Command 3023 Strawberry Point Road Baltimore, MD 21220-5513	(410) 238-5800	Medivac transport from areas up to 30 nautical miles from Maryland's borders

PARTIALLY REIMBURSABLE SPACE ACT AGREEMENT
BETWEEN
ACCOMACK COUNTY VIRGINIA
AND
NASA GODDARD SPACE FLIGHT CENTER'S WALLOPS FLIGHT FACILITY
FOR
JOINT EMERGENCY PLANNING, RESPONSE, AND MANAGEMENT ACTIVITIES AT THE WALLOPS FLIGHT FACILITY

ARTICLE 1. AUTHORITY AND PARTIES

In accordance with The National Aeronautics and Space Act, as amended (51 U.S.C. 20113(e)), this Agreement is entered into by the NASA Goddard Space Flight Center Wallops Flight Facility located at Wallops Island, VA 23337 (hereinafter referred to as "NASA GSFC," "GSFC," "NASA WFF," "WFF," or "NASA") and Accomack County Department of Public Safety located at 24420 Lankford Hwy, Tasley, VA 23441, (hereinafter referred to as "Accomack County," "County" or "PARTNER"). NASA and Partner may be individually referred to as a "Party" and collectively referred to as the "Parties."

ARTICLE 2. PURPOSE

NASA WFF and Accomack County wish to jointly plan, respond to, and manage emergency response activities during times of man-made and natural disasters as well as to provide for mutual aid responses for emergency services. Man-made disasters could include either NASA or NASA tenant mission activities with potential impacts that extend beyond WFF boundaries, or other man-made disasters. Natural disasters include but are not limited to hurricanes, storms, or floods. Emergency services for mutual aid services include fire fighting, rescue, Haz-mat and emergency medical services (ALS/BLS).

ARTICLE 3. RESPONSIBILITIES

A. Accomack County will use reasonable efforts to:

1. Work with NASA WFF to plan for and manage potential public safety issues associated with mission or other man-made activities which have the potential for emergency response and management activities beyond the boundaries of the WFF. The boundaries of WFF include the WFF Main Base, the Wallops Mainland, and Wallops Island. Among other things, this collaborative work may include planning meetings, drills, mission support and launch support.

2. Participate in one (1) annual pre-hurricane season planning and coordination meeting with NASA WFF.

3. Participate in one (1) pre-launch planning and coordination meeting with WFF prior to major launches at WFF.

4. Participate and coordinate with NASA technical points of contact, or their designee, on the projected path, and potential severity of a major storm or hurricane on a daily basis from 72 hours in advance of the projected landfall.

5. As part of the 72 hour planning for a specific storm, the County shall also notify the designated NASA agreement representative in writing, or by email, to reserve the number of NASA dormitory rooms the County requires to support law enforcement, emergency management, and utility recovery personnel. The County shall reimburse NASA for the cost of dormitory services.

6. Respond to requests for mutual aid made by the WFF dispatch center or an on scene NASA incident commander at an emergency or event. A County representative shall determine the amount and type of equipment and the number of personnel to be furnished. The expectation is that county resources will not be called in unless the resources are essential for the nature of the emergency or event, not due to expediency or other discretionary reasons.

7. Request mutual aid from NASA through the Accomack County or Chincoteague (9-1-1) center to the WFF dispatch center. Request for aid shall include the requested amount and type of equipment, personnel requested, and shall specify the location where assistance is required.

8. Release the WFF mutual aid response organization when the services requested are no longer required. Additionally, the WFF mutual aid resources responding may be recalled by WFF dispatch for emergency response on the WFF. Notice of the recall will be provided to on-scene incident commander.

9. Be completely responsible for all emergency shelter operations, if provided. Therefore, at a minimum, the County will be responsible for security/law enforcement, health and safety, documentation and control, and escort and removal of all personnel from the WFF at the earliest safe opportunity.

B. NASA/will use reasonable efforts to:

1. Notify the County emergency management office when planned mission or other WFF man-made activities have the potential for emergency response and management activities beyond the boundaries of the WFF to protect the safety of the public. The boundaries of the WFF include the WFF Main Base, the Wallops Mainland, and Wallops Island.

2. Participate in a minimum of one (1) annual pre-hurricane season planning and coordination meeting with the County.

3. Participate in one (1) pre-launch planning and coordination meeting with the County prior to major launches at WFF.

4. Provide up to 25 dormitory rooms (including back-up power) in building F-5 for up to 25 law enforcement, emergency management, and utility recovery personnel. All such personnel shall be U.S. citizens. Personnel may occupy dormitory facilities for the duration of the storm, and for a minimum of 48 hours after recovery operations have begun. The County may pre-position personnel in the dormitory 48 hours in advance of the storm, subject to the availability of the dorm rooms. The designated on-site NASA point of contact shall provide the designated county point of contact the keys, temporary badges, and other information for use of the dorm rooms.

5. Provide one designated on-site point of contact for all matters relating to the use and logistics of the WFF dorm rooms.

6. Participate in recovery and any post emergency management briefings or meetings with the county.

7. Respond to requests for mutual aid made by the Accomack County or Chincoteague (9-1-1) center or an on scene incident commander at the emergency or event. A WFF representative shall determine the amount and type of equipment and the number of personnel to be furnished. The expectation is that WFF resources will not be called in unless the resources are essential for the nature of the emergency, not due to expediency or other discretionary reasons.

8. Request mutual aid from the WFF dispatch center to Accomack County or Chincoteague (9-1-1) center. Requests for aid shall include the requested amount and type of equipment, personnel requested, and shall specify the location where assistance is required.

9. Release the County mutual aid response organization when the services requested are no longer required or when the County resources responding are needed within the area for which it normally provides services. In that case, the County resources may be recalled by the County with immediate notification to the NASA on scene incident commander.

10. Respond to an Accomack County emergency request to provide a shelter of last resort, at the sole discretion of NASA, and under the terms and conditions specified by NASA for the specific emergency.

ARTICLE 4. SCHEDULE AND MILESTONES

The planned major milestones for the activities defined in the "Responsibilities" clause are as follows:

Annual Pre-Hurricane season Planning Meeting	3rd Quarter each Federal Fiscal Year
Pre-Launch planning and coordination meeting	Prior to Major Orbital Launches

ARTICLE 5. FINANCIAL OBLIGATIONS

1. Partner agrees to fully reimburse NASA for costs in the event the County requests emergency response support from NASA as outlined in the scope of this agreement. The scope of this agreement explicitly does not include support from the County to NASA that is beyond the mutual aid defined in this agreement. In no event will NASA transfer any U.S. Government funds to Partner under this Agreement. The nature of emergencies and events varies greatly. If the nature of the emergency or event requires County services or effort in excess of the mutual aid scoped herein, NASA shall reimburse the County thorugh a separate intergovernmental order. Payment must be made by Partner in advance of initiation of NASA's efforts at such time as the emergency situation occurs. The parties agree that the terms of reimbursement for NASA WFF's participation shall include, but not be limited to, fuel for generators in excess of 24 hours of usage, long distance phone calls, and any dormitory services provided. As an estimate, NASA dorm rooms cost for FY 2011 is $33.00 per night, but these rates are subject to variations each year. NASA will estimate the cost of services to the County as reasonably in advance of the event as possible. NASA shall bill the County for all services actually rendered within 30 days of the delivery of services. Payment shall be made within 30 days of notice from NASA on the final cost of all services received in support of this agreement.

2. Payment shall be payable to the National Aeronautics and Space Administration through [choose one form of payment: U.S. Treasury FEDWIRE Deposit System, Federal Reserve Wire Network Deposit System, pay.gov at https://www.nssc.nasa.gov/portal/site/customerservice/menuitem.bb29c518138071c056969daf4dd72749, or check.] A check should be payable to NASA Goddard Space Flight Center and sent to:

NASA Shared Service Center (NSSC)-FMD Accounts Receivable
Attn: For the Accounts of NASA Goddard Space Flight Center
Bldg. 1111, C Road
Stennis Space Center, MS 39529

3. NASA will not provide services or incur costs beyond the available funding amount. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Agreement will be accomplished for the above estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and have the option of canceling the remaining effort, or

providing additional funding in order to continue the proposed effort under the revised estimate. Should this Agreement be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within One (1) year after completion of all effort under this Agreement, and promptly thereafter, return any unspent funds to Partner.

4. Notwithstanding any other provision of this Agreement, all activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, Title 31 U.S.C. § 1341.1.

ARTICLE 6. PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of NASA personnel, facilities and equipment. In the event that NASA's projected availability changes, Partner shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA usage of the facilities, equipment, and personnel shall have priority over the usage planned in this Agreement. Should a conflict arise, NASA in its sole discretion shall determine whether to exercise that priority. Likewise, should a conflict arise as between two commercial users, NASA, in its sole discretion, shall determine the priority as between the two users. This Agreement does not obligate NASA to seek alternative government property or services under the jurisdiction of NASA at other locations.

ARTICLE 7. NONEXCLUSIVITY

This Agreement is not exclusive; accordingly, NASA may enter into similar Agreements for the same or similar purpose with other U.S. private or public entities.

ARTICLE 8. LIABILITY AND RISK OF LOSS

1. Partner hereby waives any claims against NASA, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, customers, users, and their contractors and subcontractors, at any tier) and employees of NASA's related entities for any injury to, or death of, Partner employees or the employees of Partner's related entities, or for damage to, or loss of, Partner's property or the property of its related entities arising from or related to activities conducted under this Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct.

2. Partner further agrees to extend this unilateral waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of NASA and employees of NASA's related entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement.

ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

NASA and Partner agree that the information and data exchanged in furtherance of the activities under this Agreement will be exchanged without use and disclosure restrictions unless required by national security regulations (e.g., classified information) or otherwise agreed to by NASA and Partner for specifically identified information or data (e.g., information or data specifically marked with a restrictive notice).

ARTICLE 10. USE OF NASA NAME AND NASA EMBLEMS AND RELEASE OF GENERAL INFORMATION TO THE PUBLIC

1. NASA Name and Initials

Partner agrees the words "National Aeronautics and Space Administration" and the letters "NASA" will not be used in connection with a product or service in a manner reasonably calculated to convey any impression that such product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. In addition, with the exception of release of general information in accordance with paragraph 3 below, Partner agrees that any proposed public use of the NASA name or initials (including press releases resulting from activities conducted under this Agreement and all promotional and advertising use) shall be submitted by Partner in advance to the NASA Assistant Administrator for Public Affairs or designee ("NASA Public Affairs") for review and approval. Approval by NASA Public Affairs shall be based on applicable law and policy governing the use of the NASA name and initials.

2. NASA Emblems

Use of NASA emblems/devices (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) are governed by 14 C.F.R. Part 1221. Partner agrees that any proposed use of such emblems/devices shall be submitted to NASA Public Affairs for review and approval in accordance with such regulations.

3. Release of General Information to the Public

NASA or Partner may, consistent with Federal law and this Agreement, release general information regarding its own participation in this Agreement as desired.

ARTICLE 11. DISCLAIMER OF WARRANTY

Equipment, facilities, technical information, and services provided by NASA under this Agreement are provided "as is." NASA makes no express or implied warranty as to the condition of such equipment, facilities, technical information, or services, or as to the condition of any research or information generated under this Agreement, or as to any products made or developed under or as a result of this Agreement including as a result of the use of information generated hereunder, or as to the merchantability or fitness for a

particular purpose of such research, information, or resulting product, or that the equipment, facilities, technical information, or services provided will accomplish the intended results or are safe for any purpose including the intended purpose, or that any of the above will not interfere with privately owned rights of others. Neither the government nor its contractors shall be liable for special, consequential or incidental damages attributed to such equipment, facilities, technical information, or services provided under this Agreement or such research, information, or resulting products made or developed under or as a result of this Agreement.

ARTICLE 12. DISCLAIMER OF ENDORSEMENT

NASA does not endorse or sponsor any commercial product, service, or activity. NASA's participation in this Agreement or supply of equipment, facilities, technical information, or services under this Agreement does not constitute endorsement by NASA. Partner agrees that nothing in this Agreement will be construed to imply that NASA authorizes, supports, endorses, or sponsors any product or service of Partner resulting from activities conducted under this Agreement, regardless of the fact that such product or service may employ NASA-developed technology.

ARTICLE 13. COMPLIANCE WITH LAWS AND REGULATIONS

The Parties shall comply with all applicable laws and regulations including, but not limited to, safety, security, export control, and environmental laws and regulations. Access by Partner to a NASA facilities or property, or to a NASA Information Technology (IT) system or application, is contingent upon compliance with NASA security and safety policies and guidelines including, but not limited to, standards on badging, credentials, and facility and IT system/application access.

With respect to any export control requirements:

(a) The Parties will comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in performing work under this Agreement. In the absence of available license exemptions/exceptions, the Partner shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data and software, or for the provision of technical assistance.

(b) The Partner shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of work under this Agreement, including instances where the work is to be performed on-site at NASA and where the foreign person will have access to export-controlled technical data or software.

(c) The Partner will be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions or exceptions.

(d) The Partner will be responsible for ensuring that the provisions of this Article apply to its Related Entities.

ARTICLE 14. TERM OF AGREEMENT

This Agreement becomes effective upon the date of the last signature below and shall remain in effect until the completion of all obligations of both Parties hereto, or 5 years from the date of the last signature, whichever comes first.

ARTICLE 15. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Agreement by providing 90 calendar days written notice to the other Party. In the event of such termination, Partner will be obligated to reimburse NASA for all costs for which the Partner was responsible and that have been incurred in support of this Agreement up to the date the termination notice is received by the non-terminating Party. Where Partner terminates this Agreement, Partner will also be responsible for termination costs.

ARTICLE 16. CONTINUING OBLIGATIONS

The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this Agreement, e.g., "Liability and Risk of Loss" and "Intellectual Property Rights"and "Financial Obligations" shall survive such expiration or termination of this Agreement.

ARTICLE 17. MANAGEMENT POINTS OF CONTACTS

The following personnel are designated as the principal points of contact between the Parties in the performance of this Agreement.

Technical Points of Contact

NASA Wallops Flight Facility
Kenneth E. Volante
Emergency Management Coordinator
Mail Stop: 803.2
Wallops Island, VA 23337
Phone: 757-824-1159
Fax: 757-824-1518
kenneth.e.volante@nasa.gov

Accomack County Department of Public Safety
Jason R. Loftus
Director, Public Safety
PO Box 102
Tasley, VA 23441
Phone: 757-824-3610
Fax: 757-789-3063
jloftus@co.accomack.va.us

ARTICLE 18. DISPUTE RESOLUTION

Except as otherwise provided in the article entitled "Priority of Use," the article entitled "Intellectual Property Rights – Invention and Patent Rights" (for those activities governed by 37 C.F.R. Part 404), and those situations where a pre-existing statutory or regulatory system exists (e.g. under the Freedom of Information Act, 5 U.S.C. § 552), all disputes concerning questions of fact or law arising under this Agreement shall be referred by the claimant in writing to the appropriate person identified in this Agreement as the "Management Points of Contact." The persons identified as the "Management Points of Contact" for NASA and the Partner will consult and attempt to resolve all issues arising from the implementation of this Agreement. If they are unable to come to agreement on any issue, the dispute will be referred to the signatories to this Agreement, or their designees, for joint resolution. If the Parties remain unable to resolve the dispute, then the NASA signatory or that person's designee, as applicable will issue a written decision that will be the final agency decision for the purpose of judicial review. Nothing in this section limits or prevents either Party from pursuing any other right or remedy available by law upon the issuance of the final agency decision.

ARTICLE 19. MODIFICATIONS

Any modification to this Agreement shall be executed, in writing, and signed by an authorized representative of NASA and the Partner. Any modification that creates an additional commitment of NASA resources must be signed by the original NASA signatory authority, or successor, or a higher level NASA official possessing original or delegated authority to make such a commitment.

ARTICLE 20. ASSIGNMENT

Neither this Agreement nor any interest arising under it will be assigned by the Partner or NASA without the express written consent of the officials executing this Agreement.

ARTICLE 21. APPLICABLE LAW

U.S. Federal law governs this Agreement for all purposes, including, but not limited to, determining the validity of the Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

ARTICLE 22. INDEPENDENT RELATIONSHIP

This Agreement is not intended to constitute, create, give effect or otherwise recognize a joint venture, partnership, or formal business organization, or agency agreement of any kind, and the rights and obligations of the Parties shall be only those expressly set forth herein.

ARTICLE 23. SIGNATORY AUTHORITY

The signatories to this Agreement covenant and warrant that they have authority to execute this Agreement. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WALLOPS FLIGHT FACILITY

BY: _____
William A. Wrobel
Director of Wallops Flight Facility
Building F-6
Wallops Island, VA 23337

DATE: 18 October 2011

ACCOMACK COUNTY
DEPARTMENT OF PUBLIC SAFETY

BY: _____
Jason Loftus
Director, Public Safety
PO Box 102
Tasley, VA 23441
jloftus@co.accomack.va.us

DATE: 10/20/2011

EMERGENCY SERVICE ASSOCIATES, P.A.
PENINSULA REGIONAL MEDICAL CENTER
100 EAST CARROLL STREET
SALISBURY, MARYLAND 21801
410-543-7742

Mrs. Carolyn Turner
Wallops Flight Facility
Building F 160
Wallops Island, VA 23337

October 30, 2007

Dear Captain on Duty:

Please be advised that Peninsula Regional Medical Center's Emergency Department is most willing and well prepared to handle any and all hazardous material exposures of your wallops employees. We are a 24/7 fully functional emergency department and appreciate the opportunity to meet your potential needs.

If you have any questions, please let me know.

Sincerely,

William Todd, M.D.
Medical Director
Emergency Department, PRMC

MARTIN O'MALLEY
GOVERNOR

ANTHONY G. BROWN
LT. GOVERNOR

STATE OF MARYLAND
MARYLAND STATE POLICE

Aviation Command
3023 Strawberry Point Road
Baltimore, MD 21220
410-238-5800
410-238-5809 (FAX)
e-mail: msp.aviation@maryland.gov

COLONEL
MARCUS L. BROWN
SUPERINTENDENT

July 2, 2014

Michelle Bradford, RN
Nurse Manager
NASA – Wallops Flight Facility
Health Unit, Building F-160
Wallops Island, VA 23337

Dear Ms. Bradford:

This letter is in response to your request to update the response capabilities of the Maryland State Police Aviation Command to the Wallops Flight Facility in the event of a medical or traumatic emergency. Our policy has not changed since the previous correspondence. Requests for medevac transports, from areas up to 30 nautical miles from the borders of Maryland, will still be considered for dispatch, consistent with the aircraft fleet's availability, and our ability to still respond to requests from within Maryland.

Medevac requests from out-of-state must still meet criteria for air transport set forth in the Maryland Medical Protocols for Pre-Hospital Providers, as if the patient was within Maryland. In addition, patients who have been exposed to hazardous materials or excessive radiation are generally not considered for air transport.

Our out-of-state contact number for medevac requests is 410-706-8080.

Should you require additional information regarding the Maryland Medical Protocols, you may consult the website of Maryland's EMS Agency at www.miemss.org; or the State Air Medical Director's Office at 410-706-0880. In addition, you may feel free to contact me or a member of my Flight Operations Staff at 410-238-5800.

Sincerely,

Frank B. Lioi,
Assistant Bureau Chief
Special Operations Bureau
Aviation Command

FBL:WPK:fsc

APPENDIX L

SAMPLE TRAINING CERTIFICATE

CERTIFICATE OF COMPLETION

This is certifies that

NAME OF RECIPIENT

has succesfully completed

WFF Integrated Contingency Plan and Stormwater Water Pollution Prevention Plan Training

Trainer

Date

NASA Officials

APPENDIX M

SITE INSPECTION CHECKLISTS

APPENDIX M-1

DAILY AST SITE INSPECTION CHECKLIST

Month:	**Daily Inspection Checklist** **Aboveground Storage Tanks D-9A, D-9B**
Year :	

Instructions:

- The person conducting the daily visual inspection must also complete this log.
- Check (√) box if ok. For problems, **X** box and explain on the reverse.
- Describe any event, (spills, cracked or compromised containment, non-functional safety equipment, etc.) and corrective actions on the reverse.
- Report spills or leaks to 1333 immediately.

Day	Inspector	Time	Walk-through of the facility indicated no hazardous conditions exist	Inspection of ground surface showed no signs of leakage, spillage, or discolored soils	Inspection of piping, valves, and flanges showed no signs of leakage	Inspection of exterior tank showed no signs of leakage	Containment checked for excessive accumulation of water or sheen; Controlled Drainage Discharge Log completed if drained	Comment: **X** box and explain on reverse.
1								
2								
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31								

Comments, Observations and Corrective Action Taken: Describe the actions taken to correct each deficiency noted above, and note date each action was taken.

APPENDIX M-2
WEEKLY AST SITE INSPECTION CHECKLIST

WEEKLY INSPECTION FORM
ABOVEGROUND STORAGE TANK SYSTEMS:

Facility: **Goddard Space Flight Center**
Wallops Flight Facility
Wallops Island, Virginia 23337

Date: _____
Completed By: _____
Company: _____

SYMBOLS: Y – Yes N – No S – Satisfactory U – Unsatisfactory NA – Not Applicable
D – Diesel Oil J – Jet Fuel MO – Motor Oil UO – Used Oil

ITEM	CONDITIONS	COMMENTS(1)	REFERRED TO
TANK ID: _____			
Tank Condition			
Support Condition			
Staining on concrete or adjacent surfaces			
Tank area clear of debris			
Secondary containment free of oil, water and debris			
AST label appropriate and legible (not faded)			
Threaded fill caps kept closed when not in use			
Evidence of fuel spillage at remote fill and/or direct fill			
Fuel leaks visible on top of the tank or from piping			
Fuel gauge functioning properly			
All vent systems operational			
Status of spill kit supplies			
Is corrosion (rust) present on exterior surface of tanks, fittings or other equipment?			

(1) Provide comments below or attach additional sheets as necessary. Be sure to note the item you are commenting on.

_____

_____

_____

KEEP ON FILE FOR FIVE (5) YEARS.
MAKE AVAILABLE TO REGULATORY PERSONNEL UPON REQUEST.

APPENDIX M-3
MONTHLY SITE INSPECTION CHECKLIST
ABOVEGROUND STORAGE TANK

MONTHLY ABOVEGROUND STORAGE SYSTEM INSPECTION CHECKLIST				
Building Number	**Tank Number**	**Facility Name/Address**	**Inspected By**	**Date**
Were any issues found? Circle: YES or NO (Describe in detail on reverse side)			**Was Task Order issued? Circle: YES or NO** **Who was contacted?**	

AREA SURROUNDING TANK		**Y, N, or N/A**	**COMMENTS**
	Are the ground surface around tank, containment structures, and transfer areas free of leakage? (W6*)		
TANK COMPONENTS		**Y, N, or N/A**	**COMMENTS**
Condition of Tank and Saddles	Is the tank area free of hazardous conditions? (D1)		
	Is the tank shell, saddle, other components, including the welds, rivets, bolts, seams, and foundation free of leakage, damage, corrosion, and paint or other deterioration? (D6, W5)		
	Does tank have adequate vehicle protection?		
Tank Leaks	Is the tank area clean with no evidence of any leaks or spills? (Wipe areas clean.)		
	Inspection of ground surface area shows no signs of leakage, spillage, or stained soils? (D2)		
Overfill Prevention	Does the tank have an overfill alarm and is it working properly?		
	Is the tank equipped with a functioning overfill prevention valve?		
Tank Gauge	Is the tank gauge legible, accurate, and working properly? (W13)		
Tank Ladders Stairs	Is the tank ladder or stairway(s) in good condition?		
Secondary Containment Area	Is concrete pad or containment dike in good condition? (W1)		
	Is the secondary containment area dry? (Interstitial or Concrete Dike) (D3, W2)		
	Was the dike drained with no sheen present? (Also complete the Controlled Discharge Drainage Log) (D4, D5)		
	Is the berm, base, and drain holes free of excess standing water, sheen, debris, high grass, and weeds? (W4)		
	Are gate valves for emptying containment areas in good condition and secured? (D3, W3)		
Interstitial Leak Detection	Are the leak sensors in good condition and have they been physically activated/tested? (Remove leak sensor and physically raise the rod. Should perform once annually. Place date completed within comments.) (W7)		
Vent	Are the primary and emergency vents unrestricted and working properly?		
Separator/Drainage Tank/Draw-Offs	Is the separator or drainage tank in satisfactory condition? (W8)		
	Are the tank water bottom draw-offs secured? (W9)		
Signage	Does the tank have proper signage including NFPA Hazard Diamond, Product, Working and Design Capacity, Delivery Driver Instructions, and Tank Number?		
TANK FILL AREA		**Y, N, or N/A**	**COMMENTS**
Spill Containment Manhole/Bucket	Is the spill bucket secured and free of dirt, trash, water, or product?		
Fill Pipe	Is the fill cap/pipe in good condition, free of deterioration, seals tightly, and locked? (W10)		
Spill Kit	Is the spill kit in place and properly stocked?		
PIPING		**Y, N, or N/A**	**COMMENTS**
All piping	Is paint on all piping in good shape and no corrosion present?		
Support	Is the piping properly supported?		
Inlet and Outlet Piping/Valve Leaks/Flanges	Are there visible stains, leaks, or deterioration present? (All stains should be wiped clean.) (D7,W11, W12)		

*W or D refer to VDEQ daily and weekly requirements which must be completed monthly

APPENDIX M-4
ANNUAL INSPECTION FORM
FUEL STORAGE TANK

ANNUAL FUEL STORAGE TANK INSPECTION FORM

Facility: **Goddard Space Flight Center**
Wallops Flight Facility
Wallops Island, Virginia

Date: _____
Completed By: _____
Title: _____

This form should be used after a review of all monthly inspections for the past year.

(Yes / No / NA)

1. Fuel Pump Equipment
   A. Has the pump system been serviced according to written procedures? _____
   B. Were any repairs made to the equipment? If so, describe below. _____
   C. Has a leak detector test been conducted on the underground lines? _____
   D. Have interstitial leak detection devices been inspected annually? _____
2. Are containment or diversionary structures or equipment in place to prevent oil from reaching navigable waters? _____
3. Inspections, Testing and Records
   A. Do the required inspections follow written procedures? _____
   B. Are written procedures and inspection records available? _____
   C. Are inspections approved by appropriate supervisor? _____
   D. Is tank or pipe testing required:
      i. based on evidence of a leak; or _____
      ii. based on the API/STI schedule? _____
   E. Are there five (5) years of records onsite? _____
   F. Have all USTs been tested annually? _____
   G. Are all USTs corrosion-resistant or cathodically protected? _____
4. Personnel, Training and Spill Prevention Procedures
   A. Are oil-handling personnel properly instructed in the following:
   i. Operation and maintenance of equipment to prevent oil discharges. _____
   ii. Applicable pollution control laws, rules and regulations. _____
   iii. Use of applicable spill control equipment and materials. _____
   iv. Inspection procedures. _____
   v. New precautionary measures. _____
   B. Date of training: _____
   C. Is the training log up to date? _____

Comments and/or repair descriptions (reference question above):

_____
_____
_____

ATTACH COPIES OF MOST RECENT AST INSPECTION FORM

Review by Environmental Office: _____**(Signature)**
_____**(Date)**

APPENDIX M-5
MONTHLY INSPECTION FORM
DRUM STORAGE AREA

MONTHLY INSPECTION FORM
DRUM STORAGE AREA

Facility: **Goddard Space Flight Center**
Wallops Flight Facility
Wallops Island, Virginia 23337

Date: _____
Completed By: _____
Company: _____

ITEM	CONDITIONS	COMMENTS(1)	REFERRED TO
DRUM STORAGE AREA _____			
Containment area conditions			
Labels appropriate and legible			
Staining on concrete floor – evidence of leaks/spills			
Adequate spill kit supplies			

(1) Provide comments below or attach additional sheets as necessary. Be sure to note the item you are commenting on.

_____
_____
_____
_____
_____
_____
_____
_____

KEEP ON FILE FOR FIVE (5) YEARS.
MAKE AVAILABLE TO REGULATORY PERSONNEL UPON REQUEST.

APPENDIX M-6
ANNUAL TRANSFORMER INSPECTION FORM

ANNUAL TRANSFORMER INSPECTION FORM

Facility: **Goddard Space Flight Center** **Date:** _____
Wallops Flight Facility **Completed By:** _____
Wallops Island, Virginia **Title:** _____

This form should be used after a review of all quarterly inspections for the past year.

(Yes/No/NA)

1. Oil-Filled Electrical Equipment
   - A. Has the equipment been serviced according to written procedures? _____
   - B. Were any repairs made to the equipment? If so, describe below. _____
2. Are containment or diversionary structures or equipment in place to prevent oil from reaching navigable waters if necessary? _____
3. Inspections, Testing and Records
   - A. Do the required inspections follow written procedures? _____
   - B. Are the written procedures and inspections records available? _____
   - C. Are inspections approved by appropriate supervisor? _____
   - D. Is equipment testing required
     - i. based on evidence of a leak; or _____
     - ii. based on the API/STI schedule? _____
   - E. Are there five (5) years of records on-site? _____
4. Personnel, Training and Spill Prevention Procedures
   - A. Are oil-handling personnel properly instructed in the following:
     - i. Operation and maintenance of equipment to prevent oil discharges _____
     - ii. Applicable pollution control laws, rules and regulations. _____
     - iii. Use of applicable spill control equipment and materials. _____
     - iv. Inspection procedures. _____
     - v. New precautionary measures. _____
   - B. Date of training: _____
   - C. Is the training log up to date? _____

Comments and/or repair descriptions (reference question above):

_____

_____

_____

_____

_____

Review by Environmental Office _____ **(Signature)**

_____ **(Date)**

APPENDIX M-7
TRANSFORMER INSPECTION FORMS

WFF Integrated Contingency Plan **37.01.01.16428**

QUARTERLY INSPECTION FORM
FOR TRANSFORMER TANKS

Facility:	**Goddard Space Fight Center**
	Wallops Flight Facility
	Wallops Island, Virginia 23337

Month:
Completed By:
Company: **LJT & ASSOCIATES**

Transformers to be inspected **every** quarter:

E-7-1		F-4 & F-5
F-3-1		F-11-1
F-10-4		

PTI POINTS 40 OUTAGE

PTI POINTS 27 TANK INSP

MAINBASE CIRCUIT 1

SWITCH / XFMR #	OIL CAPACITY FROM NAME PLATE (GAL)	IS THERE ANY OIL LEAKING FROM TANK	EQUIP CONDITION / NEW / GOOD / NEEDS REPAIR / NEEDS TO BE REPLACE	HAS OIL SAMPLE BEEN TAKEN FROM XFMR	HAS PM BEEN PERFORMED ON XFMR/SWITCH	DID YOU PLACE RODENT CONTROL	NOTE ANY REPAIRS NEEDED
S/S 2C1							
S/S 1A1							
TR -N157 25 KVA TRANSFORMER	**130**						
TR-N159C 750 KVA TRANSFORMER	**448**						
TR-N159B 750 KVA **DRY** TRANSFORMER	**DRY**						
TR-D8 GEN ROOM 1500 KVA TRANSFORMER TR-D8-4	**139**						
S/S 1B1							
TR-N161C 500 KVA TRANSFORMER	**308**						
S/S 1B2							
TR-N165-1 75 KVA TRANSFORMER	**136**						
TR-N181-2 150 KVA TRANSFORMER	**120**						
TR-WEB1	**252**						
TR-WEB2	**252**						
S/S 1W1							
TR-E106-W 300 KVA TRANSFORMER	**175**						
TR-F2 112 KVA TRANSFORMER	**162**						
S/S 1W2							
TR-N159D 500 KVA TRANSFORMER	**342**						
300 KVAR CAPACITOR BANK							
S/S 1W3							
TR-N163A 45 KVA TRANSFORMER	**130**						
TR-N175 300 KVA **DRY** TRANSFORMER	**DRY**						
TR-N179 150 KVA TRANSFORMER	**143**						
S/S 1W4							
TR-N174 A&B 45 KVA TRANSFORMER	**101**						
S/S 1W5							
TR-N176-W 225 KVA TRANSFORMER	**290**						

	S/S 1W6							
	TR-N162A-W 300 KVA TRANSFORMER	**320**						
	TR-N162B-W 225 KVA TRANSFORMER	**320**						
	SWITCH / XFMR #	OIL CAPACITY FROM NAME PLATE (GAL)	IS THERE ANY OIL LEAKING FROM TANK	EQUIP CONDITION / NEW / GOOD / NEEDS REPAIR / NEEDS TO BE REPLACE	HAS OIL SAMPLE BEEN TAKEN FROM XFMR	HAS PM BEEN PERFORMED ON XFMR/SWITCH	DID YOU PLACE RODENT CONTROL	NOTE ANY REPAIRS NEEDED
	TR-N162C-W 300 KVA TRANSFORMER	**320**						
	TR-N162D-W 225 KVA TRANSFORMER	**290**						
	S/S 1W7							
	TR-N181-1 150 KVA TRANSFORMER	**128**						
	TR-N181-3 150 KVA TRANSFORMER	**130**						
	TR-N181-4 45 KVA TRANSFORMER	**127**						
	TR-N167A 300 KVA TRANSFORMER	**320**						
	TR-N167B 750 KVA TRANSFORMER	**417**						
	S/S 1W8							
	TR-N169 500 KVA **DRY** TRANSFORMER	**DRY**						

WFF Integrated Contingency Plan **37.01.01.16428**

QUARTERLY INSPECTION FORM
FOR TRANSFORMER TANKS

						Transformers to be inspected **every** quarter:		
Facility	**Goddard Space Fight Center**		**Month:**			E-7-1		F-4 & F-5
	Wallops Flight Facility		**Completed By:**			F-3-1		F-11-1
	Wallops Island, Virginia 23337		**Company:**	**LJT & ASSOCIATES**		F-10-4		
	PTI POINTS 50	OUTAGE						
	PTI POINTS 32	TANK INSP						
	MAINBASE CIRCUIT 2							
CREW	SWITCH / XFMR #	OIL CAPACITY FROM NAME PLATE (GAL)	IS THERE ANY OIL LEAKING FROM TANK	EQUIP CONDITION / NEW / GOOD / NEEDS REPAIR / NEEDS TO BE REPLACE	HAS OIL SAMPLE BEEN TAKEN FROM XFMR	HAS PM BEEN PERFORMED ON XFMR/SWITCH	DID YOU PLACE RODENT CONTROL	NOTE ANY REPAIRS NEEDED
	S/S 2A1							
	TR-N133 75 KVA TRANSFORMER	**146**						
	TR-N222 45 KVA TRANSFORMER	**160**						
	S/S 2A2							
	TR-WELL 4-1 75 KVA TRANSFORMER	**180**						
	TR-F160 300 KVA TRANSFORMER	**147**						
	S/S 2A3							
	TR-F-1-1 225 KVA TRANSFORMER	**290**						
	TR-F-3-1 112.5 KVA TRANSFORMER	**195**						
	TR-F-4 & F-5 150 KVA TRANSFORMER	**184**						
	S/S W2C1							
	S/S 2A4							
	TR-D008-1 300 KVA TRANSFORMER	**184**						
	S/S 2B1							
	TR-D010 150 KVA TRANSFORMER	**175**						
	TR-F006 300 KVA TRANSFORMER	**210**						
	S/S 2B2							
	TR-D001-1 300 KVA TRANSFORMER	**162**						
	TR-D001-2 300 KVA TRANSFORMER	**168**						
	TR-D049 & D002 112.5 KVA TRANSFORMER	**175**						
	S/S 2B3							
	TR-D004-1 225 KVA TRANSFORMER	**195**						
	S/S 2C3							
	TR-N-116 & N-117 75 KVA TRANSFORMER	**180, 111**						
	TR-E134 & WELL #1 112.5 KVA XFMR	**175**						
	TR-N159 POWER STAND 300 KVA XFMR	**199**						
	TR- TEST PAD 300 KVA TRANSFORMER	**212**						

CREW	SWITCH / XFMR #	OIL CAPACITY FROM NAME PLATE (GAL)	IS THERE ANY OIL LEAKING FROM TANK	EQUIP CONDITION / NEW / GOOD / NEEDS REPAIR / NEEDS TO BE REPLACE	HAS OIL SAMPLE BEEN TAKEN FROM XFMR	HAS PM BEEN PERFORMED ON XFMR/SWITCH	DID YOU PLACE RODENT CONTROL	NOTE ANY REPAIRS NEEDED
	S/S 2C2							
	TR-E144 75 KVA TRANSFORMER	**180**						
	300 KVAR CAPACITOR BANK							
	TR-E108 500 KVA TRANSFORMER	**198**						
	TR-E AREA CHILLER 500KVA	**198**						
	S/S 2D1							
	TR-E104 300 KVA TRANSFORMER	DRY TRANSFORMER						
	TR-E105 300 KVA TRANSFORMER	DRY TRANSFORMER						
	TR-E106 500 KVA TRANSFORMER	DRY TRANSFORMER						
	TR-E107 500 KVA TRANSFORMER	DRY TRANSFORMER						
	TR-E109 750 KVA TRANSFORMER	**250**						
	TR-E110 TRANSFORMER	**281**						
	S/S 2D2							
	TR-E007 150 KVA TRANSFORMER	**175**						
	TR-E006 500 KVA TRANSFORMER	**198**						
	TR E-100	**136**						
	S/S 2E1							
	S/S 2E2							
	TR-E010 225 KVA TRANSFORMER	**180**						
	TR-B030 75 KVA TRANSFORMER	**180**						
	S/S 2E3							
	TR-B129 150 KVA TRANSFORMER	**211**						
	TR-B029 112.5 KVA TRANSFORMER	**240**						
	TR A3-2 FEEDS S/S W2 FO							
	S/S 2F1							
	TR-A002 150 KVA TRANSFORMER	**150**						
	TR-A002-1 GSNS RADAR 75 KVA XFMR	**170**						
	TR-A031 MLS 45 KVA TRANSFORMER	**DRY**						
	TR-A029 MLS 45 KVA TRANSFORMER	**DRY**						
	MLS PAD 3 45 KVA TRANSFORMER	**150**						
	S/S 2F2							
	TR-C94 300 KVA **DRY** TRANSFORMER							
	S/S 2F3							
	TR-A132 75 KVA TRANSFORMER	**160**						
	TR-A041 225 KVA **DRY** TRANSFORMER	**DRY**						
	TR-HOT PAD 300 KVA TRANSFORMER	**190**						
	S/S W2FO							
	TR-A3-2 1500 KVA	**415**						
	S/S W2F1							
	TR-A001-1 150 KVA	**170**						

WFF Integrated Contingency Plan **37.01.01.16428**

QUARTERLY INSPECTION FORM
FOR TRANSFORMER TANKS

						Transformers to be inspected **every** quarter:		
Facility	**Goddard Space Fight Center**		**Month:**			E-7-1		F-4 & F-5
	Wallops Flight Facility		**Completed By:**			F-3-1		F-11-1
	Wallops Island, Virginia 23337		**Company:**	**LJT & Associates**		F-10-4		
	PTI POINTS 49	OUTAGE						
	PTI POINTS 31	TANK INSP						
	MAINBASE CIRCUIT 3							
	SWITCH / XFMR #	OIL CAPACITY FROM NAME PLATE (GAL)	IS THERE ANY OIL LEAKING FROM TANK	EQUIP CONDITION / NEW / GOOD / NEEDS REPAIR / NEEDS TO BE REPLACED	HAS OIL SAMPLE BEEN TAKEN FROM XFMR	HAS PM BEEN PERFORMED ON XFMR/SWITCH	DID YOU PLACE RODENT CONTROL	NOTE ANY REPAIRS NEEDED
	S/S 3A1							
	TR-N127 75 KVA TRANSFORMER	**94**						
	S/S 3A2							
	S/S 3B1							
	TR-F007 225 KVA TRANSFORMER #1	**137**						
	TR-F007 500 KVA TRANSFORMER #2	**258**						
	S/S 3B2							
	TR-F019 150 KVA TRANSFORMER	**123**						
	TR-M001 150 KVA TRANSFORMER	**146**						
	S/S 3A3							
	TR-F010B 300 KVA TRANSFORMER	**150**						
	TR-F010A 225 KVA TRANSFORMER	**162**						
	TR-F010-1 500 KVA TRANSFORMER	**DRY**						
	TR-F010-2 500 KVA TRANSFORMER	**DRY**						
	S/S 3A4							
	TR-F010-3 1500 KVA TRANSFORMER	**415**						
	S/S 3A5							
	300 KVAR CAPACITOR BANK							
	S/S 3C1							
	TR-H100 PAYLOAD KVA TRANSFORMER							
	TR-H100 1000KVA 480/277	**386**						
	S/S 3C2							
	TR-H30 (TRCG-5) 50 KVA TRANSFORMER	**52**						
	S/S 3A6							
	TR-F011-1 & F009 & WELL 75 KVA XFMR	**146**						
	TR-F010-4 500 KVA TRANSFORMER	**191**						
	TR-F016 300 KVA TRANSFORMER	**150**						
	TR-F016 225 KVA TRANSFORMER	**137**						
	S/S 3A7							
	TR-F020 & F026 225 KVA TRANSFORMER	**180**						

	SWITCH / XFMR #	**OIL CAPACITY FROM NAME PLATE (GAL)**	IS THERE ANY OIL LEAKING FROM TANK	EQUIP CONDITION / NEW / GOOD / NEEDS REPAIR / NEEDS TO BE REPLACED	HAS OIL SAMPLE BEEN TAKEN FROM XFMR	HAS PM BEEN PERFORMED ON XFMR/SWITCH	DID YOU PLACE RODENT CONTROL	NOTE ANY REPAIRS NEEDED
	TR-F023 150 KVA TRANSFORMER	**123**						
	S/S 3A8							
	S/S 3D1							
	TR-D012 75 KVA TRANSFORMER	**160**						
	TR-NAVY	**187**						
	S/S 3D2							
	TR-M009 25 KVA TRANSFORMER	**55**						
	TR-M020-2 500 KVA TRANSFORMER	**217**						
	TR-M020-3 112.5 KVA TRANSFORMER	**125**						
	S/S 3D3							
	TR-M010 25 KVA TRANSFORMER	**55**						
	TR-D050 500 KVA TRANSFORMER	**240**						
	TR-M011 25 KVA TRANSFORMER	**55**						
	S/S 3D4							
	TR-M012 25 KVA TRANSFORMER	**55**						
	TR-M022 25 KVA TRANSFORMER	**187**						
	TR-M014 25 KVA TRANSFORMER	**55**						
	S/S 3D5							
	TR-M015 & M017 150 KVA TRANSFORMER	**123**						
	TR-M016 300 KVA TRANSFORMER	**141**						

WFF Integrated Contingency Plan **37.01.01.16428**

QUARTERLY INSPECTION FORM
FOR TRANSFORMER TANKS

Facility:	**Goddard Space Fight Center**		**Month:**				
	Wallops Flight Facility		**Completed By:**				
	Wallops Island, Virginia 23337		**Company:**				
	PTI POINTS 2	TANK INSP					
	TRANSFORMERS NOT MAINTAINED BY NASA BUT ON NASA PROPERTY	If oil is leaking notify supervisor					
CREW	SWITCH / XFMR #	Is there any oil leaking from tank, bushings, fins or any penetrations at this time.		Is there evidence that oil has been leaking from this transformer but not leaking at this time			
	J-20 (VISITOR CENTER) A&N						
	R-1 (CROPPER CENTER) A&N						
	TR-CG-5						
	TR-CG-11						
	TR-CG-12						
	TR-CG-13						
	TR-CG-14						
	TR-CG-21						
	TR-CG-22						
	TR-CG-23						
	TR-CG-24						
	T-10 (NAVY)						
	T-11 (NAVY)						
	T-12 (NAVY)						
	T-13 (NAVY)						
	T-14 (NAVY)						
	T-15 (NAVY)						
	T-16 (NAVY)						
	3525494812 (NOAA)						
	3489914712 (NOAA)						

APPENDIX M-8
ASSESSMENT CHECKLIST FOR EXTERNAL OIL-FILLED TRANSFORMERS WITHOUT PASSIVE SECONDARY CONTAINMENT

ASSESSMENT CHECKLIST FOR EXTERIOR OIL-FILLED TRANSFORMERS WITHOUT PASSIVE SECONDARY CONTAINMENT

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
3489914712 (NOAA)	3	1	1	2	2	1	10
3525494812 (NOAA)	3	1	1	2	2	1	10
T-10 (Navy)	1	1	2	2	2	2	10
T-11 (Navy)	1	1	2	2	2	1	9
T-12 (Navy)	1	1	1	2	2	1	8
T-13 (Navy)	1	1	1	2	2	2	9
T-14 (Navy)	1	1	1	2	2	2	9
T-15 (Navy)	1	1	1	2	2	2	9
T-16 (Navy)	1	1	1	2	2	2	9
T-8 (Navy)	1	1	2	2	2	3	11
T-CG-11 (A&N)	2	1	2	2	2	1	10
T-CG-12 (A&N)	2	1	2	2	2	1	10
T-CG-13 (A&N)	2	1	1	2	2	2	10
T-CG-14 (A&N)	2	1	1	2	2	1	9
T-CG-21 (A&N)	2	1	1	2	2	1	9
T-CG-22 (A&N)	2	1	1	2	2	2	10
T-CG-23 (A&N)	2	1	1	2	2	1	9
T-CG-24 (A&N)	2	1	1	2	2	1	9
TR-A001-1	2	3	2	2	2	1	12
TR-A-132	2	3	1	2	2	1	11

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-A-2	2	3	1	2	2	3	13
TR-A-2-1 GSNS RADAR	2	3	1	2	2	3	13
TR-A-3-2	3	3	2	2	2	1	13
TR-A-41	2	1	1	2	2	3	11
TR-B129-1	3	1	1	2	2	1	10
TR-B29-1	3	3	2	2	3	1	14
TR-B-30-1	2	3	1	2	2	2	12
TR-C94-1	2	3	2	2	2	2	13
TR-D001-1	2	1	1	2	3	1	10
TR-D001-2	2	1	1	2	3	2	11
TR-D004-1	2	2	3	3	1	1	12
TR-D008-1	2	2	3	2	1	1	11
TR-D008-4	2	2	3	2	1	1	11
TR-D-10-1	2	1	2	2	2	1	10
TR-D-12-1	2	3	2	2	2	1	12
TR-D-49 & D-2	2	2	2	2	2	1	11
TR-D-50	3	2	1	2	3	2	13
TR-E-100	2	2	2	2	2	2	12
TR-E-10-1	2	3	1	2	2	1	11
TR-E-109	3	2	2	2	3	1	13
TR-E-134-1	2	1	2	2	3	1	11
TR-E-144-1	2	3	1	2	2	1	11

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-E-6-1	3	2	2	2	2	1	12
TR-E-7-1	2	2	3	2	2	1	12
TR-E-Area Chiller	2	2	1	2	2	1	10
TR-F-10-3	3	2	2	2	3	1	13
TR-F-10-4	3	2	3	3	2	1	14
TR-F-10-B	3	2	2	2	3	1	13
TR-F-10-A	3	2	3	2	2	1	13
TR-F-1-1	3	2	3	2	2	2	14
TR-F-11-1	2	2	3	3	2	1	13
TR-F-160	2	2	2	2	2	3	13
TR-F-16-1	2	2	2	2	3	1	12
TR-F-16-2	2	2	2	2	3	1	12
TR-F-19-1	2	2	2	2	2	2	12
TR-F-2	2	2	1	2	2	2	11
TR-F-20-1/F-26	2	3	2	2	2	1	12
TR-F-23-1	2	3	2	2	2	2	13
TR-F-3-1	2	2	3	2	2	2	13
TR-F-4 & F-5	2	2	3	2	2	2	13
TR-F-6-1	3	2	1	2	2	1	11
TR-F-7-1	2	2	1	3	2	2	12
TR-F-7-2	3	2	1	3	2	2	13
TR-WELL-4-1	2	3	1	2	2	1	11
TR-H-23-1	2	3	2	2	2	2	13
TR-HELO PAD	2	3	1	2	2	3	13

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-HOT PAD	2	3	1	2	2	3	13
TR-M-1	2	2	2	2	2	1	11
TR-M-010	2	2	1	2	2	1	10
TR-M-011	2	2	1	2	2	1	10
TR-M-012	2	2	2	2	2	1	11
TR-M-014	2	2	1	2	2	1	10
TR-M-015/M-017	2	2	1	2	2	3	12
TR-M-016	2	2	1	2	2	3	12
TR-M1-BACK-1 (SPARE)	2	2	1	2	2	2	11
TR-M1-BACK-2 (SPARE)	2	2	1	2	2	2	11
TR-M1-BACK-3 (SPARE)	2	2	1	2	2	2	11
TR-M1-BACK-4 (SPARE)	3	2	1	2	2	2	12
TR-M1-BACK-5 (SPARE)	2	2	1	2	2	2	11
TR-M1-BACK-6 (SPARE)	2	2	1	2	2	2	11
TR-M1-BACK-7 (SPARE)	3	2	1	2	2	2	12
TR-M1-BACK-8 (SPARE)	2	2	1	2	2	2	11
TR-M1-BACK-9 (SPARE)	2	2	1	2	2	2	11
TR-M1-SHED-1 (SPARE)	3	2	1	2	2	3	13
TR-M1-SHED-2 (SPARE)	2	2	1	2	2	3	12
TR-M1-SHED-3 (SPARE)	2	2	2	2	2	3	13
TR-M1-SHED-4 (SPARE)	2	2	2	2	2	3	13
TR-M-20-2	3	2	1	2	2	1	11
TR-M-20-3	2	2	1	2	2	1	10
TR-M-22-1	2	2	1	2	2	1	10
TR-M-009	2	2	1	2	2	1	10
TR-MET TOWER	1	3	1	2	2	1	10
TR-MLS PAD-3	2	3	2	2	2	2	13
TR-MLS PAD-5	2	3	1	2	2	3	13
TR-MOBILE RANGE TEST PAD	3	3	1	2	3	1	13

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-N-116-1	2	2	1	2	2	2	11
TR-N-117	2	2	1	2	2	2	11
TR-N-127	1	1	2	2	2	1	9
TR-N-133	2	2	1	2	2	3	12
TR-N-157	2	3	2	2	2	1	12
TR-N-159-C	3	1	2	2	3	1	12
TR-N-159-D	3	1	3	3	3	1	14
TR-N-159-POWER STAND	2	3	2	2	2	3	14
TR-N-161-C	3	2	2	2	2	1	12
TR-N-162-A	3	2	2	2	2	2	13
TR-N-162-B	3	2	2	2	2	2	13
TR-N-162-C	2	2	2	2	2	2	12
TR-N-162-D	2	2	2	2	2	2	12
TR-N-163-A	2	3	2	2	2	2	13
TR-N-165-1	2	2	1	2	2	1	10
TR-N-167-A	3	2	1	2	2	2	12
TR-N-167-B	3	2	1	2	2	2	12
TR-N-174-A&B	2	3	1	2	2	3	13
TR-N-176	3	2	1	2	3	1	12
TR-N-179	2	3	1	2	2	2	12
TR-N-181-1	2	3	2	2	2	2	13
TR-N-181-2	2	3	1	2	2	2	12
TR-N-181-3	2	3	1	2	2	2	12
TR-N-181-4	2	3	1	2	2	2	12
TR-N-222-1	2	3	1	2	2	2	12
TR-WEB1	3	2	2	2	1	1	11
TR-WEB2	3	2	2	2	1	1	11
TR-R-10 (Navy)	2	3	2	2	2	3	14
TR-R-20 (Navy)	2	2	2	2	2	1	11

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-R-30 (Navy)	3	2	2	2	2	3	14
TR-R-40 (Navy)	2	2	1	2	2	2	11
TR-SEAWALL	1	3	1	2	2	2	11
TR-U-12	2	2	2	2	2	1	11
TR-U-20	2	2	1	2	2	1	10
TR-U-25	3	2	1	2	3	1	12
TR-U-30-1	3	2	2	2	3	1	13
TR-U-30-2	2	2	2	2	3	1	12
TR-U-40	3	2	1	2	2	1	11
TR-U-48	2	3	2	3	2	1	13
TR-U-5	2	2	2	3	2	1	12
TR-U-55	2	2	1	2	3	1	11
TR-U-70-1	3	2	1	3	2	1	12
TR-U-70-2	3	2	1	3	2	1	12
TR-U-70-C (3)	2	2	1	2	3	1	11
TR-U-70-D (4)	2	2	1	2	3	1	11
TR-U-80	2	3	2	2	2	1	12
TR-U90	3	2	2	3	2	1	13
TR-UAV-1	2	3	1	2	2	1	11
TR-V-003 440 VOLT	3	2	1	2	3	1	12
TR-V-003 448 VOLT	3	2	1	2	3	1	12
TR-V-100	2	2	1	2	2	1	10
TR-V-21-1	3	1	1	2	3	1	11
TR-V-21-1	3	1	1	2	3	1	11
TR-V21-2	3	1	1	2	3	1	11
TR-V-21-2	3	1	1	2	3	1	11
TR-V-24-1	3	1	1	2	3	3	13
TR-V-24-2	3	1	1	2	3	3	13
TR-V-25	2	3	1	2	2	1	11

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-V-50	2	2	1	2	2	2	11
TR-V-65	3	3	1	2	2	1	12
TR-V-67	1	3	1	2	2	3	12
TR-V-80	2	3	1	2	2	1	11
TR-W-32	1	3	1	2	2	1	10
TR-W-56	2	3	2	2	3	1	13
TR-W-65-1	2	3	1	2	2	2	12
TR-W-65-2	1	3	1	2	2	2	11
TR-W-70	1	3	1	2	2	2	11
TR-W-83	2	3	2	2	2	2	13
TR-X-100	3	1	1	2	2	3	12
TR-X33A	3	3	1	2	2	3	14
STA-X-72	3	2	1	2	2	3	13
TR-X-89A	2	2	2	2	2	1	11
TR-X-75	1	3	1	2	2	1	10
TR-Y-39	2	3	1	2	2	1	11
TR-Y-55	2	2	1	2	2	1	10
TR-Y-60	2	2	1	2	2	1	10
TR-Y-62A	1	3	1	2	2	1	10
TR-Y-75A-1	2	3	1	2	2	2	12
TR-Y-75A-2	2	3	1	2	2	2	12
TR-Y-80A-1	2	3	1	2	2	2	12
TR-Y-80A-2	2	3	1	2	1	1	10
TR-Z-100	3	3	1	2	2	2	13
TR-Z-25	2	3	1	2	2	1	11
TR-Z-3	1	2	2	3	2	1	11
TR-Z-38	2	3	2	3	2	1	13
TR-Z-4	2	2	1	2	2	2	11
TR-Z-40	2	2	2	3	2	1	12

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

Transformer Identification Number or Bldg No.	Oil Capacity	Local Building Site Activity	Distance to Storm Drain or Water Body	Elevation of Transformer	Surrounding Terrain	Transformer Visible from Roadway?	Net Total Risk Ranking
TR-Z-52	2	3	1	2	2	1	11
TR-Z-53	2	3	1	2	2	2	12
TR-X-57	1	3	1	2	2	1	10
TR-Z-60	2	3	1	2	2	1	11

Transformer Ranking Criteria

Criteria	Low Risk = 1	Medium Risk = 2	High Risk = 3
Oil Capacity	55 to 100 gallons	100 to 200 gallons	Greater than 200 gallons
Local Building Site Activity	Frequent	Infrequent	Normally Unmanned
Distance to Storm Drain or Water Body	Greater than 100 feet	25 to 100 feet	Less than 25 feet
Elevation of Transformer	Within Depression	Flat Terrain	Hill or Slope
Surrounding Terrain	Gravel Bed	Soil	Pavement
Transformer Visible from Roadway?	Yes	Partially	No

Net Total Risk Ranking 6 to 9: Acceptable for Active Containment Measures; 10 to 14: Questionable for Active Containment Measures; 15 or Greater: Active Measures not recommended, Install Passive Secondary Containment Structures around transformer

APPENDIX M-9
MOBILE ELECTRIC GENERATOR MONTHLY PREVENTATIVE MAINTENANCE FORM

Month: _____
Completed by: _____

MOBILE ELECTRIC GENERATORS Monthly Preventative Maintenance:

1. All mobile electric generators are to be started and operated for 20 minutes every other Tuesday of each month. Check and record all oil, coolant, and battery fluid levels, if applicable. Record all engine hours, if applicable.
2. All mobile electric generators are to be operated under load (load bank) for 30 minutes the last Tuesday of each month. The individual perming the test must initial and record information in each block.

Generator Designation	Start Hours	Stop Hours	Oil Level	Coolant Level	Battery Level	Load Bank Test	Evidence of Belly Tank Fuel Leak	Observations
NA-00858T								
NA-00684T								
NA-00211T/1								
NA-00212T/2								
Generator-3								
NA-00246T/4								
NA-00616T/5								
NA-00613T/6								
NA-00199T/7								
NA-00611T/8								
NA-00612T/9								
NA-0660T/10								
A-7806 NAVY								

Problems/Concerns: _____
_____
_____
_____

Signature: _____

APPENDIX M-10
WEEKLY STATIONARY GENERATOR INSPECTION FORM

Wallops Flight Facility
Wallops Island, Va.

Date:_____
Completed By:_____
Company:_____

WEEKLY STATIONARY GENERATOR CHECKS

	Building Lights	Gen Panel Lights	Day Tank	Block Heater	Alternator Output	Load Test Battery	Oil Level	Coolant Level	AC Output Voltage	Engine Start Hours	Engine Stop Hours	Engine Start Time	Engine Stop Time	No Leaks
D50														
D8														
F16														
N127														
7806														
R30														
U12-1														
U12-2														
U55														
U25														
ZO62														
W20														
V18														
V062														
V65														

Comments_____

_____

Signature_____

APPENDIX M-11
ANNUAL GENERATOR INSPECTION FORM

ANNUAL GENERATOR INSPECTION FORM

Facility: **Goddard Space Flight Center** **Date:** _____
Wallops Flight Facility **Completed By:** _____
Wallops Island, Virginia **Title:** _____

This form should be used after a review of all generator inspections for the past year.

(Yes/No/NA)

1. Stationary/Mobile Electric Generators
   A. Has the equipment been serviced according to written procedures? _____
   B. Were any repairs made to the equipment (if so, describe below)? _____
2. Are containment or diversionary structures or equipment in place to prevent oil from reaching navigable waters ? _____
3. Inspections, Testing and Records
   A. Do the required inspections follow written procedures? _____
   B. Are the written procedures and inspections records available? _____
   C. Are inspections approved by appropriate supervisor? _____
   D. Is tank or pipe testing required:
      i. based on evidence of a leak; or _____
      ii. based on the API/STI schedule? _____
   E. Are there three (3) years of records on-site? _____
4. Personnel, Training and Spill Prevention Procedures
   A. Are oil-handling personnel properly instructed in the following:
      i. Operation and maintenance of equipment to prevent oil discharges _____
      ii. Applicable pollution control laws, rules and regulations. _____
      iii. Use of applicable spill control equipment and materials. _____
      iv. Inspection procedures. _____
      v. New precautionary measures. _____
   B. Date of training: _____
   C. Is the training log up to date? _____

Comments and/or repair descriptions (reference question above):

_____

_____

_____

_____

_____

Review by Environmental Office _____ **(Signature)**

_____ **(Date)**

APPENDIX M-12
ANNUAL ELEVATOR
INSPECTION FORM

ANNUAL ELEVATOR INSPECTION FORM

Facility: **Goddard Space Flight Center** **Date:** _____
Wallops Flight Facility **Completed By:** _____
Wallops Island, Virginia **Title:** _____

This form should be used after a review of all elevator inspections for the past year.

(Yes/No/NA)

1. Elevators
   A. Has the equipment been serviced according to written procedures? _____
   B. Were any repairs made to the equipment (if so, describe below)? _____
2. Are containment or diversionary structures or equipment in place to prevent oil from reaching navigable waters ? _____
3. Inspections, Testing and Records
   A. Do the required inspections follow written procedures? _____
   B. Are the written procedures and inspections records available? _____
   C. Are inspections approved by appropriate supervisor? _____
   D. Is tank or pipe testing required:
      i. based on evidence of a leak; or _____
      ii. based on the API/STI schedule? _____
   E. Are there three (3) years of records on-site? _____
4. Personnel, Training and Spill Prevention Procedures
   A. Are oil-handling personnel properly instructed in the following:
      i. Operation and maintenance of equipment to prevent oil discharges _____
      ii. Applicable pollution control laws, rules and regulations. _____
      iii. Use of applicable spill control equipment and materials. _____
      iv. Inspection procedures. _____
      v. New precautionary measures. _____
   B. Date of training: _____
   C. Is the training log up to date? _____

Comments and/or repair descriptions (reference question above):

_____

_____

_____

_____

_____

Review by Environmental Office _____ **(Signature)**

_____ **(Date)**

APPENDIX M-13
OIL WATER SEPARATOR INSPECTION FORM

INSPECTION FORM
OIL WATER SEPARATOR (OWS):

Facility: **Goddard Space Flight Center**
Wallops Flight Facility
Wallops Island, Virginia 23337

Date: _____
Completed By: _____
Company: _____

OIL WATER SEPARATOR

	Conditions	**Yes**	**No**
Visual Inspection	Are leaks or malfunctions evident in the OWS?		
	Are there any signs of spill in the general vicinity?		
	Are there any foreign substances accumulating in the OWS?		
	Is there evidence of substances bypassing the OWS?		

Provide comments below or attach additional sheets as necessary. Be sure to note the item you are commenting on.

_____

_____

_____

KEEP ON FILE FOR FIVE (5) YEARS.
MAKE AVAILABLE TO REGULATORY PERSONNEL UPON REQUEST.

APPENDIX N

SAFETY DATA SHEETS

The following pages include the Safety Data Sheets for the following compounds:

- #2 Fuel Oil
- Diesel Fuel
- Gasoline, Unleaded
- Hydrashield FR 395-2 Hydraulic Oil
- Hydraulic Oil
- Envirotemp FR3
- Jet-A Fuel /JP-8
- Laquer Thinner
- Mineral Oil
- Mineral Spirits
- Oil, Drydene Non-Detergent Motor
- RP-1 Kerosene
- Ansul AFFF
- Mobil DTE Oil (Spandar)
- Brayco 717 (U-25 Antenna)
- Brayco Micronic 781-2 (U-70 Antenna)
- Hyvolt II

MATERIAL SAFETY DATA SHEET
No. 2 Fuel Oil MSDS No. 0088

1. CHEMICAL PRODUCT and COMPANY INFORMATION (rev. Jan-98)
Amerada Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961
EMERGENCY TELEPHONE NUMBER (24 hrs): CHEMTREC (800) 424-9300
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
SYNONYMS: #2 Heating Oil; 2 Oil; Off-road Diesel Fuel
See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS (rev. Sep-98)
INGREDIENT NAME EXPOSURE LIMITS
CONCENTRATION
PERCENT BY WEIGHT
#2 Fuel Oil
CAS NUMBER: 68476-30-2
OSHA PEL-TWA: 5 mg/m3 as mineral oil mist
ACGIH TLV-TWA: 1997 NOIC - 100 mg/m3, skin, A3
100
Naphthalene
CAS NUMBER: 91-20-3
OSHA PEL-TWA: 10 ppm
ACGIH TLV-TWA/STEL: 10 / 15 ppm, A4
Typically 0.1
A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

3. HAZARDS IDENTIFICATION (rev. Jan-98; Tox-98)
EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED
Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation. Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).
EYES
Contact with eyes may cause mild irritation.
SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.
INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.
Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.
INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.
NFPA 704 (Section 16)
WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

MATERIAL SAFETY DATA SHEET
No. 2 Fuel Oil MSDS No. 0088

CHRONIC EFFECTS and CARCINOGENICITY
Similar products have produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined – see Section 11Toxicological Information.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).
4. FIRST AID MEASURES (rev. Jan-98; Tox-98)
EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.
SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.
INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.
INHALATION
Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.
5. FIRE FIGHTING MEASURES (rev. Sep-94)
FLAMMABLE PROPERTIES:
FLASH POINT: 100 $_{o}$F (38 $_{o}$C) minimum PMCC
AUTOIGNITION POINT: 494 $_{o}$F (257 $_{o}$C)
LOWER EXPLOSIVE LIMIT (%): 0.6
UPPER EXPLOSIVE LIMIT (%): 7.5
FIRE AND EXPLOSION HAZARDS
OSHA and NFPA Class 2 COMBUSTIBLE LIQUID (see Section 14 for transportation classification). Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.
EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.
LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.
FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.
Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.
Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.
See Section 16 for the NFPA 704 Hazard Rating.

MATERIAL SAFETY DATA SHEET
No. 2 Fuel Oil MSDS No. 0088

6. ACCIDENTAL RELEASE MEASURES (rev. Jan-98)
ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.
Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.
Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection. Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE (rev. Jan-98)

HANDLING PRECAUTIONS
Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.
Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when this product is loaded into tanks previously containing low flash point products (such as gasoline) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

STORAGE PRECAUTIONS
Keep containers closed and clearly labeled. Use approved vented storage containers. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.
Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

WORK/HYGIENIC PRACTICES
Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse.
Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION (rev. Jan-98)

ENGINEERING CONTROLS
Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION
Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION
Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to

exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to
OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.
Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES (rev. Jul-98)

APPEARANCE

Red or reddish/orange colored (dyed) liquid

ODOR

Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE: 340 to 700 °F (171 to 371 °C)
VAPOR PRESSURE: 0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1): > 1.0
SPECIFIC GRAVITY (H_2O = 1): AP 0.87
PERCENT VOLATILES: 100 %
EVAPORATION RATE: Slow; varies with conditions
SOLUBILITY (H_2O): Negligible

10. STABILITY and REACTIVITY (rev. Sep-94)

STABILITY: Stable. Hazardous polymerization will not occur

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES (rev. Jan-98; Tox-98)

ACUTE TOXICITY

Acute Oral LD50 (rat): 14.5 ml/kg
Acute Dermal LD50 (rabbit): > 5 ml/kg
Guinea Pig Sensitization: negative
Primary dermal irritation: moderately irritating (Draize mean irritation score - 3.98 rabbits)
Draize eye irritation: mildly irritating (Draize score, 48 hours, unwashed - 2.0 rabbits)

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenic: IARC: NO NTP: NO OSHA: NO ACGIH: 1997 NOIC: A3
Dermal carcinogenicity: positive - mice
Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.
This product is similar to Diesel Fuel. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A) and NIOSH regards it as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MUTAGENICITY (genetic effects)

Material of similar composition has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION (rev. Jan-98)

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS(rev. Jan-98)

Consult federal, state and local waste regulations to determine appropriate disposal options.

MATERIAL SAFETY DATA SHEET
No. 2 Fuel Oil MSDS No. 0088

14. TRANSPORTATION INFORMATION (rev. Jan-98)
PROPER SHIPPING NAME: FUEL OIL, NO. 2
HAZARD CLASS & PACKING GROUP: 3, PG III
DOT IDENTIFICATION NUMBER: NA 1993
DOT SHIPPING LABEL: FLAMMABLE LIQUID
May be reclassified for transportation as a COMBUSTIBLE LIQUID under conditions of DOT 49 CFR 173.120(b)(2).

15. REGULATORY INFORMATION (rev. Feb-01)

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION
This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)
Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.
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CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)
The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES
ACUTE HEALTH CHRONIC HEALTH FIRE SUDDEN RELEASE OF PRESSURE REACTIVE
X X X -- --

SARA SECTION 313 - SUPPLIER NOTIFICATION
This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Amerada Hess Corporate Safety if you require additional information regarding this product.

CANADIAN REGULATORY INFORMATION (WHMIS)
Class B, Division 3(Combustible Liquid); Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION (rev. Feb-01)
NFPA® HAZARD RATING HEALTH: 0 Negligible
FIRE: 2 Moderate
REACTIVITY: 0 Negligible
HMIS® HAZARD RATING HEALTH: 1 * Slight
FIRE: 2 Moderate
REACTIVITY: 0 Negligible
* Chronic
SUPERSEDES MSDS DATED: 09/03/98

ABBREVIATIONS:
AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:
ACGIH American Conference of Governmental Industrial Hygienists
AIHA American Industrial Hygiene Association
ANSI American National Standards Institute (212) 642-4900
API American Petroleum Institute (202) 682-8000

MATERIAL SAFETY DATA SHEET
No. 2 Fuel Oil MSDS No. 0088

CERCLA Comprehensive Emergency Response, Compensation, and Liability Act
DOT U.S. Department of Transportation
[General info: (800) 467-4922]
EPA U.S. Environmental Protection Agency
HMIS Hazardous Materials Information System
IARC International Agency For Research On Cancer
MSHA Mine Safety and Health Administration
NFPA National Fire Protection Association (617) 770-3000
NIOSH National Institute of Occupational Safety and HealthNOIC Notice of Intended Change (proposedchange to ACGIH TLV)
NTP National Toxicology Program
OPA Oil Pollution Act of 1990
OSHA U.S. Occupational Safety & Health Administration
PEL Permissible Exposure Limit (OSHA)
RCRA Resource Conservation and Recovery Act
REL Recommended Exposure Limit (NIOSH)
SARA Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA Self-Contained Breathing Apparatus

MATERIAL SAFETY DATA SHEET
Diesel Fuel

1. CHEMICAL PRODUCT and COMPANY INFORMATION

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): 800-572-0778

Global Companies LLC
Water Mill Center
800 South St.
Waltham, MA 02454-9161

SYNONYMS: Diesel Fuel; Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Dyed Diesel; * DieselOne®; * DieselOne® w/Platinum Plus DFX; Ultra Low Sulfur Diesel; ULSD
See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS

INGREDIENT NAME	EXPOSURE LIMITS	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel	OSHA PEL-TWA: 5 mg/m, as mineral oil mist	100
CAS NUMBER: 68476-34-6	ACGIH TLV-TWA: 1997 NOIC- 100 mg/m skin, A3	
Naphthalene	OSHA PEL: 10 ppm	Typically < 0.01
CAS NUMBER: 91-20-3	ACGIH TLV-TWA/STEL: 10 / 15 ppm, A4	
"Dyed Diesel Fuel" contains a Red Dye		Typically 11 - 14 ppm
* DieselOne® and DieselOne® w/Platinum Plus DFX are Premium Diesel Fuels, Which contain a multifunctional additive		Typically < 0.01

*Ultra Low Sulfur Diesel typically contains less than 15 ppm of Sulfur

A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined – see Section 11 Toxicological Information. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties.
Small amounts of material, which enter the mouth, should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flashback. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO_2, water spray, fire fighting foam, or Halon.
LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPCC, SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Do not touch or walk-through spilled material. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with dry earth, sand or other non-combustible, inert oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container with clean, non-sparking tools for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8). Local and / or Federal notification may be required if this material is released to the environment (see Section 15 for additional information).

7. HANDLING and STORAGE HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.
Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Label all secondary containers that this material is transferred into with the chemical name and associated hazard(s). Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.
Store in a well-ventilated area. Protect containers from damage and vehicular traffic. Post "No Smoking" signs in product storage areas. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

ENGINEERING CONTROLS
Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION
Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION
Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.
Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES APPEARANCE

Clear, straw-yellow liquid or Reddish Orange color for Dyed Diesel

ODOR
Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 °F (160 to 366 °C)
VAPOR PRESSURE:	0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.86 @ 60 °F (16 °C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong acids and oxidizers; Viton ® ; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute dermal LD50 (rabbits): > 5 ml/kg Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits) Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: 1997 NOIC: A3
Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)
This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION
Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations. (See Section 15 for additional information).

13. DISPOSAL CONSIDERATIONS
Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel
HAZARD CLASS and PACKING GROUP:	3, PG III
DOT IDENTIFICATION NUMBER:	NA 1993
DOT SHIPPING LABEL:	None
EMERGENCY RESPONSE GUIDEBOOK GUIDE NUMBER:	128

IRS REQUIREMENTS if Dyed, "Dyed Diesel Fuel, Non-Taxable Use Only, Penalty for Taxable Use"

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION
This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

RCRA INFORMATION
If disposed, this product would be considered a hazardous waste under RCRA with an EPA waste code of D001 for the characteristic of ignitibility

CLEAN WATER ACT (OIL SPILLS)
Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the
U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)
The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause that exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION
This product may contain listed chemicals below the *de minimus* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. This material is subject to the reporting requirements of Section 311-312 of the Emergency Planning and Community Right to Know Act (EPCRA) if stored at quantities in excess of 10,000 pounds at any one time. If you may be required to report releases of chemicals listed in 40 CFR 372.28. However, Polycyclic Aromatic Compounds (PACs) are coincidentally manufactured from the combustion of various fuel oils and other petroleum products. Under SARA Section 313, the de minims exemption has been eliminated for PACs and other listed persistent bio-accumulative and toxic chemicals (PBTs). Refer to EPA guidance for additional reporting information

EPA NOTIFICATION (OIL SPILLS)
If the there is a discharge of more than 1,000-gallons of oil into or upon navigable waters of the United States, or if it is the second spill event of 42 gallons or more of oil into water within a twelve (12) month period, a written report must be submitted to the Regional Administrator of the EPA within sixty days of the event.

CANADIAN REGULATORY INFORMATION (WHMIS)
Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING

HEALTH:	1 Slight
FIRE:	2 Moderate
REACTIVITY:	0 Negligible

HMIS® HAZARD RATING

HEALTH:	1 * Slight
FIRE:	2 Moderate
REACTIVITY:	0 Negligible
	* Chronic

ABBREVIATIONS:

AP = Approximately	< = Less than	>= Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	OSHA	U.S. Occupational Safety & Health Administration
API	American Petroleum Institute	PEL	Permissible Exposure Limit (OSHA)
AIHA	American Industrial Hygiene Association	RCRA	Resource Conservation and Recovery Act
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act	REL	Recommended Exposure Limit (NIOSH)
ANSI	American National Standards Institute	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
DOT	U.S. Department of Transportation		
EPA	U.S. Environmental Protection Agency	SCBA	Self-Contained Breathing Apparatus
HMIS	Hazardous Materials Information System	SPCC	Spill Prevention, Control, and Countermeasures
IARC	International Agency For Research On Cancer	STEL	Short-Term Exposure Limit (generally 15 minutes)
MSHA	Mine Safety and Health Administration	TLV	Threshold Limit Value (ACGIH)
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute of Occupational Safety and Health	TWA	Time Weighted Average (8 hr.)
NOIC	Notice of Intended Change	WEEL	Workplace Environmental Exposure Level (AIHA)
NTP	National Toxicology Program	WHMIS	Canadian Workplace Hazardous Materials Information System
OPA	Oil Pollution Act of 1990	PMCC	Pensky-martens Closed Cup Method

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

VALERO

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	DIESEL FUELS
Version #	02
Issue date	11-09-2010
Revision date	11-04-2012
Supersedes date	08-11-2011
MSDS Number	102
Product use	Refinery feedstock.
Synonym(s)	Diesel Fuels All Grades, Diesel Fuel No.2, Fuel Oil No.2, High Sulfur Diesel Fuel, Low Sulfur Diesel Fuel, Ultra Low Sulfur Diesel Fuel, CARB (California Air Resource Board) Diesel Fuel, Off-Road Diesel Fuel, Dyed Diesel Fuel, X Grade Diesel Fuel, X-1 Diesel Fuel, R5 ULSD, B5 ULSD See section 16 for complete information.
Manufacturer/Supplier	Valero Marketing & Supply Company and Affiliates P.O. Box 696000 San Antonio, TX 78269-6000
General Assistance	210-345-4593
Emergency	24 Hour Emergency 888-565-5220 1-800-424-9300 (CHEMTREC USA)

2. Hazards Identification

Physical state	Liquid.
Appearance	Liquid (may be dyed red).
Emergency overview	WARNING! Combustible liquid and vapor. May be ignited by heat, sparks or flames. Heat may cause the containers to explode. Harmful if inhaled or swallowed. May be harmful if absorbed through skin. Aspiration may cause lung damage. Irritating to eyes, respiratory system and skin. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. Suspect cancer hazard - may cause cancer. Prolonged exposure may cause chronic effects. Diesel exhaust has been reported to be an occupational hazard due to NIOSH-reported potential carcinogenic properties. Hydrogen sulfide, a highly toxic gas, may be present or released. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment. The toxicological properties of this material have not been fully investigated. Static accumulating flammable materials can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite material and vapor may cause flash fire (or explosion).
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Contact may irritate or burn eyes. Eye contact may result in corneal injury.
Skin	May be harmful if absorbed through skin. Irritating to skin. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Inhalation	Harmful if inhaled. Irritating to respiratory system. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. May cause breathing disorders and lung damage. May cause cancer by inhalation. Prolonged inhalation may be harmful.
Ingestion	Harmful if swallowed. Ingestion may result in vomiting; aspiration (breathing) of vomitus into lungs must be avoided as even small quantities may result in aspiration pneumonitis. Irritating to mouth, throat, and stomach.
Target organs	Blood. Eyes. Liver. Respiratory system. Skin. Kidneys. Central nervous system.

Chronic effects	Suspect cancer hazard - may cause cancer. Liver injury may occur. Kidney injury may occur. Exposure may cause lung cancer and also noted a positive association with an increased risk of bladder cancer. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Signs and symptoms	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash. The toxicological properties of this product have not been thoroughly investigated. Use appropriate precautions.
Potential environmental effects	Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Fuels, diesel, no. 2	68476-34-6	85 - 100
Biodiesel - Fatty acid methyl esters	67762-38-3	0 - 10
n-Nonane	111-84-2	1 - 3
Octane (All isomers)	111-65-9	1 - 2
Hexane (Other isomers)	96-14-0	0 - 1
Naphthalene	91-20-3	0 - 1
n-Heptane	142-82-5	0 - 1
n-Hexane	110-54-3	0 - 1

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
Skin contact	Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Ingestion	Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Get medical attention immediately.
Notes to physician	In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed. The toxicological properties of this material have not been fully investigated.
General advice	If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire Fighting Measures

Flammable properties	Combustible liquid and vapor. Containers may explode when heated.
Extinguishing media	
Suitable extinguishing media	Water spray. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use a solid water stream as it may scatter and spread fire.
Protection of firefighters	
Protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.
Specific methods	In the event of fire and/or explosion do not breathe fumes.
Hazardous combustion products	Carbon monoxide. Carbon Dioxide. Sulfur oxides. Nitrogen oxides (NOx). Hydrocarbons. Hydrogen sulfide.

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Local authorities should be advised if significant spills cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the MSDS for Personal Protective Equipment.
Environmental precautions	If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Flammable. Review Firefighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802. For highway or railways spills, contact Chemtrec at 1-800-424-9300.
Methods for containment	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Local authorities should be advised if significant spillages cannot be contained. Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.
Methods for cleaning up	Use non-sparking tools and explosion-proof equipment. Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.
Other information	Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling	Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Wear personal protective equipment. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is combustible, and heating may generate vapors which may form explosive vapor/air mixtures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.
Storage	Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Fuels, diesel, no. 2 (CAS 68476-34-6)	TWA	100 mg/m3	Inhalable fraction and vapor.
Hexane (Other isomers) (CAS 96-14-0)	STEL	1000 ppm	
Naphthalene (CAS 91-20-3)	TWA	500 ppm	
	STEL	15 ppm	
n-Heptane (CAS 142-82-5)	TWA	10 ppm	
	STEL	500 ppm	
n-Hexane (CAS 110-54-3)	TWA	400 ppm	
n-Nonane (CAS 111-84-2)	TWA	50 ppm	
Octane (All isomers) (CAS 111-65-9)	TWA	200 ppm	
		300 ppm	

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Naphthalene (CAS 91-20-3)	PEL	50 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3
		500 ppm
n-Hexane (CAS 110-54-3)	PEL	1800 mg/m3
		500 ppm
Octane (All isomers) (CAS 111-65-9)	PEL	2350 mg/m3
		500 ppm

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
Fuels, diesel, no. 2 (CAS 68476-34-6)	TWA	100 mg/m3
Hexane (Other isomers) (CAS 96-14-0)	STEL	3500 mg/m3
		1000 ppm
	TWA	1760 mg/m3
		500 ppm
Naphthalene (CAS 91-20-3)	STEL	79 mg/m3
		15 ppm
	TWA	52 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	STEL	2050 mg/m3
		500 ppm
	TWA	1640 mg/m3
		400 ppm
n-Hexane (CAS 110-54-3)	TWA	176 mg/m3
		50 ppm
n-Nonane (CAS 111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (All isomers) (CAS 111-65-9)	TWA	1400 mg/m3
		300 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Fuels, diesel, no. 2 (CAS 68476-34-6)	TWA	100 mg/m3	Vapor and aerosol.

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Hexane (Other isomers) (CAS 96-14-0)	TWA	200 ppm	
Naphthalene (CAS 91-20-3)	STEL	15 ppm	
	TWA	10 ppm	
n-Heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-Hexane (CAS 110-54-3)	TWA	20 ppm	
n-Nonane (CAS 111-84-2)	TWA	200 ppm	
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm	

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Fuels, diesel, no. 2 (CAS 68476-34-6)	TWA	100 mg/m3	Inhalable fraction and vapor.
Hexane (Other isomers) (CAS 96-14-0)	STEL	1000 ppm	
	TWA	500 ppm	
Naphthalene (CAS 91-20-3)	STEL	15 ppm	
	TWA	10 ppm	
n-Heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-Hexane (CAS 110-54-3)	TWA	50 ppm	
n-Nonane (CAS 111-84-2)	TWA	200 ppm	
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm	

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Hexane (Other isomers) (CAS 96-14-0)	STEL	3500 mg/m3
		1000 ppm
	TWA	1760 mg/m3
		500 ppm
Naphthalene (CAS 91-20-3)	STEL	79 mg/m3
		15 ppm
	TWA	52 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	STEL	2050 mg/m3
		500 ppm
	TWA	1640 mg/m3
		400 ppm
n-Hexane (CAS 110-54-3)	TWA	176 mg/m3
		50 ppm
n-Nonane (CAS 111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (All isomers) (CAS 111-65-9)	STEL	1750 mg/m3
		375 ppm
	TWA	1400 mg/m3
		300 ppm

Mexico. Occupational Exposure Limit Values

Components	Type	Value
Hexane (Other isomers) (CAS 96-14-0)	STEL	3500 mg/m3
		1000 ppm
	TWA	1760 mg/m3

Mexico. Occupational Exposure Limit Values

Components	Type	Value
		500 ppm
Naphthalene (CAS 91-20-3)	STEL	75 mg/m3
		15 ppm
	TWA	50 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	STEL	2000 mg/m3
		500 ppm
	TWA	1600 mg/m3
		400 ppm
n-Hexane (CAS 110-54-3)	TWA	176 mg/m3
		50 ppm
n-Nonane (CAS 111-84-2)	STEL	1300 mg/m3
		250 ppm
	TWA	1050 mg/m3
		200 ppm
Octane (All isomers) (CAS 111-65-9)	STEL	1800 mg/m3
		375 ppm
	TWA	1450 mg/m3
		300 ppm

Engineering controls Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Personal protective equipment

Eye / face protection Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection Wear chemical-resistant, impervious gloves. Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

Respiratory protection Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.

General hygiene considerations Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance	Liquid (may be dyed red).
Physical state	Liquid.
Form	Liquid.
Color	Clear. Straw.
Odor	Kerosene (strong).
Odor threshold	Not available.
pH	Not available.
Vapor pressure	< 1 mm Hg (20°C)
Vapor density	3 (Air = 1)
Boiling point	325 - 700 °F (162.78 - 371.11 °C)
Melting point/Freezing point	-60.1 °F (-51.15 °C) Estimated
Solubility (water)	Not available.
Specific gravity	0.82 - 0.87 (60°F)

Flash point	> 100 °F (> 37.8 °C) Closed Cup
Flammability limits in air, upper, % by volume	8 %
Flammability limits in air, lower, % by volume	0.4 %
Auto-ignition temperature	494.98 °F (257.2 °C)
Evaporation rate	0.02
Viscosity	2 - 4.5 mm^2/s
Other data	
Flash point class	Combustible II

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal temperature conditions and recommended use.
Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides. Sulfur oxides. Nitrogen oxides (NOx). Hydrocarbons. Hydrogen sulfide.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	Species	Test Results
Naphthalene (CAS 91-20-3)		
Acute		
Dermal		
LD50	Rabbit	> 2 g/kg
Oral		
LD50	Rat	490 mg/kg
n-Heptane (CAS 142-82-5)		
Acute		
Inhalation		
LC50	Rat	103 mg/l, 4 Hours
n-Nonane (CAS 111-84-2)		
Acute		
Inhalation		
LC50	Rat	3200 mg/l, 4 Hours
Octane (All isomers) (CAS 111-65-9)		
Acute		
Inhalation		
LC50	Rat	118 mg/l, 4 Hours

Sensitization	This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals.
Acute effects	Harmful if inhaled, absorbed through skin, or swallowed. Harmful: may cause lung damage if swallowed. Irritating to eyes, respiratory system and skin. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. Hydrogen sulfide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. The toxicological properties of this material have not been fully investigated.

Local effects

US. ACGIH Threshold Limit Values

Fuels, diesel, no. 2 (CAS 68476-34-6)	Can be absorbed through the skin.
Naphthalene (CAS 91-20-3)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.

Chronic effects Contains organic solvents which in case of overexposure may depress the central nervous system causing dizziness and intoxication. Repeated exposure to naphthalene may cause cataracts, allergic skin rashes, destruction of red blood cells, and anemia, jaundice, kidney and liver damage. Danger of serious damage to health by prolonged exposure. Prolonged or repeated overexposure may cause central nervous system, kidney, liver, and lung damage.

Subchronic effects Liver and kidney damage may occur after prolonged and repeated exposure.

Carcinogenicity International Agency for Research on Cancer (IARC): Whole diesel engine exhaust – IARC Group 1. Exposure may cause lung cancer and also noted a positive association with an increased risk of bladder cancer.
Diesel exhaust has been reported to be an occupational hazard due to NIOSH-reported potential carcinogenic properties.

ACGIH Carcinogens

Fuels, diesel, no. 2 (CAS 68476-34-6)	A3 Confirmed animal carcinogen with unknown relevance to humans.
Naphthalene (CAS 91-20-3)	A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Fuels, diesel, no. 2 (CAS 68476-34-6)	3 Not classifiable as to carcinogenicity to humans.
Naphthalene (CAS 91-20-3)	2B Possibly carcinogenic to humans.

US NTP Report on Carcinogens: Anticipated carcinogen

Naphthalene (CAS 91-20-3)	Reasonably Anticipated to be a Human Carcinogen.

Epidemiology Studies have shown a risk of spontaneous abortions in women exposed to high concentrations of organic solvents during pregnancy. Pre-existing skin conditions including dermatitis might be aggravated by exposure to this product.

Mutagenicity No component of this product present at levels greater than or equal to 0.1% is identified as a mutagen by OSHA.

Neurological effects Chronic exposure to high concentrations of various hydrocarbon blends may lead to polyneuropathy (peripheral nerve damage), characterized by progressive weakness and numbness in the extremities, loss of deep tendon reflexes and reduction of motor nerve conduction velocity. Numerous cases of polyneuritis have been reported following prolonged exposures to a petroleum fraction containing various isomers of heptane as major ingredients. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue) and/or damage.

Reproductive effects Napthalene interferes with embryo development in experimental animals at dose levels that cause maternal toxicity. In humans, excessive exposure to this agent may cause hemolytic anemia in the mother and fetus.

Teratogenicity The components of this product are not reported to cause teratogenic effects in humans. Based on best current information, there is no known teratogenicity associated with this product.

Further information Symptoms may be delayed. Toxicological properties of this material have not been fully investigated.

12. Ecological Information

Ecotoxicological data

Components		Species	Test Results
Naphthalene (CAS 91-20-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1.09 - 3.4 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.91 - 2.82 mg/l, 96 hours
n-Hexane (CAS 110-54-3)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.101 - 2.981 mg/l, 96 hours

Ecotoxicity Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Aquatic toxicity Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Persistence and degradability	Not available.
Bioaccumulation / Accumulation	Not available.
Partition coefficient	
Hexane (Other isomers)	3.6
n-Hexane	3.9
n-Heptane	4.66
Octane (All isomers)	5.18
n-Nonane	5.46
Mobility in environmental media	No data available.

13. Disposal Considerations

Waste codes	D001: Waste Flammable material with a flash point <140 °F
Disposal Instructions	Dispose in accordance with all applicable regulations. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

14. Transport Information

DOT

Basic shipping requirements:	
UN number	UN1202
Proper shipping name	Diesel fuel, MARINE POLLUTANT
Hazard class	Combustible Liquid
Packing group	III
Environmental hazards	
Marine pollutant	Yes
Additional information:	
Special provisions	144, B1, IB3, T2, TP1
Packaging exceptions	150
Packaging non bulk	203
Packaging bulk	242

IATA

UN number	UN1202
UN proper shipping name	Gas oil
Transport hazard class(es)	3
Packing group	III
Environmental hazards	Yes
ERG code	3L

IMDG

UN number	UN1202
UN proper shipping name	DIESEL FUEL, MARINE POLLUTANT
Transport hazard class(es)	3
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E

TDG

Proper shipping name	DIESEL FUEL, MARINE POLLUTANT
Hazard class	Combustible Liquid
UN number	UN1202
Packing group	III
Marine pollutant	Yes
Special provisions	82, 88

15. Regulatory Information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

n-Nonane (CAS 111-84-2)	1.0 % One-Time Export Notification only.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Naphthalene (CAS 91-20-3)
n-Hexane (CAS 110-54-3)

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Naphthalene (CAS 91-20-3)	0.1 %
n-Hexane (CAS 110-54-3)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Naphthalene (CAS 91-20-3)	Listed.
n-Hexane (CAS 110-54-3)	Listed.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

n-Nonane: 100
Octane (All isomers): 100
Hexane (Other isomers): 100
Naphthalene: 100
n-Hexane: 5000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance (40 CFR 366, Appendix A)	No
Section 311/312 (40 CFR 370)	Yes
Drug Enforcement Administration (DEA) (21 CFR 1308.11-15)	Not controlled
WHMIS status	Controlled
WHMIS classification	B3 - Combustible Liquids D2A - Other Toxic Effects-VERY TOXIC D2B - Other Toxic Effects-TOXIC

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On Inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

State regulations

US - California Hazardous Substances (Director's): Listed substance

Hexane (Other isomers) (CAS 96-14-0)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (All isomers) (CAS 111-65-9)	Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)	Listed.
Toluene (CAS 108-88-3)	Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzene (CAS 71-43-2)	Listed: February 27, 1987 Carcinogenic.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Developmental toxin.
Toluene (CAS 108-88-3)	Listed: January 1, 1991 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

Toluene (CAS 108-88-3)	Listed: August 7, 2009 Female reproductive toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Male reproductive toxin.

US - New Jersey RTK - Substances: Listed substance

Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (All isomers) (CAS 111-65-9)	Listed.

US. Massachusetts RTK - Substance List

Hexane (Other isomers) (CAS 96-14-0)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (All isomers) (CAS 111-65-9)	Listed.

US. New Jersey Worker and Community Right-to-Know Act

Fuels, diesel, no. 2 (CAS 68476-34-6)	10000 LBS
Naphthalene (CAS 91-20-3)	500 LBS
n-Hexane (CAS 110-54-3)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Fuels, diesel, no. 2 (CAS 68476-34-6)	Listed.
Hexane (Other isomers) (CAS 96-14-0)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (All isomers) (CAS 111-65-9)	Listed.

16. Other Information

Further Information	HMIS® is a registered trade and service mark of the NPCA.
Other Information	Note: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical Specifications vary greatly depending on the products and are not reflected in this document. Consult specification sheets for technical information.
HMIS® ratings	Health: 2* Flammability: 2 Physical hazard: 0

NFPA ratings	Health: 2 Flammability: 2 Instability: 0
Disclaimer	This Material Safety Data Sheet (MSDS) was prepared in accordance with 29 CFR 1910.1200 by Valero Marketing & Supply Co., ("VALERO"). VALERO does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this MSDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use , the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.

123455-20 GASOLINE, UNLEADED AUTOMOTIVE MATERIAL SAFETY DATA BULLETIN

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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: GASOLINE, UNLEADED AUTOMOTIVE
SUPPLIER: EXXONMOBIL OIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037
24 - Hour Health and Safety Emergency (call collect): 609-737-4411
24 - Hour Transportation Emergency:
CHEMTREC: 800-424-9300 202-483-7616
LUBES AND FUELS: 281-834-3296
Product and Technical Information:
Lubricants and Specialties: 800-662-4525 800-443-9966
Fuels Products: 800-947-9147
MSDS Fax on Demand: 613-228-1467
MSDS Internet Website: http://emmsds.ihssolutions.com/

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2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: GASOLINE AND PROPRIETARY ADDITIVES
GLOBALLY REPORTABLE MSDS INGREDIENTS:
Substance Name Approx. Wt%
--- ---
GASOLINE 100
COMPONENT(S) OF PRODUCT INGREDIENTS INCLUDE:
METHYL-TERT-BUTYL ETHER < 16
(1634-04-4)
ETHANOL (64-17-5) < 11
XYLENE (1330-20-7) 10
TRIMETHYL BENZENE 8
(25551-13-7)
TOLUENE (108-88-3) 6
ETHYL BENZENE (100-41-4) 3
N-HEXANE (110-54-3) 3
BENZENE (71-43-2) 2
NAPHTHALENE (91-20-3) 0.5
NOTE: The concentration of the components shown above may vary substantially. In certain countries benzene content may be limited to lower levels (eg. US reformulated gasoline). Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present (eg. concentration to provide a minimum oxygen content of 1.5 Wt% in the US). Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane and isopentane. The reportable component percentages, shown in the Regulatory Information section, are based on API's evaluation of a typical gasoline mixture.
See Section 8 for exposure limits (if applicable).

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3. HAZARDS IDENTIFICATION

This product is considered hazardous according to regulatory guidelines (See Section 15).
EMERGENCY OVERVIEW: Clear (May Be Dyed) Liquid. EXTREMELY FLAMMABLE, HIGH HAZARD. Liquid can release considerable vapor at temperatures below ambient which readily form flammable mixtures. Vapors settle to ground level and may reach, via drains and other underground passages, ignition sources remote from the point of escape. Product can accumulate a static charge which may cause a fire or explosion. DOT ERG No. : 128
POTENTIAL HEALTH EFFECTS: Skin irritation. May cause eye and respiratory irritation, headache, dizziness, nausea, loss of consciousness, and in cases of extreme exposure, possibly death. Low viscosity material-if swallowed may enter the lungs and cause lung damage. Overexposure to benzene may result in cancer, blood disorders and damage to the bone marrow. Long-term exposure to gasoline vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic gasoline abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of gasoline as a motor fuel.
POTENTIAL ENVIRONMENTAL EFFECTS: Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.
For further health effects/toxicological data, see Section 11.

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4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.
SKIN CONTACT: Wash contact areas with soap and water. Immediately remove contaminated clothing, including shoes. (See Section 16 - Injection Injury)
INHALATION: Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with mechanical device or use mouth-to-mouth resuscitation.
INGESTION: Seek immediate medical attention. Do not induce vomiting.
NOTE TO PHYSICIANS: Material if ingested may be aspirated into the lungs and can cause chemical pneumonitis. PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE: Skin contact may aggravate an existing dermatitis. Benzene- Individuals with liver disease may be more susceptible to toxic effects. Hexane- Individuals with neurological disease should avoid exposure.

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5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon Dioxide, Foam, Dry Chemical, Water Fog.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate area. For large spills, fire fighting foam is the preferred agent and should be applied in sufficient quantities to blanket the product surface. Water may be ineffective, but water should be used to keep fire-exposed

containers cool. Water spray may be used to flush spill away from exposures, but good judgement should be practiced to prevent spreading of the product into sewers, streams or drinking water supplies. If a leak or spill has not ignited, apply a foam blanket to suppress the release of vapors. If foam is not available, a water spray curtain can be used to disperse vapors and to protect personnel attempting to stop the leak.
SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS: EXTREMELY FLAMMABLE, HIGH HAZARD. Liquid can release considerable vapor at temperatures below ambient which readily form flammable mixtures. Vapors settle to ground level and may reach, via drains and other underground passages, ignition sources remote from the point of escape. Product can accumulate a static charge which may cause a fire or explosion.
COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.
Flash Point C(F): < -40(-40) (ASTM D-56).
Flammable Limits (approx.% vol.in air) - LEL: 1.4%, UEL: 7.6%
NFPA HAZARD ID: Health: 1, Flammability: 3, Reactivity: 0

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6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Eliminate sources of ignition. Warn occupants in downwind areas of fire and explosion hazard. Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping using explosion-proof equipment or contain spilled liquid with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.
WATER SPILL: Eliminate sources of ignition. Advise occupants and ships in the vicinity in downwind areas of fire and explosion hazard and warn them to stay clear. Notify port and other relevant authorities. Do not confine in area of leakage. Allow liquid to evaporate from the surface. Do not use dispersants.
ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.
PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

HANDLING: USE NON-SPARKING TOOLS AND EXPLOSION-PROOF EQUIPMENT. NEVER SIPHON GASOLINE BY MOUTH. GASOLINE SHOULD NOT BE USED AS A SOLVENT OR AS A CLEANING AGENT. Avoid contact with skin. Avoid inhalation of vapors or mists. Use in well ventilated area away from all ignition sources. This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode. Use product with caution around heat, sparks, pilot lights, static electricity, and open flames. It is unlawful and dangerous to put gasoline into unapproved containers. Do not fill container in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. See Section 8 for additional personal protection advice when handling this product.
STORAGE: Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters. Store away from all ignition sources in a cool, well ventilated area equipped with an automatic sprinkling system. Outside or detached storage preferred. Storage containers should be grounded and bonded.
SPECIAL PRECAUTIONS: To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Electrical equipment and fittings must comply with local fire prevention regulations for this class of product. Use the correct grounding procedures. Refer to national or local regulations covering safety at petroleum handling and storage areas for this product.
EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove.
Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:
ExxonMobil recommends an 8-hour time-weighted average (TWA) exposure of
300 mg/m3 (100 ppm vapor).
---TWA--- ----STEL--- NOTE
Substance Name (CAS-No.) Source ppm mg/m3 ppm mg/m3
------ --- ----- --- ---- ---
GASOLINE
OSHA 300 900 500 1500
ACGIH 300 890 500 1480
METHYL-TERT-BUTYL ETHER
(1634-04-4)
ACGIH 40 144
XOM 25 75
ETHANOL (64-17-5)
OSHA 1000 1900
ACGIH 1000 1880
XYLENE (1330-20-7)
O, M, P, -Isomers OSHA 100 435 150 655
O, M, P, -Isomers ACGIH 100 434 150 651
TRIMETHYL BENZENE
(25551-13-7)
OSHA 25 125
ACGIH 25 123
TOLUENE (108-88-3)
OSHA 100 375 150 560
Skin ACGIH 50 188
XOM 200
ETHYL BENZENE (100-41-4)
OSHA 100 435 125 545
ACGIH 100 434 125 543
N-HEXANE (110-54-3)
OSHA 50 180
Other Isomers OSHA 500 1800 1000 3600
N-Hexane Skin ACGIH 50 176
Other Isomers ACGIH 500 1760 1000 3500
BENZENE (71-43-2)
OSHA 1 5
Skin ACGIH 0.5 1.6 2.5 8
NAPHTHALENE (91-20-3)
OSHA 10 50 15 75
ACGIH 10 52 15 79
NOTE: Limits shown for guidance only. Follow applicable regulations.
VENTILATION: Ventilation equipment must be explosion proof.
RESPIRATORY PROTECTION: Approved respiratory equipment must be used
when airborne concentrations are unknown or exceed the
recommended exposure limit. Self-contained breathing apparatus
may be required for use in confined or enclosed spaces.
EYE PROTECTION: If splash with liquid is possible, chemical type goggles should be worn.
SKIN PROTECTION: Impervious gloves should be worn. Good personal
hygiene practices should always be followed.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.
APPEARANCE: Liquid
COLOR: Clear (May Be Dyed)
ODOR: Gasoline
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 20(68)
MELTING POINT C(F): NA
FLASH POINT C(F): < -40(-40) (ASTM D-56)
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NE
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: > 200.0
VAPOR DENSITY: 3.0
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.79
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 1
VISCOSITY AT 40 C, cSt: < 1.0
VISCOSITY AT 100 C, cSt: NA
POUR POINT C(F): NA
FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
DMSO EXTRACT, IP-346 (WT.%): NA
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES
FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

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10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Heat, sparks, flame and build up of static electricity.
INCOMPATIBILITY (MATERIALS TO AVOID): Halogens, strong acids, alkalies, and oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

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11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---
ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.

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EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.
SKIN IRRITATION (RABBITS): Irritant. (Primary Irritation Index: 3 or greater but less than 5). ---Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Inhalation of high concentrations of vapors or aerosols/mists, especially deliberate or abuse exposure, may cause respiratory system irritation and damage. These exposures may also result in central nervous system depression and damage, possibly leading to death. Prolonged skin contact with gasoline may cause severe skin irritation similar to a chemical burn. The above effects, which may result from the whole gasoline or some of the gasoline components, are well documented in the medical literature. HAZARDS OF COMBUSTION PRODUCTS: Exposure to high concentrations of carbon monoxide can cause loss of consciousness, heart damage, brain damage and death.
---SUBCHRONIC TOXICOLOGY (SUMMARY)---
Two dermal studies resulted in significant irritation in rabbits but no significant systemic toxicity. 90-day inhalation exposures (approximately 1500 ppm vapor) in rats and monkeys produced light hydrocarbon nephropathy in male rats, but no other significant systemic toxicity.
---NEUROTOXICOLOGY (SUMMARY)---
Exposure to high concentrations of unleaded gasoline in rodents caused reversible central nervous system depression, however, no persistent neurotoxic effects were observed in subchronic inhalation studies of gasoline blending streams. No neurotoxic effects, as measured by a functional observation battery, motor activity, and neuropathology, were observed in rats exposed to light alkylate naphtha for 13 weeks at concentrations up to 6600 ppm. The medical literature clearly documents neurotoxic effects in humans from abusive gasoline inhalation (sniffing).
---REPRODUCTIVE TOXICOLOGY (SUMMARY)---
Two separate inhalation teratology studies of unleaded gasoline vapor at exposures up to 1600 ppm and 9000 ppm for 6 hours/day on days 6-20 did not result in any significant developmental effects in rats. No significant effects were observed in the mothers or offspring. A two-generation inhalation reproductive study (CONCAWE) of unleaded gasoline showed no reproductive or developmental effects in rats exposed to concentrations up to 20, 000 mg/m3 (approx. 8000 ppm).
---CHRONIC TOXICOLOGY (SUMMARY)---
A lifetime mouse skin painting study of unleaded gasoline applied at 50 microliters, three times weekly, resulted in some severe skin irritation and changes, but no statistically significant increase in skin cancer or cancer to any other organ. A lifetime inhalation study of vaporized unleaded gasoline at up to 2000 ppm caused liver tumors in female mice and increased kidney tumors in male rats. The kidney tumors resulted from the formation of a compound unique to male rats, and are not considered relevant to humans. The U.S. EPA Risk Assessment Forum concluded that the male rat kidney tumor results are not relevant for human risk assessment. The implications for the female mice liver tumor

data for human risk assessment have not been fully determined. Multiple short-term cancer predicative tests (Ames Test, etc.) have routinely been negative (no cancer or mutagenic potential) for unleaded gasoline.
---SENSITIZATION (SUMMARY)---
Unleaded gasoline was not a skin sensitizer in tests in a Buehler Guinea Pig Sensitization Assay.
---OTHER TOXICOLOGY DATA---
Gasoline and Refinery Streams: Isolated constituents of gasoline may display these or other potential hazards in laboratory tests. Gasoline consists of a complex blend of petroleum/processing derived paraffinic, olefinic, naphthenic and aromatic hydrocarbons which include up to 5% benzene (with 1-2 % typical in the U.S.), n-hexane, mixed xylenes, toluene, ethylbenzene and trimethyl benzene. Benzene has also caused damage to the fetus of test animals in developmental studies. Benzene has tested positive (mutagenic) in a number of short-term cancer/mutation predicative tests. Repeated exposures to low levels of benzene (50-500 ppm) have been reported to result in blood abnormalities including anemia and, in rare cases, leukemia in both animals and humans. Prolonged exposure to n-hexane may result in a condition known as peripheral neuropathy. This is nervous system damage and is characterized by numbness of the extremities and, in extreme cases, paralysis. This product contains ethylbenzene. The International Agency for Research on Cancer (IARC) has evaluated ethylbenzene and classified it as possibly carcinogenic to humans (Group 2B) based on sufficient evidence for carcinogenicity in experimental animals, but inadequate evidence for cancer in exposed humans. Methyl Tertiary Butyl Ether (MTBE) was tested for carcinogenicity, neurotoxicity, chronic, reproductive, and developmental toxicity. The NOAEL for all end points evaluated in three animal species was 400 ppm or greater. An increase in kidney tumors/damage and liver tumors was observed in animals exposed to high concentrations of MTBE. Some embryo/fetal toxicity and birth defects were observed in the offspring of pregnant mice exposed to maternally toxic doses of MTBE, however the offspring of exposed pregnant rabbits were unaffected. The significance of the animal findings at high exposures are not believed to be directly related to potential human health hazards in the workplace.

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12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:
In the absence of specific environmental data for this product, this assessment is based on information for representative substances.
ECOTOXICITY: Based on test results for similar products, this substance may be toxic to aquatic organisms such as algae and daphnia (EL50/ IrL50 =1-10 mg/L). This substance has also been shown to be toxic to fish (LL50 = 1-10 mg/L).
MOBILITY: Dissolution of the higher molecular weight hydrocarbon components in water will be limited, but losses through sediment adsorption may be significant.

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PERSISTENCE AND DEGRADABILITY: The majority of the components in this product are expected to be inherently biodegradable. When released into the environment, some of the constituents of gasoline will volatilize and be photodegraded in the atmosphere. The less volatile, more water-soluble components which are aromatic hydrocarbons will also undergo aqueous photodegradation.
BIOACCUMULATIVE POTENTIAL: Not established.

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13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning for fuel value in compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.
RCRA INFORMATION: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity, or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP).
BENZENE: 2.0000 PCT (TCLP)
FLASH: < -40(-40) C(F)

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14. TRANSPORT INFORMATION

USA DOT:
SHIPPING NAME: Gasoline
HAZARD CLASS & DIV: 3
ID NUMBER: UN1203
ERG NUMBER: 128
PACKING GROUP: PG II
STCC: NE
DANGEROUS WHEN WET: No
POISON: No
LABEL(s): Flammable Liquid
PLACARD(s): Flammable
PRODUCT RQ: NA
MARPOL III STATUS: NA
RID/ADR:
HAZARD CLASS: 3
PACKING GROUP: II
LABEL: 3
DANGER NUMBER: 33
UN NUMBER: 1203
SHIPPING NAME: Gasoline
REMARKS: NA
IMO:
HAZARD CLASS & DIV: 3
UN NUMBER: 1203
PACKING GROUP: PG II
SHIPPING NAME: Gasoline
LABEL(s): Flammable Liquid
MARPOL III STATUS: NA

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ICAO/IATA:
HAZARD CLASS & DIV: 3
ID/UN Number: 1203
PACKING GROUP: PG II
SHIPPING NAME: Gasoline
SUBSIDIARY RISK: NA
LABEL(s): Flammable Liquid
STATIC ACCUMULATOR (50 picosiemens or less): YES

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15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: Product assessed in accordance with OSHA 29 CFR 1910.1200 and determined to be hazardous.
EU Labeling: Product is dangerous as defined by the European Union Dangerous Substances/Preparations Directives.
Symbol: F+ T N Extremely flammable, Toxic, Dangerous for the environment.
Risk Phrase(s): R12-45-38-65-67-51/53.
Extremely flammable. May cause cancer. Irritating to skin.
Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrase(s): S16-53-45-2-23-24-29-43-62.
Keep away from sources of ignition - No smoking. Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Keep out of the reach of children. Do not breathe vapor. Avoid contact with skin. Do not empty into drains. In case of fire use foam/drypowder/CO2. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.
Contains: Low Boiling Point Naphtha.
Governmental Inventory Status: All components comply with TSCA, EINECS/ELINCS, AICS, METI, DSL, KOREA, and PHILIPPINES.
U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".
SARA (311/312) REPORTABLE HAZARD CATEGORIES:
FIRE CHRONIC ACUTE
This product contains the following SARA (313) Toxic Release Chemicals:

CHEMICAL NAME	CAS NUMBER	CONC.
BENZENE(COMPONENT ANALYSIS)	71-43-2	2%
PSEUDOCUMENE (1,2, 4-TRIMETHYLBENZENE)(COMPONENT ANALYSIS)	95-63-6	3%
ETHYL BENZENE(COMPONENT ANALYSIS)	100-41-4	3%
TOLUENE(COMPONENT ANALYSIS)	108-88-3	6%
N-HEXANE(COMPONENT ANALYSIS)	110-54-3	3%
XYLENES(COMPONENT ANALYSIS)	1330-20-7	10%
METHYL-TERT-BUTYL ETHER(COMPONENT ANALYSIS)	1634-04-4	<16%

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The following product ingredients are cited on the lists below:
CHEMICAL NAME CAS NUMBER LIST CITATIONS *
--- --- ---
GASOLINE 1, 8, 19, 20, 21,
23, 25
ETHYL ALCOHOL (COMPONENT ANALYSIS) 64-17-5 1, 6, 10, 18, 19,
20, 21, 23, 25, 26
BENZENE (COMPONENT ANALYSIS) 71-43-2 1, 2, 4, 6, 9, 10,
(2.00%) 16, 17, 18, 19, 20,
21, 22, 23, 24, 25,
26
NAPHTHALENE (COMPONENT ANALYSIS) 91-20-3 16, 22
(0.50%)
PSEUDOCUMENE (1,2, 95-63-6 1, 20, 24, 25
4-TRIMETHYLBENZENE) (COMPONENT
ANALYSIS)
ETHYL BENZENE (COMPONENT ANALYSIS) 100-41-4 1, 8, 10, 18, 19,
20, 21, 23, 24, 25,
26
TOLUENE (COMPONENT ANALYSIS) 108-88-3 1, 10, 17, 18, 19,
(6.00%) 20, 21, 22, 23, 24,
25, 26
N-HEXANE (COMPONENT ANALYSIS) 110-54-3 1, 10, 18, 19, 20,
21, 23, 24, 25, 26
XYLENES (COMPONENT ANALYSIS) 1330-20-7 1, 10, 18, 19, 20,
(10.00%) 21, 22, 23, 24, 25,
26
METHYL-TERT-BUTYL ETHER (COMPONENT 1634-04-4 1, 21, 24, 25
ANALYSIS)
TRIMETHYL BENZENE (COMPONENT 25551-13-7 1, 10, 18, 19, 20,
ANALYSIS) 21, 23, 25, 26
--- REGULATORY LISTS SEARCHED ---
1=ACGIH ALL 6=IARC 1 11=TSCA 4 16=CA P65 CARC 21=LA RTK
2=ACGIH A1 7=IARC 2A 12=TSCA 5a2 17=CA P65 REPRO 22=MI 293
3=ACGIH A2 8=IARC 2B 13=TSCA 5e 18=CA RTK 23=MN RTK
4=NTP CARC 9=OSHA CARC 14=TSCA 6 19=FL RTK 24=NJ RTK
5=NTP SUS 10=OSHA Z 15=TSCA 12b 20=IL RTK 25=PA RTK
26=RI RTK
* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.
Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

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16. OTHER INFORMATION

USE: UNLEADED MOTOR FUEL
NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.
Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

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INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.
Precautionary Label Text:
CONTAINS GASOLINE, BENZENE, AND ETHYLBENZENE
DANGER!
EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CAUSES SKIN IRRITATION. RESPIRATORY IRRITATION, HEADACHE, DIZZINESS, NAUSEA, LOSS OF CONSCIOUSNESS, AND IN CASES OF EXTREME EXPOSURE, POSSIBLY DEATH. LOW VISCOSITY MATERIAL-IF SWALLOWED, MAY BE ASPIRATED AND CAN CAUSE SERIOUS OR FATAL LUNG DAMAGE.
OVEREXPOSURE TO BENZENE MAY RESULT IN CANCER, BLOOD DISORDERS, AND DAMAGE TO THE BONE MARROW. LONG-TERM EXPOSURE TO GASOLINE VAPOR HAS CAUSED KIDNEY AND LIVER CANCER IN LABORATORY ANIMIALS, BLOOD EFFECTS, AND NERVOUS SYSTEM DAMAGE.
Keep away from heat, sparks, and flame. Avoid all personal contact. Avoid prolonged breathing of vapor. Use with adequate ventilation. Keep container closed. Approved portable containers must be properly grounded when transferring fuel. For use as a motor fuel only. Misuse of gasoline may cause serious injury or illness. Never siphon by mouth. Not to be used as a solvent or skin cleaning agent.
FIRST AID: In case of contact, wash skin with soap and water. Immediately remove contaminated clothing, including shoes. Destroy or wash clothing before reuse. If swallowed, seek immediate medical attention. Do not induce vomiting. Only induce vomiting at the instruction of a physician. This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of this product. Refer to product Material Safety Data Sheet for further safety and health information.

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For Internal Use Only: MHC: 1* 1* 1* 1* 2*, MPPEC: CF, TRN: 123455-20, CMCS97: EMGF20, REQ: PS+C, SAFE USE: G
EHS Approval Date: 03APR2003

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Prepared by: ExxonMobil Oil Corporation Environmental Health and Safety Department, Clinton, USA
Emergency Numbers
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Appendix A: Material Safety Data Sheets

Houghton International Inc.

Revision Date : 07/23/2009

Material Safety Data Sheet
HYDRASHIELD FR-395-2

1. Chemical Product and Company Identification

Product Name	HYDRASHIELD FR-395-2	FAX	(610) 666-1376
Company Name	Houghton International Inc. Madison & Van Buren Aves Valley Forge, PA 19482	Customer Service	(888) 459-9844
		Product Use	Hydraulic Fluid
Website	www.houghtonintl.com		
Telephone	(610) 666-4000		
Emergency Phone Number	24 HOUR - (800) 424-9300 (CHEMTREC)		

2. Hazardous Ingredients

Component	Cas No	% by Weight	Hazards
Mineral Oil	-Mixture-	1-5	TLV: 5 mg/m³ as oil mist PEL: 5 mg/m³ as oil mist STEL: 10 mg/m³ as oil mist Other:

N/E - Not Established; N/A - Not Applicable; Mfr - Manufacturer Recommendation

3. Hazards Identification

Primary Entry Routes	EYES, SKIN, INHALATION
Acute Effects	
Inhalation	NO SIGNIFICANT EFFECTS KNOWN OR EXPECTED IF INHALED.
Eye	MAY CAUSE MILD EYE IRRITATION.
Skin	MAY CAUSE MILD IRRITATION TO SKIN ON PROLONGED CONTACT.
Ingestion	NO SIGNIFICANT ADVERSE EFFECTS ARE EXPECTED UPON INGESTION OF THE PRODUCT.
Carcinogenicity	THIS PRODUCT DOES NOT CONTAIN ANY COMPONENT REPORTABLE AS A CARCINOGEN UNDER 29 CFR 1910.1200.
Medical Conditions Aggravated by LongTerm Exposure	PRE-EXISTING SKIN AND RESPIRATORY CONDITIONS MAY BE AGGRAVATED BY EXPOSURE.
Chronic Effects	UNKNOWN

Continued on Next Page

3. Hazards Identification - continued

HMIS:

Health	1
Flammability	1
Physical Hazard	0

* indicates that there may be chronic health effects present

4. First Aid Measures

Inhalation	IF INHALED, REMOVE TO A SOURCE OF FRESH AIR.
Eye Contact	FLUSH EYES WITH WATER FOR 15 MINUTES. CONSULT PHYSICIAN.
Skin Contact	WASH SKIN WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND LAUNDER BEFORE REUSING.
Ingestion	IF INGESTED, GIVE LIQUIDS TO DILUTE. INDUCE VOMITING. CONSULT PHYSICIAN.
Note to Physicians	NO SPECIFIC ANTIDOTE KNOWN. BASED ON INDIVIDUAL REACTIONS OF THE PATIENT, THE PHYSICIAN'S JUDGMENT SHOULD BE USED TO CONTROL SYMPTOMS AND CLINICAL CONDITIONS.

N/A - Not Applicable

5. Fire Fighting Measures

Flash Point	580°F
Method Used	CLEVELAND OPEN CUP
Autoignition Temperature	N/D
LEL	N/D
UEL	N/D
Extinguishing Media	USE CARBON DIOXIDE, DRY CHEMICAL OR FOAM.
Unusual Fire or Explosion Hazards	PRODUCT FLOATS ON WATER CREATING A POTENTIAL FLOATING FIRE HAZARD. EMPTY CONTAINERS RETAIN PRODUCT RESIDUE WHICH MAY BE IGNITED. TREAT CONTAINERS ACCORDINGLY.
Fire Fighting Instructions	WEAR PROTECTIVE GEAR DURING FIREFIGHTING.

Continued on Next Page

5. Fire Fighting Measures - continued

NFPA:

Health	1
Flammability	1
Reactivity	0
Special	N/A

N/A - Not Applicable; ND - Not Determined; > - Greater Than; < - Less Than

6. Accidental Release Measures

Spill or Release Procedures	APPLY DRY ABSORBENT MATERIAL AND SWEEP UP THOROUGHLY.

7. Handling and Storage

Handling Precautions	AVOID CONTACT WITH STRONG OXIDIZERS. WASH THOROUGHLY AFTER HANDLING.
Storage Requirements	KEEP CONTAINERS CLOSED WHEN NOT IN USE. EMPTY CONTAINERS RETAIN PRODUCT RESIDUE WHICH MAY EXHIBIT HAZARDS OF THE PRODUCT.

8. Exposure Controls/Personal Protection

Engineering Controls	GENERAL MECHANICAL VENTILATION IS ADEQUATE.
Personal Protective Equipment	
Eye/Face Protection	WEAR SAFETY GOGGLES OR SAFETY GLASSES WITH SIDE SHIELDS.
Skin Protection	USE RUBBER GLOVES IF SKIN IS SENSITIVE.
Respiratory Protection	RESPIRATORY PROTECTION NORMALLY NOT REQUIRED.
Other	EYEWASH AND SAFETY SHOWER RECOMMENDED.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, or applying cosmetics.

Continued on Next Page

9. Physical and Chemical Properties

Appearance	CLEAR, YELLOW TO AMBER LIQUID	pH (Neat)	N/A
Odor	BLAND	Water Solubility	INSOLUBLE
Vapor Pressure (mmHg)	< 1	Boiling Point	> 300°F
Vapor Density (Air = 1)	> 1	Freezing/ Melting Point	N/D
Specific Gravity (Water = 1)	0.920	Evaporation Rate (BuAc = 1)	< 1

N/D - Not Determined; N/A - Not Applicable; > - Greater Than; < - Less Than

10. Stability and Reactivity

Stability	THIS PRODUCT IS STABLE AT ROOM TEMPERATURE IN CLOSED CONTAINERS UNDER NORMAL STORAGE AND HANDLING CONDITIONS.
Chemical Incompatibilities	AVOID CONTACT WITH STRONG OXIDIZERS.
Hazardous Decomposition Products	THERMAL: OXIDES OF CARBON
Hazardous Polymerization	HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

11. Toxicological Information

NO DATA AVAILABLE

12. Ecological Information

NO DATA AVAILABLE

13. Disposal Considerations

Disposal	FOLLOW PERTINENT REGULATIONS FOR DISPOSAL. IT IS THE RESPONSIBILITY OF THE PRODUCT USER TO DETERMINE, AT THE TIME OF DISPOSAL, WHETHER A MATERIAL CONTAINING THE PRODUCT OR DERIVED FROM THE PRODUCT SHOULD BE CLASSIFIED AS A HAZARDOUS WASTE (40 CFR 261.20-24).

Continued on Next Page

13. Disposal Considerations - continued

RCRA Hazardous Waste Number	N/A

14. Transportation Information

Proper Shipping Name	NOT HAZARDOUS UNDER DOT, AIR OR IMO REGULATIONS.

15. Regulatory Information

TSCA Section 8(b)	ALL OF THE COMPONENTS IN THIS PRODUCT ARE ON THE TSCA INVENTORY.
DSL	ALL OF THE COMPONENTS IN THIS PRODUCT ARE IN COMPLIANCE WITH THE CANADIAN DSL.
CERCLA Reportable Quantity	NONE
SARA Title III, Section 313	THIS PRODUCT CONTAINS NO TOXIC CHEMICAL SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.
Ozone Depleting Substances	THIS PRODUCT WAS NOT MANUFACTURED, DOES NOT CONTAIN, AND WAS NOT PACKAGED USING ANY CLASS I OR CLASS II OZONE DEPLETING SUBSTANCE AS DEFINED BY THE CLEAN AIR ACT.
WHMIS	NOT CONTROLLED

16. Other Information

Prepared By	GARY CARL
Title	MANAGER, PRODUCT SAFETY

Disclaimer: The information presented herein has been compiled from sources considered to be dependable and is accurate as of the date issued. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use are beyond our control, Houghton International makes no warranty regarding the accuracy of such data or its suitability for any purchaser's use or for any consequence of its use. The data in this MSDS relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. Safe handling and use remains the responsibility of the purchaser and the purchaser has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. Houghton International assumes no responsibility for injury to the recipient or to third persons or for any damage to any property and the recipient assumes all such risks.

D4-5

LUBRICATION ENGINEERS®, INC.

P.O. Box 7128 FORT WORTH, TX 76111-0128

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT IDENTIFICATION

SUPPLIER:
Lubrication Engineers®, Inc.
3851 Airport Freeway
Fort Worth, TX 76111-0128

EMERGENCY TELEPHONE NO.:
(817) 834-8321

CHEMICAL NAME AND SYNONYMS:
Not applicable

TRADE NAME AND SYNONYMS:
6120 MONOLEC® Hydraulic Oil

CHEMICAL FAMILY:
Hydrocarbon

FORMULA:
Not applicable

SECTION II - TYPICAL CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE:
Red lubricant

ODOR:
Lube oil odor

RELATIVE DENSITY:
(Air=1) >1

MELTING POINT: °F
Not applicable

BOILING POINT: °F
>500

VAPOR PRESSURE:
(mm Hg @ 60°F) <5

VISCOSITY: @ 210°F, SUS
55.13

@ 100°C, cSt
8.69

VISCOSITY: @ 100°F, SUS
348.9

@ 40°C, cSt
67.58

SOLUBILITY IN WATER:
Negligible

PH: 6-8

POUR POINT: °F
-22

FLASH POINT: °F (Method)
436 (C.O.C.)

SPECIFIC GRAVITY: (H_2O=1)
0.87

SECTION III - INGREDIENTS

HAZARDOUS INGREDIENTS:	WT PCT (APPROX)	TLV	ORAL LD50	DERMAL LD50
Oil Mist (mineral)	>90.0	5 mg/m³-TWA	Unknown	Unknown
Zinc dithiophosphate	<1.0	Unknown	Unknown	UNknown
Zinc compounds	<1.0	Unknown	Unknown	Unknown
Butylated phenol	<0.5	Unknown	Unknown	Unknown
1-hexanol, 2-ethyl (2-Ethylhexanol)	<0.25	Unknown	2460 mg/kg Rat	Unknown

NON-HAZARDOUS INGREDIENTS:

ADDITIVES AND/OR OTHER INGREDIENTS: This product is a mixture. The specific chemical identity of hazardous ingredients and non-hazardous ingredients, their C.A.S. numbers and their exact percent of composition are proprietary to Lubrication Engineers®, Inc. and are being withheld as Trade Secrets. The above listing of hazardous ingredients discloses the properties, approximate concentration and known toxicological effects of the hazardous ingredients. This material is an automotive/industrial lubricant with a low order of toxicity and irritancy. The product is formulated with ingredients that are not designated as harmful to the ozone.

REGULATORY INFORMATION:

SARA Title III: This product does not contain any chemical substance on the SARA Extremely Hazardous Substances list. If this product contains any chemicals that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372, they will be listed in the above HAZARDOUS INGREDIENTS section.

TSCA: This material is in compliance with the Toxic Substances Control Act (15 USC 2601-2629) and all components of this product appear on the Toxic Substance Control Act (TSCA) inventory list.

Clean Air Act: No ozone depleting chemicals listed in Title VI, Stratospheric Ozone Protection, Section 602 of the Clean Air Act are present or used in the manufacturing process of this product.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: °F (Method)
436 °F (C.O.C.)

FLAMMABLE LIMITS: LEL UEL
Unknown

EXTINGUISHING MEDIA:
Foam, dry chemical, water fog, or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES:
Do not direct a solid stream of water into fire. Treat as a petroleum oil fire. Respiratory protection required for fire fighting personnel.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
None

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: (If Established)
Not established. Oil mist = 5mg/m³

EFFECTS OF OVEREXPOSURE:
Although there are no consistent primary routes of entry, the product may cause mild dermatitis upon prolonged contact and is expected to be an eye and lung irritant. Any existing skin, eye, or lung irritation may be aggravated by direct contact. No components are listed on OSHA, I.A.R.C., or N.T.P. lists for carcinogens.

SECTION VI - EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:
Flush immediately with water until irritation subsides.

SKIN CONTACT:
Wash affected skin area with mild soap and water.

INGESTION:
Do not induce vomiting. Contact a physician.

INHALATION:

Remove to fresh air. If not breathing, give artificial respiration. Contact a physician.

SECTION VII - REACTIVITY DATA

STABILITY: (Thermal, Light, Etc.)

Stable

CONDITIONS TO AVOID:

Contact with nuclear radiation and strong oxidizing materials.

INCOMPATIBILITY: (Materials to avoid)

Strong oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS:

Dense smoke; oxides of C, S, N, P, Ca and Zn; hydrogen sulfide.

HAZARDOUS POLYMERIZATION:

Will not occur.

SECTION VIII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Remove all sources of ignition. Treat as a petroleum oil spill.

WASTE DISPOSAL METHOD:

Incinerate where permitted under federal, state, and local laws. Used petroleum products may be recycled through re-refining processes.

SECTION IX - SPECIAL PROTECTION INFORMATION

EYE PROTECTION:

Sufficient to avoid direct contact.

SKIN PROTECTION:

Protective neoprene or plastic gloves may be desired.

RESPIRATORY PROTECTION:

Usually not needed in open, unconfined areas.

VENTILATION:

Usually not needed in open, unconfined areas.

OTHER:

Usually not needed.

SECTION X - SPECIAL PRECAUTIONS

Close containers when not in use. Keep away from heat, sparks, open flames, and strong oxidants. Avoid eye contact and prolonged skin contact. Avoid breathing oil mists. Wash thoroughly after handling.

SECTION XI - HAZARD RATINGS

There are several recognized and accepted systems that assign hazard ratings to materials. Although this product has not been evaluated specifically against these systems, the ratings for the National Fire Protection Association (NFPA) and the National Paint and Coatings Association's Hazardous Material Identification System (HMIS) are:

	NFPA	HMIS
Health	2	1
Flammability	1	1
Reactivity	1	1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Chemical type	:	Mixture
Trade name	:	AGIP OSO (ISO 32)
EC index no	:	N/A
EC no	:	N/A
CAS No.	:	N/A
REACH registration No.	:	N/A
Product code	:	2302
Formula	:	0036-2012

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Main use category	:	Industrial use,Professional use
Industrial/Professional use spec.	:	Wide dispersive use Used in closed systems
Use of the substance/mixture	:	Hydraulic fluids
Use of the substance/mixture	:	Functional fluids Hydraulic oil ---- Do not use the product for any purposes that have not been advised by the manufacturer. In that case, the user could be exposed to unpredictable risks.
Function or use category	:	Lubricants and additives

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

ENI S.p.A.
P.le E. Mattei 1 - 00144 ROMA Italy
Tel (+39) 06 59821
www.eni.com

Contact:
Refining & Marketing Division
Via Laurentina 449 00142 ROMA Italy
Tel (+39) 06 59881 Fax (+39) 06 59885700

Competent person responsible for the Safety Data Sheet (Reg. EC nr. 1907/2006): qualt-t@eni.com

1.4. Emergency telephone number

Emergency number	:	CNIT +39 0382 24444 (24h) (IT + EN)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Not classified

Classification according to Directive 67/548/EEC or 1999/45/EC

Not classified

Adverse physicochemical, human health and environmental effects

None to be reported, according to the present EU regulations.

2.2. Label elements

2.2.1. Labelling according to Regulation (EC) No. 1272/2008 [CLP]

EUH phrases : EUH210 - Safety data sheet available on request

2.3. Other hazards (not relevant for classification)

Physical/chemical	:	This product is combustible, but not classified as Flammable. The creation of flammable vapour mixtures takes place at temperatures which are higher than normal ambient levels.
Health	:	If the product is handled or used at high temperature, contact with hot product or vapours may cause burns.,Any material in case of accidents involving pressurized circuits and the like, may be accidentally injected under the skin, even without external damage. In such a case, the victim should be brought to an hospital as soon as possible, to get specialized medical treatment.,Do not wait for symptoms to develop.
Environment	:	None.
Contaminants	:	In exceptional cases (i.e prolunged storage in tanks contaminated with water, and presence of anaerobic sulfate-reducing microbial colonies), the product may undergo a degradation and generate small amounts of sulfur compounds, including H2S.,See Heading 16.

This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Composition/information on ingredients	:	Mineral base oil, severely refined Additives
Hazardous ingredients and/or with relevant occupational exposure limits	:	See table

Name	Product identifier	%	Classification according to Directive 67/548/EEC
Mineral base oil, severely refined (Main component)		>= 95	Not classified
Zinc, bis[O,O-bis(2-ethylhexyl) phosphorodithioato-S,S']-, (T-4)- (Additive)	(CAS No.) 4259-15-8 (EC no) 224-235-5 (REACH-no) 01-2119493635-27	0,19 - 0,99	Xi; R41 N; R51/53
Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (Additive)	(CAS No.) 68921-45-9 (EC no) 272-940-1 (EC index no) N/D (REACH-no) N/D	0,05 - 0,149	R52/53
Reaction mass of isomers of: C7-9-alkyl 3-(3,5-di-trans-butyl-4-hydroxyphenyl)propionate (Additive)	(CAS No.) 125643-61-0 (EC no) 406-040-9 (EC index no) 607-530-00-7 (REACH-no) N/D	0,05 - 0,149	R53

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Mineral base oil, severely refined (Main component)		>= 95	Not classified
Zinc, bis[O,O-bis(2-ethylhexyl) phosphorodithioato-S,S']-, (T-4)- (Additive)	(CAS No.) 4259-15-8 (EC no) 224-235-5 (REACH-no) 01-2119493635-27	0,19 - 0,99	Eye Dam. 1, H318 Aquatic Chronic 2, H411
Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (Additive)	(CAS No.) 68921-45-9 (EC no) 272-940-1 (EC index no) N/D (REACH-no) N/D	0,05 - 0,149	Aquatic Chronic 3, H412
Reaction mass of isomers of: C7-9-alkyl 3-(3,5-di-trans-butyl-4-hydroxyphenyl)propionate (Additive)	(CAS No.) 125643-61-0 (EC no) 406-040-9 (EC index no) 607-530-00-7 (REACH-no) N/D	0,05 - 0,149	Aquatic Chronic 4, H413

Full text of R-, H- and EUH-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : In case of spontaneous vomiting, transport the victim to a hospital, to verify the possibility that the product has been aspired into the lungs.

First-aid measures after inhalation : In case of disturbances owing to inhalation of vapours or mists, remove the victim from exposure; keep at rest; if necessary, seek medical attention.
See also Point 4.3.

First-aid measures after skin contact : Take off contaminated clothing and shoes. Wash thoroughly with soap and water.
If inflammation or irritation persists, seek medical advice.
In case of contact with hot product, cool affected part with plenty of cold water, and cover with gauze or clean cloth. Call a doctor or bring to an hospital. Do not use salves or ointments, unless directed by doctor.
Body hypothermia must be avoided.
Do not put ice on the burn.

First-aid measures after eye contact : Rinse eyes thoroughly for at least 15 minutes. Keep eyelids well apart.
If irritation persists, seek medical advice.
In case of contact with hot product, cool affected part with plenty of cold water, and cover with gauze or clean cloth. Call a doctor or bring to an hospital. Do not use salves or ointments, unless directed by doctor.

First-aid measures after ingestion : Do not induce vomiting to avoid aspiration into the lungs. If the person is conscious, rinse mouth with water without swallowing. Keep at rest. Call for medical assistance or bring to an hospital. If the casualty is inconscious, place in the recovery position. In case of spontaneous vomiting, keep head low, to avoid the risk of aspiration into the lungs.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : This product has a low vapour pressure, and in normal conditions at ambient temperature the concentration in the air is negligible. A significant concentration may build up only if the product is used at high temperature, or in case of sprays and mists. In these cases overexposure to vapours may cause irritation to airways, nausea and dizziness.

Symptoms/injuries after skin contact : Prolonged and repeated skin contact may cause reddening, irritation and dermatitis, due to a defatting effect. Contact with hot product may cause thermal burns.

Symptoms/injuries after eye contact : Contact with eyes may cause a light transient irritation. Contact with hot product or vapours may cause burns.

Symptoms/injuries after ingestion : Accidental ingestion of small quantities of the product may cause irritation, nausea and gastric disturbances. Taking into account the taste of the product, however, ingestion of dangerous quantites is very unlikely.

Symptoms/injuries upon intravenous administration : No information available.

4.3. Indication of any immediate medical attention and special treatment needed

If there is any suspicion of inhalation of H2S (hydrogen sulphide). The casualty should be sent immediately to hospital. Immediately begin artificial respiration if breathing has ceased. Administer oxygen if necessary. Seek medical attention in all cases of serious burns.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Small-size fires: carbon dioxide, dry chemicals, foam, sand or earth. Large fires: foam or water fog (mist). These means should be used by trained personnel only. Other extinguishing gases (according to regulations).

Unsuitable extinguishing media : Do not use water jets. They could cause splattering, and spread the fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : This product is combustible, but not classified as Flammable. The creation of flammable vapour mixtures takes place at temperatures which are higher than normal ambient levels.

Explosion hazard : In case of losses from pressurized circuits, the sprays may form mists. Take into account that in this case the lower explosion limit for mists is about 45 g/m³ of air.

Combustion products : Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including carbon monoxide, NOx, H2S and SOx,Oxygenated compounds (aldehydes, etc.),CaOx,POx.

5.3. Advice for firefighters

Firefighting instructions : Shut off source of product, if possible. If possible, move containers and drums away from danger area. Spilled product which is not burning should be covered with sand or foam. Use water sprays to cool containers and surfaces exposed to the flames. If the fire cannot be controlled, evacuate area.

Special protective equipment for firefighters : Personal protection equipment for firefighters (see also sect. 8). Self-contained breathing apparatus.

Other information : In case of fire, do not discharge residual product, waste materials and runoff water: collect separately and use a proper treatment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Stop or contain leak at the source, if safe to do so. Eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares). Avoid accidental sprays on hot surfaces or electrical contacts. Avoid direct contact with released material.

6.1.1. For non-emergency personnel

Protective equipment : See Section 8.

Emergency procedures : Keep non-involved personnel away from the area of spillage. Alert emergency personnel. Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency.

6.1.2. For emergency responders

Protective equipment : Small spillages: normal antistatic working clothes are usually adequate. Large spillages: full body suit of chemically resistant and antistatic material. if necessary heat resistant and insulated. Work gloves providing adequate chemical resistance, specifically to aromatic hydrocarbons. Gloves made of PVA are not water-resistant, and are not suitable for emergency use. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated. Work helmet. Antistatic non-skid safety shoes or boots. Goggles and /or face shield, if splashes or contact with eyes is possible or anticipated. Respiratory protection: A half or full-face respirator with filter(s) for organic vapours (and when applicable for H2S). A Self Contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.

Emergency procedures : Notify local authorities according to relevant regulations.

6.2. Environmental precautions

Do not let the product flow into sewers, water courses or underground spaces. In case of soil contamination, remove contaminated soil and treat in accordance with local regulations.

6.3. Methods and material for containment and cleaning up

For containment : Soil. Contain spilled liquid with sand, earth or other suitable absorbents (non-flammable). Recover free liquid and waste materials in suitable waterproof and oil-resistant containers. Clean contaminated area. Dispose of according to local regulations. Water: Confine the spillage. Remove from surface by skimming or suitable floating absorbents. Collect recovered product and other waste materials in suitable waterproof, oil resistant containers. Recover or dispose of according to local regulations. Do not use solvents or dispersants, unless specifically advised by an expert, and, if required, approved by local authorities.

Other information : Recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions.

6.4. Reference to other sections

Refer to chapter 16.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ensure that all relevant regulations regarding handling and storage facilities of flammable products are followed. Do not use compressed air for filling, discharging, or handling operations. Keep away from heat/sparks/open flames/hot surfaces. Use and store only outdoors or in a well-ventilated area. During transfer and mixing operations, ensure that all equipment is correctly grounded. Avoid the build-up of electric charges. Emptied containers can contain combustible product residues. Do not cut, weld, drill, burn or incinerate empty containers or drums, unless they have been drained and cleaned. Before entering storage tanks and commencing any operation in a confined area (e.g. tunnels), carry out an adequate clean-up, and check the atmosphere for oxygen content, flammability, and the presence of sulphur compounds. See also Section 16, "Other information".

Handling temperature : 0 - 65 °C

Hygiene measures : Avoid contact with skin. Do not breathe fume/ mist/ vapours. Do not ingest. Do not smoke. Do not eat and do not drink during use. Do not clean hands with dirty or oil-soaked rags. Do not re-use clothes, if they are still contaminated. Keep away from food and beverages.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in dry, well ventilated area. Keep away from open flames, hot surfaces and sources of ignition. Do not smoke.

Incompatible products : Keep away from: strong oxidants.

Storage temperature : 0 - 55 °C

Storage area : Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation. Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills. Cleaning, inspection and maintenance of internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.

Packages and containers: : If the product is supplied in containers: Keep containers tightly closed and properly labelled. Keep only in the original container or in a suitable container for this kind of product.

Packaging materials : For containers, or container linings use materials specifically approved for use with this product. Recommended materials for containers, or container linings use mild steel, stainless steel. Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

7.3. Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Mineral base oil, severely refined		
Austria	MAK (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)

Mineral base oil, severely refined		
Belgium	Limit value (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Italy - Portugal - USA ACGIH	ACGIH TLV®-TWA (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Italy - Portugal - USA ACGIH	ACGIH TLV®-STEL (mg/m³)	10 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
USA NIOSH	NIOSH REL (TWA) (mg/m3)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
USA NIOSH	NIOSH REL (STEL) (mg/m3)	10 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
USA OSHA	OSHA PEL (TWA) (mg/m3)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Spain	VLA-ED (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Spain	VLA-EC (mg/m³)	10 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
The Netherlands	MAC TGG 8h (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
United Kingdom	WEL TWA (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
United Kingdom	WEL STEL (mg/m³)	10 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Denmark	Grænseværdie (langvarig) (mg/m3)	1 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Denmark	Grænseværdie (kortvarig) (mg/m3)	2 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Hungary	AK-érték	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Sweden	nivågränsvärde (NVG) (mg/m3)	1 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Sweden	kortidsvärde (KTV) (mg/m3)	3 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Canada (Quebec)	VECD (mg/m³)	10 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)
Canada (Quebec)	VEMP (mg/m³)	5 mg/m³ (Mineral base oil mist, severely refined, DMSO <3% m/m)

AGIP OSO (ISO 32) (N/A)	
DNEL/DMEL (Workers)	
Long-term - systemic effects, inhalation	= 5,4 mg/m³/day (DNEL, Mineral base oil mist, severely refined, DMSO <3% m/m)
DNEL/DMEL (General population)	
Long-term - local effects, inhalation	= 1,2 mg/m³/day (DNEL, Mineral base oil mist, severely refined, DMSO <3% m/m)

Additional information : Note: The Derived No Effect Level (DNEL) is an estimated safe level of exposure that is derived from toxicity data in accord with specific guidance within the European REACH regulation. The DNEL may differ from an Occupational Exposure Limit (OEL) for the same chemical. OELs may be recommended by an individual company, a governmental regulatory body or an expert organization, such as the Scientific Committee for Occupational Exposure Limits (SCOEL) or the American Conference of Governmental Industrial Hygienists (ACGIH). OELs are considered to be safe exposure levels for a typical worker in an occupational setting for an 8-hour work shift, 40 hour work week, as a time weighted average (TWA) or a 15 minute short-term exposure limit (STEL). While also considered to be protective of health, OELs are derived by a process different from that of REACH.

Monitoring methods : Monitoring procedures should be chosen according to the indications set by national authorities or labour contracts.,Refer to relevant legislation and in any case to the good practice of industrial hygiene.

8.2. Exposure controls

Appropriate engineering controls : Before entering storage tanks and commencing any operation in a confined area, carry out an adequate clean-up, and check the atmosphere for oxygen content, flammability, and the presence of sulphur compounds. See also Section 16, "Other information".

Personal protective equipment (for industrial or professional use) : Face shield. Gloves. Protective clothing. Safety glasses. Safety shoes or boots. Dust/aerosol mask.

Hand protection : When there is a risk of contact with the skin, use hydrocarbon-resistant, felt-lined gloves. Materials that are presumably adequate: nitrile or PVC with a protection index > 5 (permeation time > 240 mins). Use gloves respecting all the conditions and within the limits set by the manufacturer. Replace gloves immediately in case of cuts, holes or other signs of damages or degradation. If necessary, refer to the EN 374 standard.

Eye protection : When there is a risk of contact with the eyes, use safety goggles or other means of protection (face shield). If necessary, refer to national standards or to the EN 166 standard.

Skin and body protection : Long-sleeved overalls. If necessary, refer to the EN 340 and related standards, for definition of characteristics and perfomance according to the risk rating of the area. Antistatic non-skid safety shoes or boots, chemical resistant, if necessary heat resistant and insulated.

Respiratory protection : Independently from other possible actions (technical modifications, operating procedures, and other means to limit the exposure of workers), personal protection equipment can be used according to necessity. Open or well ventilated spaces: in presence of oil mists and if the product is handled without adequate containment means: use full or half-face masks with filter for mists/aerosols. In case there is a significant presence of vapours (e.g. through handling at high temperature), use full or half-face masks with filter for hydrocarbon vapours. Closed or confined areas (e.g. tank interiors): the use of protection measures for airways (masks or self-contained breathing apparatus), must be assessed according to the specific activity, as well as level and duration of predicted exposure.

Thermal hazard protection : If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated.

Environmental exposure controls	:	Do not discharge the product into the environment. Onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Consumer exposure controls	:	No special requirements necessary, if handled at room temperature.

8.3. Hygiene measures

General protective and hygienic measures	:	Avoid contact with skin and eyes,Do not breathe vapours or mists.,Do not clean hands with dirty or oil-soaked rags.,Do not keep dirty rags in the overall pockets.,Do not drink, eat or smoke with dirty hands.,Wash hands with water and mild soap, do not use solvents or other irritant products which have a defatting effect on the skin.,Do not re-use clothes, if they are still contaminated.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Appearance	:	Liquid, bright & clear.
Molecular mass	:	Not applicable for mixtures
Colour	:	Yellow to amber.
Odour	:	Slight odour of petroleum.
Odour threshold	:	There are no data available on the preparation/mixture itself.
pH	:	Not applicable.
Melting point	:	Pour point ≤ -27 °C (ASTM D 97)
Freezing point	:	No data available
Boiling point	:	≥ 200 °C (ASTM D 1160)
Flash point	:	≥ 195 °C (ASTM D 93)
Relative evaporation rate (butylacetate=1)	:	Negligible.
Flammability (solid, gas)	:	No data available
Explosive limits	:	LEL ≥ 45 g/m³ (Aerosol)
Vapour pressure	:	≤ 0,1 hPa (20 °C) (Mineral oil, ASTM D 5191) (CONCAWE, 2010)
Relative vapour density at 20 °C	:	No data available
Relative density	:	No data available
Density	:	≤ 880 kg/m³ (15 °C) (ASTM D 1298)
Solubility	:	Water: immiscible and insoluble
Log Pow	:	Not applicable for mixtures

Self ignition temperature	:	≥ 300 °C (DIN 51794)
Decomposition temperature	:	No data available
Viscosity, kinematic	:	29 - 32 mm²/s (40 °C) (ASTM D 445)
Viscosity, dynamic	:	No data available
Explosive properties	:	None.
Oxidising properties	:	None.

9.2. Other information

VOC content : = 0 % (EU, CH)

SECTION 10: Stability and reactivity

10.1. Reactivity

This mixture does not offer any further hazard for reactivity, except what is reported in the following paragraphs.

10.2. Chemical stability

Stable product, according to its intrinsic properties (in normal conditions of storage and handling).

10.3. Possibility of hazardous reactions

None (in normal conditions of storage and handling). Contact with strong oxidizers (peroxides, chromates, etc.) may cause a fire hazard. A mixture with nitrates or other strong oxidisers (e.g. chlorates, perchlorates, liquid oxygen) may create an explosive mass. Sensitivity to heat, friction or shock cannot be assessed in advance.

10.4. Conditions to avoid

Keep away from: strong oxidants. Keep away from open flames, hot surfaces and sources of ignition. Avoid the build-up of electrostatic charge.

10.5. Incompatible materials

Strong oxidants.

10.6. Hazardous decomposition products

In exceptional cases (i.e prolonged storage in tanks contaminated with water, and presence of anaerobic sulfate-reducing microbial colonies), the product may undergo a degradation and generate small amounts of sulfur compounds, including H2S. See also Section 16, "Other information".

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified (Based on available data, the classification criteria are not met) (according to composition)

AGIP OSO (ISO 32) (N/A)	
LD50 oral rat	≥ 2000 mg/kg (Calculated data).
LD50 dermal rat	≥ 2000 mg/kg (Calculated data).
LC50 inhalation rat (mg/l)	≥ 5 mg/l/4h (Calculated data).

Mineral base oil, severely refined	
LD50 oral rat	> 5000 mg/kg (OECD 401)
LD50 dermal rat	> 5000 mg/kg (OECD 402)
LC50 inhalation rat (mg/l)	> 5 mg/l/4h (OECD 403)

Skin corrosion/irritation : Not classified (Based on available data, the classification criteria are not met)
(according to composition)
pH: Not applicable.

Serious eye damage/irritation : Not classified (Based on available data, the classification criteria are not met)
(according to composition)
pH: Not applicable.

Respiratory or skin sensitisation : Not classified (Based on available data, the classification criteria are not met)
(according to composition)
This product does not contain any significant amounts of substances classified as sensitizers (in any case < 0.1 % wt)

Germ cell mutagenicity : Not classified (Based on available data, the classification criteria are not met)
(according to composition)
This product does not contain any significant amounts of substances classified as mutagenic by the EU (in any case < 0.1 % wt)

Carcinogenicity : Not classified (Based on available data, the classification criteria are not met)
(according to composition)
None of the components of this product are listed as carcinogen by NTP, IARC, OSHA, EU or others.
All the mineral base oils contained in this product have a value < 3 % wt of DMSO extract, according to IP 346/92 (Nota L - Dir. 94/69/CE - Reg (CE) 1272/2008)

Reproductive toxicity : Not classified (Based on available data, the classification criteria are not met)
(according to composition)
This product does not contain any significant amounts of substances classified as Toxic for Reproduction by the EU (in any case < 0.1 % wt)

Specific target organ toxicity (single exposure) : Not classified (Based on available data, the classification criteria are not met)
(according to composition)

Specific target organ toxicity (repeated exposure) : Not classified (Based on available data, the classification criteria are not met)
(according to composition)

Mineral base oil, severely refined	
LOAEL (oral,rat,90 days)	= 125 mg/kg bodyweight/day (OECD TG 408)

Aspiration hazard : Not classified (Based on available data, the classification criteria are not met)
Viscosity, kinematic: > 20,5 mm2/s (40 °C) (ASTM D 445)

Potential Adverse human health effects and symptoms	:	Prolonged and repeated skin contact may cause reddening, irritation and dermatitis, due to a defatting effect. Contact with eyes may cause temporary reddening and irritation.
Other information	:	None.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	:	According to the components, and by comparison with other products of the same type and composition, it is expected that this product has a toxicity for aquatic organisms > 100 mg/l, and must not be regarded as dangerous to the environment. An uncontrolled release to the environment may nevertheless produce a contamination of different environmental compartments (soil, underground, surface water bodies, aquifers). Handle according to general working hygiene practices to avoid pollution and release into the environment.
Ecology - air	:	This product has a low vapour pressure. A significant exposure may happen only if the product is used at high temperature, or in case of sprays and mists.
Ecology - water	:	This product is not soluble in water. It floats on water and forms a film on the surface. The damage to aquatic organisms is of mechanical kind (immobilization and entrapment)

AGIP OSO (ISO 32) (N/A)	
LC50 fish 1	≥ 100 mg/l (Calculated data). This evaluation is based on the real characteristics of the components and their combination, taking into account the information provided by the suppliers.
LC50 other aquatic organisms 1	≥ 100 mg/l (Calculated data). This evaluation is based on the real characteristics of the components and their combination, taking into account the information provided by the suppliers.
EC50 Daphnia 1	≥ 100 mg/l (Calculated data). This evaluation is based on the real characteristics of the components and their combination, taking into account the information provided by the suppliers.

Mineral base oil, severely refined	
LC50 fish 1	> 100 mg/l (LL 50)
EC50 Daphnia 1	> 10000 mg/l WAF, 48 h (OECD 202)

Zinc, bis[O,O-bis(2-ethylhexyl) phosphorodithioato-S,S']-, (T-4)- (4259-15-8)	
LC50 fish 1	1 - 10 mg/l
EC50 Daphnia 1	1 - 10 mg/l OECD 202

Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (68921-45-9)	
LC50 fish 1	= 920 mg/l (96 h; read-across)
ErC50 (algae)	= 600 mg/l (OECD 201; 96h; Scenedesmus capricornutum; read-across)

Reaction mass of isomers of: C7-9-alkyl 3-(3,5-di-trans-butyl-4-hydroxyphenyl)propionate (125643-61-0)	
LC50 fish 1	> 74 mg/l (OECD 203, 96h, Brachydanio rerio)

Reaction mass of isomers of: C7-9-alkyl 3-(3,5-di-trans-butyl-4-hydroxyphenyl)propionate (125643-61-0)	
EC50 Daphnia 1	> 100 mg/l (OECD 202, 24h)
ErC50 (algae)	> 3 mg/l (OECD 201, 72 h, Scenedesmus subspicatus)

12.2. Persistence and degradability

AGIP OSO (ISO 32) (N/A)	
Persistence and degradability	The most significant constituents of the product should be considered as "inherently biodegradable", but not "readily biodegradable", and they may be moderately persistent, particularly in anaerobic conditions.

Mineral base oil, severely refined	
Persistence and degradability	The most significant constituents of the product should be considered as "inherently biodegradable", but not "readily biodegradable", and they may be moderately persistent, particularly in anaerobic conditions.

12.3. Bioaccumulative potential

AGIP OSO (ISO 32) (N/A)	
Log Pow	Not applicable for mixtures

Zinc, bis[O,O-bis(2-ethylhexyl) phosphorodithioato-S,S']-, (T-4)- (4259-15-8)	
Log Kow	3,6 (Octanol Water Coefficient test - 0,1 days)

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

AGIP OSO (ISO 32) (N/A)	
This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.	
Results of PBT-vPvB assessment	The components in this formulation do not meet the criteria for classification as PBT or vPvB. The product should be considered as "Persistent" in the environment, according to the REACH Annex XIII criteria (1.1)

Mineral base oil, severely refined	
Results of PBT-vPvB assessment	This substance does not meet the criteria for classification as PBT or vPvB. The product should be considered as "Persistent" in the environment, according to the REACH Annex XIII criteria (1.1)

12.6. Other adverse effects

Other adverse effects : None.

Other information : This product has no specific properties for inhibition of bacterial activity. In any case, wastewater containing this product should be treated in plants that are suited for the specific purpose.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Do not dispose of the product, either new or used, by discharging into sewers, tunnels, lakes or water courses. Deliver to a qualified official collector.

Waste disposal recommendations : European Waste Catalogue code(s) (Decision 2001/118/CE): 13 01 10* (mineral based non-chlorinated hydraulic oils). This EWC code is only a general indication, and takes into account the original composition of the product and its intended use. The user has the responsibility of choosing the right EWC code, considering the actual use of the product, alterations and contaminations.

Additional information : Empty containers may contain combustible product residues. Do not cut, weld, drill, burn or incinerate empty containers or drums, unless they have been cleaned, and declared safe.

Ecology - waste materials : The product as it is does not contain halogenated substances.

SECTION 14: Transport information

No dangerous good in sense of transport regulations.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No ingredients are included in the REACH Candidate list

Relevant EU Legislation : Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). (et sequens).
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (et sequens).
Directives 89/391/CEE, 89/654/CEE, 89/655/CEE, 89/656/CEE, 90/269/CEE, 90/270/CEE, 90/394/CEE, 90/679/CEE, 93/88/CEE, 95/63/CE, 97/42/CE, 98/24/CE, 99/38/CE, 99/92/CE, 2001/45/CE, 2003/10/CE, 2003/18/CE (Health and safety on the workplace)
Directive 98/24/EC (protection of the health and safety of workers from the risks related to chemical agents at work).
Directive 92/85/CE (measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding)
Directives 96/82/CE and 2003/105/CE (Control of major-accident hazards involving dangerous substances)
Directive 2004/42/CE (Limitation of emissions of Volatile Organic Compounds)
Labelling according to directives 67/548/EEC and 1999/45/EC

VOC content : = 0 % (EU, CH)

EURAL code (EWC) : 13 01 10*

15.1.2. National regulations

Maladies professionelles (F) : RG 36 - Affections provoquées par les huiles et graisses d'origine minérale ou de synthèse

Water hazard class (WGK) (D) : 1 (according to composition)

WGK remark	:	Classification based on the components in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS)
Storage class (LGK) (D)	:	LGK 12 - Non-flammable liquids in non-flammable packages
VbF class (D)	:	Not applicable.
Regional legislation	:	National adoption of EU Directives concerning health and safety on the workplace. National laws on classification and labeling of dangerous substances/preparations (Adoption of Directive 67/548/CE and subsequent Adaptations to Technical Progress - ATP, and Directive 1999/45/CE). National adoption of EU Directives concerning control of major-accident hazards involving dangerous substances (96/82/CE - 2003/105/CE). Relevant national laws on prevention of water pollution. Relevant national laws on protection of the health of pregnant workers (National adoption of Dir. 92/85/EEC). National adoption of Directive 75/439/CEE concerning disposal of used oils.

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Indication of changes	:	Modification according to Regulation (EC) nr. 1907/2006 and nr. 453/2010.
Data sources	:	This Safety Data Sheet is based on the real characteristics of the components and their combination, taking into account the information provided by the suppliers.
Abbreviations and acronyms	:	Complete text of the phrases H and R quoted in this Safety Data Sheet. These phrases are reported here for information only, and MAY NOT correspond to the classification of the product.
Other information	:	Do not use the product for any purposes that have not been advised by the manufacturer. In that case, the user could be exposed to unpredictable risks. In exceptional cases (i.e prolunged storage in tanks contaminated with water, and presence of anaerobic sulfate-reducing microbial colonies), the product may undergo a degradation and generate small amounts of sulfur compounds, including H2S. This situation is especially relevant in all those circumstances which require to enter a confined space, with direct exposure to the vapours. If this possibility is suspected, a specific assessment of inhalation risks from the presence of H2S in confined spaces must be made, to help determine prevention measures and controls (i.e. PPE) appropriate to local circumstances, and adequate emergency procedures. If there is any suspicion of inhalation of H2S (hydrogen sulphide), Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures. Send patient to hospital. Immediately begin artificial respiration if breathing has ceased. Administer oxygen if necessary.
Exposure Scenarios (general)	:	Not applicable.

Full text of R-, H- and EUH-phrases::

Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Aquatic Chronic 4	Hazardous to the aquatic environment - Chronic Hazard Category 4
Eye Dam. 1	Serious eye damage/eye irritation Category 1
H318	Causes serious eye damage
H411	Toxic to aquatic life with long lasting effects

H412	Harmful to aquatic life with long lasting effects
H413	May cause long lasting harmful effects to aquatic life
R41	Risk of serious damage to eyes.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R53	May cause long-term adverse effects in the aquatic environment.
N	Dangerous for the environment
Xi	Irritant

SDS EU (Annex II) MIXTURE

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION

Envirotemp® FR3® fluid

Envirotemp FR3 fluid is a dielectric fluid intended for use as an insulation and cooling medium in electrical apparatus such as electrical distribution and power transformers.

Cooper Power Systems
1900 East North Street
Waukesha, Wisconsin 53188-3899 USA

Telephone: +01 262 524 3300
Internet: www.cooperpower.com

Emergency telephone (Chemtrec)
Inside USA: 800 424 9300
Outside USA: +01 703 527 3887

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Envirotemp FR3 fluid is a proprietary formulation using food-grade vegetable oils combined with performance-enhancing additives. All components are listed in the EINECS inventory.

Component	Proportion (wt%)
Vegetable oil	> 98.5
Antioxidant additive	< 1.0
Cold flow additive	< 1.0
Colorant	< 1.0

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3. HAZARDS IDENTIFICATION

Envirotemp FR3 fluid is a preparation not classified as dangerous according to Directive 1999/45/EC. Not expected to cause a severe emergency hazard.

Routes of entry

Eyes: Contact may occur as a result of splash or exposure to mist conditions. May cause irritation and redness.

Skin: Typically non-irritating. In some case, a sensitization to vegetable oils may cause localized redness

Ingestion: May cause gastric irritation.

Inhalation: Exposure may occur as a result of mist exposure. May cause respiratory irritation.

Signs and symptoms of exposure: none known

Medical conditions generally aggravated by exposure: There is a very small risk for an allergic reaction to soybean oil in persons allergic to soybeans themselves.

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4. FIRST AID MEASURES

Inhalation: If inhaled, remove affected person from exposure to mists.

Eye contact: For eye contact, flush the eyes immediately with large amounts of water with the eyelids held away from the eye to ensure thorough rinsing.

Skin contact: For skin contact, remove by washing with soap and water. Get medical attention if irritation persists.

Ingestion: If swallowed, observe for signs of stomach discomfort or nausea. If symptoms persist, seek medical help. Do not induce vomiting.

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5. FIRE-FIGHTING MEASURES

Extinguishing media: CO_2 or dry chemical foam

Special fire fighting procedures: Use approved self-contained breathing apparatus with full facemask and full protective equipment in confined areas. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from source of ignition. Application of water to flaming oil can cause spreading.

Unusual fire and explosion hazards: Slight when exposed to flame. Can react with oxidizing materials. Clay materials (Fuller's earth, oil dry products) saturated with Envirotemp FR3 fluid can, under certain conditions, undergo a slow oxidation that releases heat. If the heat so released cannot escape, it is possible that the temperature may increase and ignite combustible materials in close contact.

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6. ACCIDENTAL RELEASE MEASURES

Steps to take in case material is released or spilled: Contain and control the leaks or spills with non-combustible absorbent materials such as sand, earth, vermiculite, or diatomaceous earth in drums for waste disposal. Prevent any material from entering drains or waterways. If the product contaminates waterways, rivers or drains, alert the relevant authorities in accordance with statutory procedures.

In the USA, spills into navigable waters must be reported to the National Response Center, 800-424-8802

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7. HANDLING AND STORAGE

Precautions to take in handling and storage: Avoid extremes of temperature in storage. Store Envirotemp FR3 fluid in labeled, tightly closed containers in cool, dry, isolated and well-ventilated areas, away from sources of ignition or heat. To maintain fluid for intended use as an electrical insulating fluid, eliminate exposure to oxygen and moisture.

Intermediate bulk storage container (tote): Prolonged exposure to ultraviolet radiation (sunlight) may affect color.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values:

	TWA (mg/m^3)	
	OSHA[1] PEL	ACGIH [2] TLV
Vegetable oil mists	–	10
Vegetable oil mists: total dust	15	–
Vegetable oil mists: respirable fraction	5	–

Hazardous Materials Identification System (HMIS):	**Health**	**Flammability**	**Physical Hazard**
	0	1	0

Respiratory protection: Vaporization is not expected at ambient temperature. Therefore, the need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefilter should be used. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134). For extreme cases, use of approved supplied-air respiratory protection may be necessary.

Ventilation: General mechanical ventilation can be used to control or reduce airborne concentrations of oil.

Protective gloves: Use gloves constructed of chemical resistant materials such as neoprene or heavy nitrile rubber if frequent or prolonged contact is expected. Use heat-protective gloves when handling product at elevated temperatures.

Eye protection: Wear safety glasses or goggles to prevent eye contact. Eye baths should be readily available in the area of handling Envirotemp FR3 fluid.

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[1] U.S. Occupational Health and Safety Administration

[2] American Conference of Governmental Industrial Hygienists

Other protective clothing or equipment: Wear regularly laundered coveralls or lab coat to minimize skin exposure.
Workplace hygienic practices: Wash with soap and water after contact. Avoid exposure to mists.
Environmental exposure controls: Have oil-absorbent materials easily available.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and odor: clear light-green liquid with slight vegetable oil odor **pH:** neutral

Closed cup flash point: 310 – 320°C
Boiling point: >360°C
Vapor pressure (mm Hg): < 0.01 @ 20°C
Vapor density (air = 1): n/a
Solubility in water: negligible; < 0.1%
Viscosity: 33 – 35 mm^2/s at 40°C

Autoignition temperature: 401 – 404°C
Relative density (H_2O = 1): 0.92
Pour point: -18 to -24°C
Evaporation rate (butyl acetate = 1): nil
Volatile organic compounds: < 0.001 g/L
Miscibility: mixes with other dielectric fluids except silicone

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10. STABILITY AND REACTIVITY

Stability: Envirotemp FR3 fluid is stable under normal conditions of use.
Incompatibility (materials to avoid): Avoid contact with strong oxidizing agents.
Hazardous decomposition products: none
Hazardous Polymerization: will not occur
Stabilizers: not required
Hazardous exothermic reaction: Slight when exposed to flame; can react with oxidizing materials. Class III B liquid. Clay materials (Fuller's earth, oil dry products) saturated with Envirotemp FR3 fluid can, under certain conditions, undergo a slow oxidation that releases heat. If the heat so released cannot escape, it is possible that the temperature may increase and ignite combustible materials in close contact.

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11. TOXICOLOGICAL INFORMATION

Carcinogenicity: none **NTP:** no **IARC monographs:** no **OSHA regulated:** no

Envirotemp FR3 fluid base oils are "generally recognized as safe" (GRAS) by the U.S. Food and Drug Administration and allowed for human consumption as a food and as a component that is allowed in contact with human food.

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12. ECOLOGICAL INFORMATION

Acute oral toxicity (OECD 420 - rats): LD_{50} >2000 mg/kg
Acute aquatic toxicity (OECD 203 - trout): LC_{50} >1000 mg/kg; NOAEC >1000 mg/kg
Aquatic biodegradation (OPPTS 835.3110): readily biodegradable, >99%
Biological oxidation demand (5-Day SM5210B): 250 ppm
Chemical oxygen demand (SM5220D): 560 ppm **BOD/COD ratio:** 45%
Petroleum hydrocarbon content: none
Environmental physical hazard: Envirotemp FR3 fluid shares physical hazards common to all oils such as coating feathers, fur, and gills.

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13. DISPOSAL CONSIDERATIONS

Recycling: Consult with local used oil recyclers, restaurant grease recyclers, fat rendering companies, or biodiesel producers.

Hazardous Waste: Envirotemp FR3 fluid itself, when discarded or disposed of, is not a hazardous waste.

Disposal: Incinerate or landfill in accordance with local regulations. Do not pour into drains or waterways.

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14. TRANSPORT INFORMATION

Harmonized System Tariff Classification (Schedule B): 1507.90.4050

National Motor Freight Classification (NMFC): 155250

Euro Tariff: 15 07 90 00 00

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15. REGULATORY INFORMATION

Envirotemp FR3 fluid itself, when discarded or disposed of, is not listed as a hazardous waste per 40 CFR 261 and is not a used oil per 40 CFR 279. Envirotemp FR3 fluid is a preparation not classified as dangerous according to Directive 1999/45/EC.

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16. OTHER INFORMATION

Technical information available at the Cooper Power Systems website: www.cooperpower.com

This Material Safety Data Sheet has been prepared in order to help the users of Envirotemp FR3 fluid. The data contained herein is, to the best of our knowledge, accurate as of the date of preparation of this sheet.

Effective Date: September 22, 2011

SAFETY DATA SHEET
Aviation Jet Fuel JET A-1 (JETA1)

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name Aviation Jet Fuel JET A-1 (JETA1)

Product number ID 10505

Internal identification 145163

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Distribution of substance, (ES01a) Formulation & (re)packing of substances and mixtures, (ES02) Use as a fuel, (ES12a, ES12b)

1.3. Details of the supplier of the safety data sheet

Supplier
Neste Oyj
Keilaranta 21, Espoo, P.O.B. 95, FIN-00095 NESTE, FINLAND
Tel. +358 10 45811
SDS@neste.com (chemical safety)

1.4. Emergency telephone number

National emergency telephone number +358-9-471 977, +358-9-4711, Poison Information Centre

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards Flam. Liq. 3 - H226

Health hazards Skin Irrit. 2 - H315 STOT SE 3 - H336 Asp. Tox. 1 - H304

Environmental hazards Aquatic Chronic 2 - H411

2.2. Label elements

Hazard pictograms

Signal word Danger

Hazard statements
H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H411 Toxic to aquatic life with long lasting effects.
H304 May be fatal if swallowed and enters airways.

Aviation Jet Fuel JET A-1 (JETA1)

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273 Avoid release to the environment.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P331 Do NOT induce vomiting.
P261 Avoid breathing vapours.
P280 Wear protective gloves.

Contains

Kerosine (petroleum), sweetened, Distillates (petroleum), hydrotreated light; Kerosine - unspecified, Kerosine (petroleum), hydrodesulfurized

2.3. Other hazards

Other hazards

Evaporates slowly. May cause eye and respiratory system irritation. Risk of soil and ground water contamination.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Distillates (petroleum), hydrotreated light; Kerosine - unspecified **0-100 %**

CAS number: 64742-47-8 | EC number: 265-149-8 | REACH registration number: 01-2119484819-18-XXXX

Classification
Flam. Liq. 3 - H226
Skin Irrit. 2 - H315
STOT SE 3 - H336
Asp. Tox. 1 - H304
Aquatic Chronic 2 - H411

Kerosine (petroleum), sweetened **0-100%**

CAS number: 91770-15-9 | EC number: 294-799-5 | REACH registration number: 01-2119502385-46-XXXX

Classification
Flam. Liq. 3 - H226
Skin Irrit. 2 - H315
STOT SE 3 - H336
Asp. Tox. 1 - H304
Aquatic Chronic 2 - H411

Kerosine (petroleum), hydrodesulfurized **0-100%**

CAS number: 64742-81-0 | EC number: 265-184-9 | REACH registration number: 01-2119462828-25-XXXX

Classification
Flam. Liq. 3 - H226
Skin Irrit. 2 - H315
STOT SE 3 - H336
Asp. Tox. 1 - H304
Aquatic Chronic 2 - H411

Aviation Jet Fuel JET A-1 (JETA1)

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

Composition comments Mixture of a petroleum product and additives. Total aromatics at maximum: 26,5 %. Naphthalene (CAS 91-20-3) < 1 %. Toluene (CAS 108-88-3) < 1%. Benzene (CAS 71-43-2) < 0,1 %.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation Remove person to fresh air and keep comfortable for breathing. Get medical attention if symptoms are severe or persist.

Ingestion Do not induce vomiting. Get medical attention immediately.

Skin contact Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if irritation persists after washing.

Eye contact Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation persists after washing.

4.2. Most important symptoms and effects, both acute and delayed

General information Irritating to skin. May irritate eyes. Vapours in high concentrations are narcotic. May cause nausea, headache, dizziness and intoxication. Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards Flammable liquid and vapour. Containers can burst violently or explode when heated, due to excessive pressure build-up.

Hazardous combustion products Carbon dioxide (CO2). Carbon monoxide (CO).

5.3. Advice for firefighters

Protective actions during firefighting Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Prevent fire extinguishing water from contaminating surface water or the ground water system.

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid inhalation of vapours and contact with skin and eyes. Wear adequate protective equipment at all operations.

For emergency responders Prevent unauthorized access. Vapours are heavier than air and may spread near ground and travel a considerable distance to a source of ignition and flash back. Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharge.

Aviation Jet Fuel JET A-1 (JETA1)

6.2. Environmental precautions

Environmental precautions Avoid release to the environment. Stop leak if safe to do so. Avoid the spillage or runoff entering drains, sewers or watercourses. Contain spillage with sand, earth or other suitable non-combustible material. Inform the relevant authorities if environmental pollution occurs (sewers, waterways, soil or air). Risk of soil and ground water contamination.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Immediately start clean-up of the liquid and contaminated soil. Small Spillages: Absorb spillage with sand or other inert absorbent. Pay attention to the fire and health hazards caused by the product.

6.4. Reference to other sections

Reference to other sections For personal protection, see Section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions The product contains volatile substances which may spread in the atmosphere. Avoid heat, flames and other sources of ignition. Take precautionary measures against static discharges. All handling should only take place in well-ventilated areas. Avoid inhalation of vapours and contact with skin and eyes. Use personal protective equipment and/or local ventilation when needed. Do not eat, drink or smoke when using this product. Wash hands and any other contaminated areas of the body with soap and water before leaving the work site. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons).

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Flammable liquid storage. Store in accordance with local regulations. Store in a demarcated bunded area to prevent release to drains and/or watercourses. Take precautions against leakage by constructing collecting pools and sewerage systems as well as by surfacing the loading and unloading stations. Only store in correctly labelled containers. Use containers made of the following materials: Carbon steel. Stainless steel.

7.3. Specific end use(s)

Specific end use(s) Not known.

SECTION 8: Exposure controls/Personal protection

8.1. Control parameters

Occupational exposure limits

Solvent naphtha, group 3: 100mg/m3 (8h), HTP 2018/FIN.
The individual limit values can be applied for the hydrocarbons.

Kerosine (petroleum), hydrodesulfurized

Solvent naphtha, group 1: 500 mg/m3 (8h), HTP 2018/FIN.

toluene

Toluene: 25 ppm (8h), 81 mg/m3 (8h), 100ppm (15min), 380 mg/m3 (15min), HTP 2018/FIN.
Toluene: 50 ppm (8h), 192 mg/m3 (8h), 100ppm (15min), 384 mg/m3 (15min), EU OELV (EC/2006/15)
May be absorbed through the skin.

naphthalene

Naphthalene: 1 ppm (8h), 5 mg/m3 (8h), 2 ppm (15min), 10mg/m3 (15min), HTP 2018/FIN.
Naphthalene: 10 ppm (8h), 50 mg/m3 (8h), EU OELV (EC/1991/322).

Benzene

Aviation Jet Fuel JET A-1 (JETA1)

Benzene: 1 ppm (8h), 3,25 mg/m3, VNa 716/2000/FIN (binding limit value).
May be absorbed through the skin.

DNEL	Consumer - Oral; Long term systemic effects: 19 mg/kg/day
PNEC	Not available.

Kerosine (petroleum), sweetened (CAS: 91770-15-9)

DNEL	Consumer - Oral; Long term systemic effects: 19 mg/kg, (24h)

Kerosine (petroleum), hydrodesulfurized (CAS: 64742-81-0)

DNEL	Consumer - Oral; Long term systemic effects: 19 mg/kg, (24h)

8.2. Exposure controls

Appropriate engineering controls	All handling should only take place in well-ventilated areas. Use personal protective equipment and/or local ventilation when needed. Handle in accordance with good industrial hygiene and safety practice. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons).
Eye/face protection	Tight-fitting safety glasses.
Hand protection	Wear protective gloves. It is recommended that gloves are made of the following material: Nitrile rubber. Neoprene. Polyvinyl chloride (PVC). The selected gloves should have a breakthrough time of at least 8 hours. Protection class 6. Protective gloves according to standards EN 420 and EN 374. Change protective gloves regularly.
Other skin and body protection	Protective clothing when needed. Wear anti-static protective clothing if there is a risk of ignition from static electricity.
Respiratory protection	Filter device/half mask Gas filter, type A2. Filter device could be used maximum 2 hours at a time. Filter devices must not be used in conditions where the oxygen level is low (< 19 vol.-%). At high concentrations a breathing apparatus must be used (self-contained or fresh air hose breathing apparatus). Filter must be changed often enough. Respirator according to standard EN 140.
Environmental exposure controls	Take precautions against leakage by constructing collecting pools and sewerage systems as well as by surfacing the loading and unloading stations.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Liquid.
Colour	Clear.
Odour	Hydrocarbons.
Odour threshold	-
pH	-
Melting point	≤ -47°C (ASTM D2386, D5972, IP 529)
Initial boiling point and range	170 - 300°C (ASTM D 86)
Flash point	≥ 40°C (IP 170)
Upper/lower flammability or explosive limits	Upper flammable/explosive limit: 0,6 % Lower flammable/explosive limit: 6 %

Aviation Jet Fuel JET A-1 (JETA1)

Vapour pressure	~ 2 kPa @ 38°C
Vapour density	> 3 (Air = 1.0)
Relative density	0,775 - 0,840 @ 15°C (ASTM D4052)
Solubility(ies)	The product has poor water-solubility. < 50 mg/l @ 20°C
Partition coefficient	log Kow: > 3
Auto-ignition temperature	~ 250°C
Decomposition Temperature	-
Viscosity	Kinematic viscosity < 7 mm2/s @ 40°C
Explosive properties	Not considered to be explosive.
Oxidising properties	Does not meet the criteria for classification as oxidising.

9.2. Other information

Other information	Not known.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	There are no known reactivity hazards associated with this product.

10.2. Chemical stability

Stability	Stable at normal ambient temperatures and when used as recommended.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	No potentially hazardous reactions known.

10.4. Conditions to avoid

Conditions to avoid	Keep away from heat, sparks and open flame.

10.5. Incompatible materials

Materials to avoid	Oxidising agents.

10.6. Hazardous decomposition products

Hazardous decomposition products	Does not decompose when used and stored as recommended.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological effects	Based on available data the classification criteria are not met.

Skin corrosion/irritation

Skin corrosion/irritation	Irritating to skin. (EPA Guidelines in FR Vol. 44, No. 145, p. 44054-44093) The product irritates mucous membranes and may cause abdominal discomfort if swallowed. May cause respiratory irritation.

Serious eye damage/irritation

Serious eye damage/irritation	Based on available data the classification criteria are not met. (EPA OTS 798.4500)

Skin sensitisation

Aviation Jet Fuel JET A-1 (JETA1)

Skin sensitisation	Based on available data the classification criteria are not met. (OECD 406, EPA OTS 798.4100)

Germ cell mutagenicity

Genotoxicity - in vitro	Based on available data the classification criteria are not met. (OECD 471, 476, modified Ames test)
Genotoxicity - in vivo	Based on available data the classification criteria are not met. (OECD 475, 478, 479)

Carcinogenicity

Carcinogenicity	Based on available data the classification criteria are not met.

Reproductive toxicity

Reproductive toxicity - fertility	Based on available data the classification criteria are not met. (OECD 421)
Reproductive toxicity - development	Based on available data the classification criteria are not met. (OECD 414)

Specific target organ toxicity - single exposure

STOT - single exposure	May cause nausea, headache, dizziness and intoxication. Anaesthetic in high concentrations.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure	Based on available data the classification criteria are not met. (OECD 410, 412, 413)

Aspiration hazard

Aspiration hazard	May be fatal if swallowed and enters airways. Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

Toxicological information on ingredients.

Distillates (petroleum), hydrotreated light; Kerosine - unspecified

Acute toxicity - oral

Notes (oral LD_{50})	LD_{50} > 5000 mg/kg, Oral, Rat (OECD 420, EPA OTS 798.1175)

Acute toxicity - dermal

Notes (dermal LD_{50})	LD_{50} > 2000 mg/kg, Dermal, Rabbit (OECD 402, EPA OTS 798.1100)

Acute toxicity - inhalation

Notes (inhalation LC_{50})	LC_{50} > 5,28 mg/l, Inhalation, Rat (4h) (OECD 403)

Kerosine (petroleum), sweetened

Acute toxicity - oral

Notes (oral LD_{50})	LD_{50} > 5000 mg/kg, Oral, Rat (OECD 420, EPA OTS 798.1175)

Acute toxicity - dermal

Notes (dermal LD_{50})	LD_{50} > 2000 mg/kg, Dermal, Rabbit (OECD 402, EPA OTS 798.1100)

Acute toxicity - inhalation

Notes (inhalation LC_{50})	LC_{50} > 5,28 mg/l, Inhalation, Rat (4h) (OECD 403)

Skin corrosion/irritation

Skin corrosion/irritation	Irritating to skin. (EPA Guidelines in FR Vol. 44, No. 145, p. 44054-44093)

Serious eye damage/irritation

Serious eye damage/irritation	Based on available data the classification criteria are not met. (EPA OTS 798.4500)

Aviation Jet Fuel JET A-1 (JETA1)

Skin sensitisation

Skin sensitisation	Not sensitising. (OECD 406, EPA OTS 798.4100)

Aspiration hazard

Aspiration hazard	Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

SECTION 12: Ecological information

12.1. Toxicity

Toxicity	Toxic to aquatic life with long lasting effects.

Ecological information on ingredients.

Distillates (petroleum), hydrotreated light; Kerosine - unspecified

Acute aquatic toxicity

Acute toxicity - fish	LL_{50}, 24 hours: 5-17 mg/l, LL_{50}, 48 hours: 2-5 mg/l, WAF (OECD 203)
Acute toxicity - aquatic invertebrates	EL50, 24 hours: 4,6 mg/l, EL50, 48 hours: 1,4 mg/l, NOEL, 48 hours: 0,3 mg/l, WAF (OECD 202)
Acute toxicity - aquatic plants	EL50, 24 hours: 1-3 mg/l, NOEL, 24 hours: 1 mg/l, WAF (OECD 201)

Chronic aquatic toxicity

Chronic toxicity - aquatic invertebrates	EL50, 21 days: 0.81 mg/l, NOEL, 21 days: 0,48 mg/l, WAF (OECD 211)

Kerosine (petroleum), sweetened

Acute aquatic toxicity

Acute toxicity - fish	LL_{50}, 24 hours: 5-17 mg/l, LL_{50}, 48 hours: 2-5 mg/l, WAF (OECD 203)
Acute toxicity - aquatic invertebrates	EL50, 24 hours: 4,6 mg/l, EL50, 48 hours: 1,4 mg/l, NOEL, 48 hours: 0,3 mg/l, WAF (OECD 202)
Acute toxicity - aquatic plants	EL50, 24 hours: 1-3 mg/l, NOEL, 24 hours: 1 mg/l, WAF (OECD 201)

Chronic aquatic toxicity

Chronic toxicity - fish early life stage	NOEL, 28 days: 0,1 mg/l, Fish (QSAR)

Aviation Jet Fuel JET A-1 (JETA1)

Chronic toxicity - aquatic invertebrates	EL50, 21 days: 0.81 mg/l, NOEL, 21 days: 0,48 mg/l, WAF (OECD 211)

12.2. Persistence and degradability

Persistence and degradability	The product contains volatile substances which may spread in the atmosphere. Can be photodegraded in the atmosphere.
Stability (hydrolysis)	No significant reaction in water.
Biodegradation	Inherently biodegradable. (OECD 301F)

12.3. Bioaccumulative potential

Bioaccumulative potential	Possibly bioaccumulative.
Partition coefficient	log Kow: > 3

12.4. Mobility in soil

Mobility	Evaporates slowly. The product has poor water-solubility. Product can penetrate soil until reaching the surface of ground water. The product contains substances which are bound to particulate matter and are retained in soil.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	This product does not contain any substances classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects	Product causes fouling, and direct contact produces harmful effects e.g. to birds and vegetation. Adsorbed hydrocarbon residues can be harmful to sediment organisms.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal methods	Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out.

SECTION 14: Transport information

14.1. UN number

UN No. (ADR/RID)	1863

14.2. UN proper shipping name

Proper shipping name (ADR/RID)	UN 1863 FUEL, AVIATION, TURBINE ENGINE

14.3. Transport hazard class(es)

ADR/RID class	3

14.4. Packing group

ADR/RID packing group	III

14.5. Environmental hazards

Aviation Jet Fuel JET A-1 (JETA1)

Environmentally hazardous substance/marine pollutant
MARINE POLLUTANT

14.6. Special precautions for user

Hazard Identification Number (ADR/RID)	30
Tunnel restriction code	(D/E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Commission Regulation (EU) No 2015/830 of 28 May 2015. Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

SECTION 16: Other information

Abbreviations and acronyms used in the safety data sheet	EU OELV = European Occupational Exposure Limit Value
Key literature references and sources for data	Regulations, databases, literature, own research. Concawe Report No 11/10, 10/14. Chemical Safety Report Kerosines, 2010.
Training advice	DO NOT SIPHON PRODUCT BY MOUTH SUCTION.
Revision comments	Revised formulation. NOTE: Lines within the margin indicate significant changes from the previous revision.
Revision date	11/03/2019
Supersedes date	14/08/2018
SDS number	5306
Hazard statements in full	H226 Flammable liquid and vapour. H304 May be fatal if swallowed and enters airways. H315 Causes skin irritation. H336 May cause drowsiness or dizziness. H411 Toxic to aquatic life with long lasting effects.

Exposure scenario
Distribution of Substance - Industrial

Identification

Product name	Kerosines
Version number	2018
Es reference	ES01a

1. Title of exposure scenario

Main title	Distribution of Substance - Industrial
Process scope	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

Environment

Environmental release category	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC5 Use at industrial site leading to inclusion into/onto article ERC6a Use of intermediate ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC6c Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) ERC6d Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) ERC7 Use of functional fluid at industrial site
SPERC	ESVOC SPERC 1.1b.v1

Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 8,700,000 tonnes/year
Fraction of Regional tonnage used locally: 1
Annual site tonnage: 17,000 tonnes
Maximum daily site tonnage: 58 tonnes

Distribution of Substance - Industrial

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Release fraction to air from process (initial release prior to RMM): 1.0E-03

Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 1.0E-05

Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 1.0E-05

Environmental factors not influenced by risk management measures

Dilution Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Risk management measures

Good practice Common practices vary across sites, thus conservative process release estimates used.

Risk from environmental exposure is driven by freshwater sediment.

STP details Estimated substance removal from wastewater via domestic sewage treatment: 95%
Removal efficiency (total): 95%
Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 2.1E+06 kg/day
Assumed domestic sewage treatment plant flow (m^3/day):
2000.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air Treat air emission to provide a typical removal efficiency of 90%.

Water Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): 0.0 If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Soil Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Distribution of Substance - Industrial

Setting Assumes a good basic standard of occupational hygiene is implemented.

Temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures General measures (skin irritants) Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

General exposures (closed systems)
No other specific measures identified.
.
General exposures (open systems)
No other specific measures identified.
.
Process sampling
No other specific measures identified.
.
Laboratory activities
No other specific measures identified.
.
Bulk transfers
No other specific measures identified.
.
Drum and small package filling
No other specific measures identified.
.
Equipment cleaning and maintenance
No other specific measures identified.
.
Bulk product storage
No other specific measures identified.

3. Exposure estimation (Environment 1)

Assessment method Used Petrorisk model. (Hydrocarbon Block Method)

Maximum Risk Characterisation Ratios for air emissions 2.3E-04 Maximum Risk Characterisation Ratios for wastewater emissions 1.3E-02

4. Guidance to check compliance with the exposure scenario (Environment 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

3. Exposure estimation (Health 1)

Assessment method The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

Distribution of Substance - Industrial

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Qualitative approach used to conclude safe use. Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

4. Guidance to check compliance with the exposure scenario (Health 1)

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Exposure scenario
Formulation & (Re)packing of Substances and Mixtures - Industrial

Identification

Product name	Kerosines
Version number	2018
Es reference	ES02

1. Title of exposure scenario

Main title	Formulation & (Re)packing of Substances and Mixtures - Industrial
Process scope	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

Environment

Environmental release category	ERC2 Formulation into mixture
SPERC	ESVOC SPERC 2.2.v1

Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC14 Tabletting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 6,800,000 tonnes/year
Fraction of Regional tonnage used locally: 1
Annual site tonnage: 30,000 tonnes
Maximum daily site tonnage: 100 tonnes

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Formulation & (Re)packing of Substances and Mixtures - Industrial

Other given operational conditions affecting environmental exposure

Emission factor - air Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): 2.5E-02

Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 2.0E-04

Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 1.0E-04

Environmental factors not influenced by risk management measures

Dilution Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Risk management measures

Good practice Common practices vary across sites, thus conservative process release estimates used.

Risk from environmental exposure is driven by freshwater sediment.

STP type Municipal STP.

STP details Estimated substance removal from wastewater via domestic sewage treatment: 95.0%
Removal efficiency (total): 95.0%
Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 100 tonne/day
Assumed domestic sewage treatment plant flow (m^3/day):
2000.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air Treat air emission to provide a typical removal efficiency of 0%.

Water Prevent leaks and prevent soil/water pollution caused by leaks. Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): 94.8 If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%): 0.0

Soil Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting Assumes a good basic standard of occupational hygiene is implemented.

Formulation & (Re)packing of Substances and Mixtures - Industrial

Temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures General measures (skin irritants) Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

General exposures (closed systems)
No other specific measures identified.
.
General exposures (open systems)
No other specific measures identified.
.
Process sampling
No other specific measures identified.
.
Laboratory activities
No other specific measures identified.
.
Bulk transfers
No other specific measures identified.
.
Mixing operations
No other specific measures identified.
.
Manual
Transfer from/pouring from containers
No other specific measures identified.
.
Drum/batch transfers
No other specific measures identified.
.
Tabletting, compression, extrusion or pelletisation
No other specific measures identified.
.
Drum and small package filling
No other specific measures identified.
.
Equipment cleaning and maintenance
No other specific measures identified.
.
Bulk product storage
No other specific measures identified.

3. Exposure estimation (Environment 1)

Assessment method Used Petrorisk model. (Hydrocarbon Block Method)

Maximum Risk Characterisation Ratios for air emissions 1.6E-02 Maximum Risk Characterisation Ratios for wastewater emissions 9.7E-01

4. Guidance to check compliance with the exposure scenario (Environment 1)

Formulation & (Re)packing of Substances and Mixtures - Industrial

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

3. Exposure estimation (Health 1)

Assessment method

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Qualitative approach used to conclude safe use. Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

4. Guidance to check compliance with the exposure scenario (Health 1)

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Exposure scenario
Use as a Fuel - Industrial

Identification

Product name	Kerosines
Version number	2018
Es reference	ES12a

1. Title of exposure scenario

Main title	Use as a Fuel - Industrial
Process scope	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

Environment

Environmental release category	ERC7 Use of functional fluid at industrial site
SPERC	ESVOC SPERC 7.12a.v1

Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC16 Use of fuels

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 1,600,000 tonnes/year
Fraction of Regional tonnage used locally: 1
Annual site tonnage: 1,500,000 tonnes
Maximum daily site tonnage: 5000 tonnes

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 5.0E-02
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1.0E-05
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0

Environmental factors not influenced by risk management measures

Use as a Fuel - Industrial

Dilution

Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Risk management measures

Good practice

Common practices vary across sites, thus conservative process release estimates used.

Risk from environmental exposure is driven by freshwater sediment.

STP type

Municipal STP.

STP details

Estimated substance removal from wastewater via domestic sewage treatment: 95.0%
Removal efficiency (total): 95%
Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 2.1E+06 tonne/day
Assumed domestic sewage treatment plant flow (m^3/day):
2000.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air

Treat air emission to provide a typical removal efficiency of 95%.

Water

Prevent leaks and prevent soil/water pollution caused by leaks. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): 94.4 If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%): 0.0

Soil

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment

Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

Conditions and measures related to external recovery of waste

Recovery method

This substance is consumed during use and no waste of the substance is generated.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state

Liquid

Vapour pressure

Vapour pressure 0.5 - 10 kPa at STP.

Concentration details

Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting

Assumes a good basic standard of occupational hygiene is implemented.

Temperature

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures

General measures (skin irritants) Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Use as a Fuel - Industrial

Risk management measures

General exposures (closed systems)
No other specific measures identified.
.
Use as a fuel
(closed systems)
No other specific measures identified.
.
Bulk transfers
No other specific measures identified.
.
Drum/batch transfers
No other specific measures identified.
.
Equipment cleaning and maintenance
No other specific measures identified.
.
Bulk product storage
No other specific measures identified.

3. Exposure estimation (Environment 1)

Assessment method

Used Petrorisk model. (Hydrocarbon Block Method)

Maximum Risk Characterisation Ratios for air emissions 2.9E-02 Maximum Risk Characterisation Ratios for wastewater emissions 9.0E-01

4. Guidance to check compliance with the exposure scenario (Environment 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

3. Exposure estimation (Health 1)

Assessment method

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Qualitative approach used to conclude safe use. Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

4. Guidance to check compliance with the exposure scenario (Health 1)

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Exposure scenario
Use as a Fuel - Professional

Identification

Product name	Kerosines
Version number	2018
Es reference	ES12b

1. Title of exposure scenario

Main title	Use as a Fuel - Professional
Process scope	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

Environment

Environmental release category	ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)
SPERC	ESVOC SPERC 9.12b.v1

Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC16 Use of fuels

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 4,600,000 tonnes/year
Fraction of Regional tonnage used locally: 1
Annual site tonnage: 2300 tonnes
Maximum daily site tonnage: 6.4 tonnes

Frequency and duration of use

Continuous release.
Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from wide dispersive use (regional only): 1.0E-03
Emission factor - water	Release fraction to wastewater from wide dispersive use: 1.0E-05
Emission factor - soil	Release fraction to soil from wide dispersive use (regional only): 1.0E-05

Environmental factors not influenced by risk management measures

Use as a Fuel - Professional

Dilution

Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Risk management measures

Good practice

Common practices vary across sites, thus conservative process release estimates used.

Risk from environmental exposure is driven by fresh water.

STP type

Municipal STP.

STP details

Estimated substance removal from wastewater via domestic sewage treatment: 95.0%
Removal efficiency (total): 95.0%
Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 2.9E+05 kg/day
Assumed domestic sewage treatment plant flow (m^3/day):
2000.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air

Treat air emission to provide a typical removal efficiency of N/A%.

Water

Prevent leaks and prevent soil/water pollution caused by leaks. Onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): 0.0 If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%): 0.0

Soil

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment

Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

Conditions and measures related to external recovery of waste

Recovery method

This substance is consumed during use and no waste of the substance is generated.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state

Liquid

Vapour pressure

Vapour pressure 0.5 - 10 kPa at STP.

Concentration details

Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting

Assumes a good basic standard of occupational hygiene is implemented.

Temperature

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures

General measures (skin irritants) Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Use as a Fuel - Professional

Risk management measures

General exposures (closed systems)
No other specific measures identified.
.
Use as a fuel
(closed systems)
No other specific measures identified.
.
Bulk transfers
No other specific measures identified.
.
Transfer from/pouring from containers
No other specific measures identified.
.
Equipment cleaning and maintenance
No other specific measures identified.
.
Bulk product storage
No other specific measures identified.

3. Exposure estimation (Environment 1)

Assessment method

Used Petrorisk model. (Hydrocarbon Block Method)

Maximum Risk Characterisation Ratios for air emissions 4.4E-04 Maximum Risk Characterisation Ratios for wastewater emissions 3.4E-03

4. Guidance to check compliance with the exposure scenario (Environment 1)

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

3. Exposure estimation (Health 1)

Assessment method

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Qualitative approach used to conclude safe use. Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

4. Guidance to check compliance with the exposure scenario (Health 1)

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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MATERIAL SAFETY DATA SHEET

Complies with OSHA Hazard Communication Standard 29 CFR 1910.1200

Date of Prep: 03/21/12

SECTION 1

SUNNYSIDE CORPORATION
225 CARPENTER AVENUE
WHEELING, ILLINOIS 60090 (847) 541-5700
EMERGENCY TELEPHONE (800) 424-9300

FOR INFORMATION: (847) 541-5700
- SUNNYSIDE CORPORATION
- CHEM TREC

Product Class: Mixed Solvents
Trade Name: ALLPRO LACQUER THINNER

Manufacturer's Code: 457
NPCA HMIS: Health: 2
Flammability: 3
Reactivity: 1

Product Appearance and Odor: Clear, colorless liquid; mild solvent odor.

SECTION 2 – HAZARDOUS INGREDIENTS

OCCUPATIONAL EXPOSURE LIMITS

INGREDIENT	CAS#	PERCENT	ACGIH TLV (TWA)	ACGIH TLV (STEL)	OSHA PEL (TWA)	OSHA PEL (STEL)	VAPOR PRESSURE
Acetone	67-64-1		500 PPM	750 PPM	750 PPM	1000 PPM	213 MM Hg @ 75° F.
Ethyl Acetate	141-78-6		400 PPM		400 PPM		86 MM Hg @ 20° C.
Methanol	67-56-1		200 (SKIN)	250 PPM	200 PPM (SKIN)	250 PPM	96.0 MM Hg @ 68° F.
Light Aliphatic Solvent Naphtha	64742-89-8		300 PPM (For VM&P Naphtha - CAS # 8032-32-4)		300 PPM	400 PPM	Approx. 60 MM Hg @ 25° C.
Toluene	108-88-3		20 PPM *(SKIN, A4)		100 PPM	150 PPM	Approx. 54 MM Hg @ 25° C.
Xylene	1330-20-7		100 PPM *(A4)	150 PPM	100 PPM	150 PPM	7 MM Hg @ 20° C.
Ethyl Benzene	100-41-4		100 PPM	125 PPM	100 PPM	125 PPM	10 MM Hg @ 20° C.
Methyl Ethyl Ketone	78-93-3		200 PPM	300 PPM	200 PPM	300 PPM	83 MM Hg @ 75° C.

*Not classifiable as a Human Carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data.

SECTION 3 – EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Move victim away from exposure and into fresh air. Flush eyes with plenty of water for at least 15 minutes while holding eyelids open. In case of irritation from airborne exposure, move to fresh air. Get prompt medical attention.

Skin Contact: Remove contaminated shoes and clothing. Flush skin with water. Follow by washing with soap and water. If irritation or redness develops, get medical attention. Do not reuse clothing until cleaned.

Inhalation: Using proper respiratory protection, immediately remove the affected victim from source of exposure and into fresh air. If respiratory symptoms or other symptoms persist seek immediate medical attention. If victim is not breathing, immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion: Do not induce vomiting. Call a physician, hospital emergency room or Poison Control Center immediately. Transport to medical attention immediately. Prompt action is essential.

Emergency Medical Treatment Procedures: This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example, asthma-like conditions), liver kidney, central nervous system, pancreas, heart. Exposure to this material may aggravate any preexisting condition sensitive to a decrease in available oxygen, such as chronic lung disease, coronary artery disease or anemias.

SECTION 4 -- PHYSICAL DATA

The following data represent approximate or typical values. They do not constitute product specifications.

Boiling Range:	133° F (IBP)	Vapor Density:	Heavier than air
Evaporation Rate:	Slower than ether	% Volatile By Volume:	100%
Weight Per Gallon:	6.98 lbs.		
Solubility in Water:	Moderate		
VOC:	6.28 lbs./gal.		

SECTION 5 -- FIRE AND EXPLOSION DATA

Flammability Classification:	Flammable liquid - Class IB.
Flash Point:	0° F. (Tag.Closed Cup)
Autoignition Temperature:	Not determined
Lower Explosive Limit:	Not established
Extinguishing Media:	Either allow fire to burn under controlled conditions or extinguish with alcohol type foam and dry chemical. Try to cover liquid spills with foam.
Unusual Fire and Explosion Hazards:	Extremely flammable. Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations.
Special Fire Fighting Procedures:	Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors.

SECTION 6 -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:	See Section 2.
EFFECTS OF OVEREXPOSURE:	
Eye Contact:	Severely irritating. If not removed promptly, will injure eye tissue, which may result in permanent damage.
Skin Contact:	Skin irritant. Prolonged or repeated skin contact can cause dermatitis, drying, cracking or irritation of the skin.
Inhalation:	Breathing high vapor concentrations may result in respiratory tract irritation, central nervous system depression, liver and kidney damage, may cause headaches and dizziness, drowsiness and unconsciousness. Brain cell damage may result from long-term vapor inhalation.
Ingestion:	Swallowing as little as one to four ounces of Methanol has been reported to cause death or serious irreversible injury such as blindness in humans. Studies in experimental animals indicate that the metabolism of Methanol to formic acid results in metabolic acidosis and reversible or irreversible damage to the optic nerve. Ingestion of this product, even in small amounts can cause blindness and death. Onset of symptoms may be delayed for 18-24 hours. Treatment prior to onset of obvious symptoms may be lifesaving. Methanol is rapidly absorbed and emesis should be initiated early to be effective, within 30 minutes of ingestion, if possible. Administer syrup of ipecac. After the dose is given, encourage patient to take 6-8 ounces of clear, non carbonated fluid. Dose may be repeated once if emesis does not occur within 20-30 minutes. Administration of an aqueous slurry of activated charcoal with magnesium citrate or sorbitol as a cathartic has been reported helpful. Ethanol inhibits the formation of toxic metabolites. Ethanol therapy may prove beneficial. Maintain contact with a poison control center during all aspects of diagnosis and treatment.
Carcinogenicity:	There is inadequate data available to evaluate the risk of developing cancer from exposure to the Toluene present in this product. However, none of the solvents in this product are listed as carcinogens or potential carcinogens by the NTP, IARC, or OSHA.
Target Organs:	There is a potential hazard (from Toluene) to the central nervous system, kidney, liver and sense of hearing.
Developmental:	Potential hazard to the fetus.
Chronic Effects:	WARNING: Concentrated, prolonged or deliberate inhalation of this product may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals to Toluene (levels greater than approximately 1500 ppm) has been reported to cause adverse fetal developmental effects.
Medical Conditions Aggravated by Exposure:	Conditions aggravated by exposure may include skin disorders, respiratory (asthma-like) conditions, kidney disorders and liver disorders.

SECTION 7 – REACTIVITY DATA

Stability:	Stable.
Conditions to Avoid:	Heat, sparks, and flame.
Incompatibility (Materials to Avoid):	Strong oxidizing agents like liquid chlorine or concentrated oxygen. May be corrosive to lead and aluminum.
Hazardous Decomposition Products:	Thermal decomposition may yield carbon dioxide and carbon monoxide.
Hazardous Polymerization:	Will not occur.

SECTION 8 – SPILL OR LEAK PROCEDURES

Steps to be taken in case material is spilled or released: Remove ignition sources, evacuate area, avoid breathing vapors or contact with liquid. Use non-sparking tools and explosion proof equipment. Recover free liquid or stop leak if possible. Dike large spills and use absorbent material for small spills. Keep spilled material out of sewers, ditches and bodies of water. Warn occupants and shipping in surrounding and downwind areas of fire and explosion hazard and request all to stay clear.

Waste disposal method: Send to a licensed reclaimer or incinerator. Dispose of in accordance with local, state and federal regulations.

SECTION 9 – SAFE HANDLING AND USE INFORMATION

Respiratory Protection:	Appropriate vapor canister, self-contained breathing apparatus or supplied-air hose mask, if needed.
Ventilation:	It is not recommended that this product be used in confined spaces or in a manner that will allow accumulation of high vapor concentrations. However, for controlled industrial uses when this product is used in confined spaces, heated above ambient temperatures or agitated, the use of explosion proof ventilation is necessary to maintain exposure levels below applicable exposure limits - see Section 2.
Protective Gloves:	Wear resistant gloves such as nitrile rubber.
Eye Protection:	Chemical safety goggles
Other Protective Equipment:	Impervious clothing or boots, if needed.

SECTION 10 – SPECIAL PRECAUTIONS

Dept. of Labor Storage Category:	Flammable liquid - Class IB.
Hygienic Practices:	Keep away from heat, sparks and flame. Keep containers closed when not in use. Avoid eye contact. Avoid prolonged contact with skin. Wash skin with soap and water after contact.
Additional Precautions:	Ground containers when transferring liquid to prevent static accumulation and discharge. Additional information regarding safe handling of products with static accumulation potential can be ordered by contacting the American Petroleum Institute (API) for API Recommended Practice 2003, entitled "Protection Against Ignitions Arising Out of Static, Lighting, and Stray Currents" (American Petroleum Institute, 1720 L Street Northwest, Washington,DC 20005), or the National Fire Protection Association (NFPA) for NFPA 77 entitled "Static Electricity" (National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101).
Empty Container Warning:	"Empty" containers retain residue (liquid and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. Do not attempt to clean since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged and promptly returned to supplier or disposed of in an environmentally safe manner and in accordance with governmental regulations.

SECTION 11 – ADDITIONAL INFORMATION

This product contains the following toxic chemical(s) which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

TOXIC CHEMICAL	CAS #	APPROXIMATE % BY WEIGHT
Toluene	108-88-3	12.60%
Xylene	1330-20-7	7.11%
Methanol	67-56-1	20.62%
Ethyl Benzene	100-41-4	1.25%

SARA Title III Hazard Categories:	Immediate (Acute) Health, Delayed (Chronic) Health, Fire.
Common Names:	Lacquer reducer, solvent mixture
California Proposition 65:	This product contains Toluene, Ethyl Benzene and may contain trace amounts of Benzene which are known to the State of California to cause cancer, birth defects or other reproductive harm and may be subject to the requirements of California Proposition 65.

TRANSPORTATION* (U.S.D.O.T. land transportation in packages of 119 gallons or less)

Proper Shipping Name:	Paint related material
Hazard Class:	3
Packing Group:	II
Identification Number:	UN 1263
U.S.D.O.T. Hazardous Substances:	Acetone RQ 5000 lbs. Methanol RQ 1000 lbs. Toluene RQ 1000 lbs. Xylene RQ 1000 lbs. Ethyl Benzene RQ 1000 lbs.

*Refer to 49 CFR for additional information. Exceptions or exemptions may exist for smaller quantities.

Material Safety Data Sheet
Mineral Oil MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mineral oil
Catalog Codes: SLM1027, SLM2404
CAS#: 8042-47-5 (previous 8012-95-1)
RTECS: PY8047000 (previous PY8030000)
TSCA: TSCA 8(b) inventory: Mineral oil
CI#: Not available.
Synonym: Drakeol (R) 7; White Mineral Oil; Mineral Oil, light, white
Chemical Name: Not available.
Chemical Formula: Not available.
Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**
Order Online: ScienceLab.com
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mineral oil (previous 8012-95-1)	8042-47-5	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects:
Slightly hazardous in case of eye contact (irritant), of ingestion. Non-irritant for skin. Non-hazardous in case of inhalation.
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin Contact: Wash with soap and water. Get medical attention if irritation develops.
Serious Skin Contact: Not available.
Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Serious Inhalation: Not available.

Material Safety Data Sheet
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Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious
person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar,
tie, belt or waistband.
Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.
Auto-Ignition Temperature: Not available.
Flash Points: CLOSED CUP: 168.33°C (335°F).
Flammable Limits: Not available.
Products of Combustion: Not available.
Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.
Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in
presence of static discharge: Not available.
Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.
Special Remarks on Fire Hazards: Not available.
Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water
on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a
concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a
fume hood. Ground all equipment containing material. Do not breathe gas/fumes/ vapor/spray. Keep away from incompatibles
such as oxidizing agents.
Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective
threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection: Safety glasses. Lab coat.
Personal Protection in Case of a Large Spill:

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Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE
handling this product.
Exposure Limits:
TWA: 5 STEL: 10 (mg/m3) as oil mist Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Transparent water-white liquid)
Odor: Odorless.
Taste: Not available.
Molecular Weight: Varies.
Color: Clear
pH (1% soln/water): Not applicable.
Boiling Point: 310°C (590°F)
Melting Point: Not available.
Critical Temperature: Not available.
Specific Gravity: 0.835 @ 15.6 C (Water = 1)
Vapor Pressure: <0.1 kPa (@ 20°C)
Vapor Density: Not available.
Volatility: Not available.
Odor Threshold: Not available.
Water/Oil Dist. Coeff.: Not available.
Ionicity (in Water): Not available.
Dispersion Properties: Not available.
Solubility:
Insoluble in cold water. Soluble in hydrocarbons.

Section 10: Stability and Reactivity Data

Stability: The product is stable.
Instability Temperature: Not available.
Conditions of Instability: Excess heat, incompatibles
Incompatibility with various substances: Reactive with oxidizing agents.
Corrosivity: Non-corrosive in presence of glass.
Special Remarks on Reactivity: May react with strong oxidizing agents
Special Remarks on Corrosivity: Not available.
Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.
Toxicity to Animals:
LD50: Not available. LC50: Not available.
Chronic Effects on Humans: CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.
Other Toxic Effects on Humans:
Slightly hazardous in case of ingestion. Non-irritant for skin. Non-hazardous in case of inhalation.
Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans:
Highly refined mineral oils are not classified as human carcinogens. However, related forms (untreated and mildly-treated oils
used in metal machining, mule spinning and jute processing) are listed as human carcinogens by both IARC (group 1) and
NTP
Special Remarks on other Toxic Effects on Humans:
Potential Health Effects: Skin: This product is not expected to cause any skin irritation upon direct single or repeated and

prolonged contact. However, similar chemical compositon products applied to the skin of lab animals resulted in minimal
to slight dermal irritation. Eyes: May cause mild (minimal) eye irritation. Inhalation: May cause respiratory tract irritation
with coughing and shortness of breath. This product has a low vapor pressure and is not expected to present an inhalation
hazard at ambient conditions. Caution should be taken to prevent aerosolization or misting. If aspiration occurs, it may
lead to chemical pneumonitis which is characterized by pulmonary edema and hemorrhage and may be fatal. Signs of lung
involvement include increased respiratory rate, increased heart rate, and bluish discoloration of the skin. Coughing, choking
and gagging are often noted at the time of aspiration Ingestion: Ingestion is relatively non-toxic unless aspiration occurs. It
has laxative properties and may cause gastrointestinal tract discomfort, abdominal cramps, vomiting and diarrhea. Exposure
to a large single dose, or repeated small doses by inhalation, aspiration or ingestion leading to aspiration can lead to lipid
pneumonia or lipid granuloma. These are low-grade, chronic localized tissue reactions which are not fatal.

Section 12: Ecological Information

Ecotoxicity: Not available.
BOD5 and COD: Not available.
Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation: Not available.
Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).
Identification: Not applicable.
Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Mineral oil
Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.
Other Classifications:
WHMIS (Canada): Not controlled under WHMIS (Canada).
DSCL (EEC):
This product is not classified according to the EU regulations. Not applicable.
HMIS (U.S.A.):
Health Hazard: 1
Fire Hazard: 1
Reactivity: 0
Personal Protection: a
National Fire Protection Association (U.S.A.):
Health: 0
Flammability: 1
Reactivity: 0

Material Safety Data Sheet
Mineral Oil MSDS

Specific hazard:
Protective Equipment:
Not applicable. Lab coat. Not applicable. Safety glasses.

Section 16: Other Information

References: Not available.
Other Special Considerations: Not available.
Created: 10/10/2005 08:41 PM
Last Updated: 11/06/2008 12:00 PM

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Material Safety Data Sheet
Mineral spirits MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mineral spirits
Catalog Codes: SLM3616
CAS#: 64475-85-0
RTECS: WJ8925000
TSCA: TSCA 8(b) inventory: Mineral spirits
CI#: Not applicable.
Synonym:
Chemical Name: Not available.
Chemical Formula: Not available.
Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**
Order Online: ScienceLab.com
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:
Name CAS # % by Weight
Mineral spirits 64475-85-0 100
Toxicological Data on Ingredients: Mineral spirits LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous
in case of skin contact (permeator).
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to lungs, the nervous system.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.
Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin
with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin.
Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical
attention.

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Mineral spirits MSDS

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.
Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth
resuscitation. Seek medical attention.
Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.
Auto-Ignition Temperature: 245°C (473°F)
Flash Points: CLOSED CUP: 38°C (100.4°F).
Flammable Limits: LOWER: 1%
Products of Combustion: Not available.
Fire Hazards in Presence of Various Substances: Not available.
Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Special Remarks on Fire Hazards: Not available.
Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill:
Flammable liquid, insoluble in water.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth,
sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent
entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance
on disposal.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not
breathe gas/fumes/ vapour/spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid
contact with skin and eyes
Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep
away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all
equipment containing material. Keep container dry. Keep in a cool place.

Material Safety Data Sheet
Mineral spirits MSDS

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their
respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be
used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist
BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.
Odor: Not available.
Taste: Not available.
Molecular Weight: Not available.
Color: Clear Colorless.
pH (1% soln/water): Not applicable.
Boiling Point: 148°C (298.4°F)
Melting Point: Not available.
Critical Temperature: Not available.
Specific Gravity: 0.74 (Water = 1)
Vapor Pressure: 2 mm of Hg (@ 20°C)
Vapor Density: 4.9 (Air = 1)
Volatility: Not available.
Odor Threshold: Not available.
Water/Oil Dist. Coeff.: Not available.
Ionicity (in Water): Not available.
Dispersion Properties: Not available.
Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.
Instability Temperature: Not available.
Conditions of Instability: Not available.
Incompatibility with various substances: Not available.
Corrosivity: Not considered to be corrosive for metals and glass.
Special Remarks on Reactivity: Not available.
Special Remarks on Corrosivity: Not available.
Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.
Toxicity to Animals:
LD50: Not available.
LC50: Not available.
Chronic Effects on Humans: The substance is toxic to lungs, the nervous system.
Other Toxic Effects on Humans:

Material Safety Data Sheet
Mineral spirits MSDS

Hazardous in case of skin contact (irritant), of ingestion, of inhalation.
Slightly hazardous in case of skin contact (permeator).
Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans: Not available.
Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.
BOD5 and COD: Not available.
Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may
arise.
Toxicity of the Products of Biodegradation: The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 3: Combustible liquid with a flash point greater than 37.8C (100F).
Identification: : Flammable liquids n.o.s. : UN1993 PG: Not available.
Special Provisions for Transport: No DOT, ref 49CFR, 173.150

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Mineral spirits
Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
Other Classifications:
WHMIS (Canada):
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
DSCL (EEC):
R10- Flammable.
R36/38- Irritating to eyes and skin.
HMIS (U.S.A.):
Health Hazard: 0
Fire Hazard: 2
Reactivity: 0
Personal Protection: h
National Fire Protection Association (U.S.A.):
Health: 0
Flammability: 2
Reactivity: 0
Specific hazard:
Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Material Safety Data Sheet
Mineral spirits MSDS

Section 16: Other Information

References: Not available.
Other Special Considerations: Not available.
Created: 10/10/2005 10:50 AM
Last Updated: 11/06/2008 12:00 PM

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DRYDEN OIL INC -- DRYDENE NON-DETERGENT MOTOR OILS

==========
MSDS Safety Information
==========
FSC: 9150
NIIN: 01-079-8310
MSDS Date: 01/29/1997
MSDS Num: CKWNB
Product ID: DRYDENE NON-DETERGENT MOTOR OILS, SAE 10, 20, 30, 40 ,50.
MFN: 02
Responsible Party
Cage: 40310
Name: DRYDEN OIL CO INC
Address: 9300 PULASKI HWY
City: BALTIMORE MD 21220
Info Phone Number: 301-574-5000
Emergency Phone Number: 800-777-1466
Proprietary Ind: Y
Published: Y
==========
Contractor Summary
==========
Cage: 40310
Name: DRYDEN OIL CO INC
Address: 9300 PULASKI HWY
City: BALTIMORE MD 21220
Phone: 301-574-5000
==========
Item Description Information
==========
Item Manager: S9G
Item Name: LUBRICATING OIL,ENGINE
Specification Number: NONE
Type/Grade/Class: NONE
Unit of Issue: QT
UI Container Qty: 1
Type of Container: CAN
==========
Ingredients
==========
Name: *** PROPRIETARY ***

==========
Health Hazards Data
==========
LD50 LC50 Mixture: NO DATA PROVIDED BY MANUFACTURER
Effects of Exposure: SKIN: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE SKIN IRRITATION. EYE: MAY CAUSE EYE IRRITATION. INGESTION: RELATIVELY NON-TOXIC.

Explanation Of Carcinogenicity: NO DATA PROVIDED BY MANUFACTURER.
Signs And Symptions Of Overexposure: SKIN: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE SKIN IRRITATION. EYE: MAY CAUSE EYE IRRITATION.

DRYDEN OIL INC -- DRYDENE NON-DETERGENT MOTOR OILS

Medical Cond Aggravated By Exposure: HEALTH STUDIES HAVE SHOWN THAT MANY PETROLEUM HYDROCARBONS AND SYNTHETIC LUBRICANTS POSE POTENTIAL HUMAN HEALTH RISKS WHICH MAY VARY FROM PERSON TO PERSON.
First Aid: EYE: FLUSH WITH CLEAR WATER FOR 15 MINS OR UNTIL IRRITATION SUBSIDES. IF IRRITATION PERSISTS, CALL A PHYSICIAN. SKIN: REMOVE ANY CONTAMINATED CLOTHING AND WASH SKIN THOROUGHLY WITH SOAP AND WATER.

INGESTION: DO NOT INDUCE VOMITING, CALL A PHYSICIAN IMMEDIATELY. INHALATION: IF OVERCOME BY VAPOR FROM HOT PRODUCT, IMMEDIATELY REMOVE FROM EXPOSURE AND CALL A PHYSICIAN. ADMINISTER OXYGEN, IF AVAILABLE. IF OVER-EXPOSED TO OIL MIST, REMOVE FROM FURTHER EXPOSURE UNTIL EXCESSIVE MIST OIL CONDITION SUBSIDES.
==========
Handling and Disposal
==========
Spill Release Procedures: RECOVER FREE PRODUCT. ADD SAND, EARTH, OR OTHER SUITABLE ABSORBENT MATERIAL TO THE SPILL AREA. MINIMIZE BREATHING VAPORS. MINIMIZE SKIN CONTACT. KEEP PRODUCT OUT OF SEWERS AND WATERCOURSES BY DIKING OR IMPOUNDING. ADVISE AUTHORITIES IF THE PRODUCT HAS ENTERED OR MAY ENTER SEWERS, WATERCOURCES, OR EXTENSIVE LAND AREAS.
Neutralizing Agent: NO DATA PROVIDED BY MANUFACTURER.

Waste Disposal Methods: ASSURE CONFORMITY WITH ALL APPLICABLE REGULATIONS. DISPOSE OF IN AN ENVIRONMENTALLY SAFE MANNER AND IN ACCORDANCE WITH ALL GOVERNMENT REGULATIONS TO INCLUDE FEDERAL, STATE, AND LOCAL REQUIREMENTS.
Handling And Storage Precautions: KEEP CONTAINERS CLOSED WHEN NOT IN USE. DONOT STORE NEAR HEAT, SPARKS, FLAME OR STRONG OXIDANTS.
Other Precautions: IN ORDER TO PREVENT FIRE OR EXPLOSIONS, USE APPROPRIATE EQUIPMENT.
==========
Fire and Explosion Hazard Information
==========
Flash Point Method: COC
Flash Point Text: 419 TO 540 DEG F
Autoignition Temp Text: N/D
Lower Limits: N/D
Upper Limits: N/D

Extinguishing Media: FOAM, WATER SPRAY (FOG) DRY CHEMICAL, CARBON DIOXIDE AND VAPORIZING LIQUID TYPE EXTINGUISHING AGENTS MAY BE SUITABLE FOR EXTINGUISHINGFIRES INVOLVING THIS TYPE OF PRODUCTS.

Fire Fighting Procedures: WATER OR FOAM MAY CAUSE FROTHING. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL. WATER SPRAY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURES. MINIMIZE BREATHING OF GASES, VAPOR, FUMES OR DECOMPOSITION PRODUCTS. USE SUPPLIED-AIR BREATHING EQUIPMENT FOR ENCLOSED OR CONFINEDSPACES OR AS OTHERWISE NEEDED.

Unusual Fire/Explosion Hazard: CARBON MONOXIDE AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED ON COMBUSTION.
==========
Control Measures
==========
Respiratory Protection: USE SUPPLIED-AIR RESPIRATORY PROTECTION IN CONFINED OR

DRYDEN OIL INC -- DRYDENE NON-DETERGENT MOTOR OILS

ENCLOSED SPACES, IF NEEDED.
Ventilation: USE LOCAL EXHAUST TO CAPTURE VAPOR, MISTS OR FUMES, IF NECESSARY. PROVIDE VENTILATION SUFFICIENT TO PREVENT EXCEEDING RECOMMENDED LIMIT.
Protective Gloves: CHEMICAL RESISTANT GLOVES TO AVOID PROLONGED OR REPEATED SKIN CONTACT
Eye Protection: USE SPLASH GOGGLES OR FACE SHIELD WHEN EYE CONTACT MAY OCCUR
Other Protective Equipment: USE CHEMICAL-RESISTANT APRON OR OTHER IMPERVIOUS CLOTHING, IF NEEDED, TO AVOID CONTAMINATING REGULAR CLOTHING, WHICH COULD RESULT IN PROLONGED OR REPEATED SKIN CONTACT.
Work Hygienic Practices: MINIMIZE BREATHING VAPOR, MIST OR FUMES. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. REMOVE CONTAMINATED CLOTHING, LAUNDER OR DRY CLEAN BEFORE RE-USE. CLEAN SKIN AFTER CONTACT & BEFORE BREAKS & MEALS
Supplemental Safety and Health: EMPTY CONTAINER WARNING: EMPTY CONTAINERS RETAIN RSIDUE & CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS OR OTHER SOURCES OF IGNITION: THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.
==========
Physical/Chemical Properties
==========
HCC: V6
B.P. Text: NOT DETERMINED
Melt/Freeze Pt: =-26.C, -14.8F
M.P/F.P Text: POUR POINT
Vapor Pres: NEGLIGIBLE
Vapor Density: > AIR
Spec Gravity: .8708/.8866 APPROX (H2O=1
PH: NONE PROVIDED
Viscosity: 6.5/19.3 CST @ 100 C
Evaporation Rate & Reference: NEGLIGIBLE
Solubility in Water: NEGLIGIBLE, BELOW 0.1%
Appearance and Odor: CLEAR LIQUID, YELLOW COLOR. MILD, BLAND PETROLEUM ODOR
Percent Volatiles by Volume: NEGLIGIBLE
==========
Reactivity Data
==========
Stability Indicator: YES
Stability Condition To Avoid: AVOID HEAT, OPEN FLAMES
Materials To Avoid: OXIDIZING MATERIALS.
Hazardous Decomposition Products: THERMAL DECOMPOSITION PRODUCTS ARE HIGHLY DEPENDENT ON THE COMBUSTION CONDITIONS. A COMPLEX MISTURE OF AIRBORNE SOLID, LIQUID, PARTICULATES AND GASES WILL EVOLVE WHEN THIS MATERIAL UNDERGOES COMBUSTION.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: WILL NOT OCCUR
==========
Toxicological Information
==========
Toxicological Information: EXPOSURE LIMIT FOR TOTAL PRODUCT: 5 MG/M3 OIL MIST FOR AN 8-HOUR WARK DAY. BASIS OSHA 29 CFR 1910.1000.
==========
Ecological Information
==========

DRYDEN OIL INC -- DRYDENE NON-DETERGENT MOTOR OILS

Ecological: NO DATA PROVIDED BY MANUFACTURER.
==========
MSDS Transport Information
==========
Transport Information: DOT IDENTIFICATION NUMBER: NOT REGULATED.
==========
Regulatory Information
==========
Sara Title III Information: TOXIC CHEMICAL RELEASE REPORTING, EPA REGULATION 40 CFR 372 (SECTION 313): N/A. THREASHOLD PLANNING QUANTITY (TPQ), EPA REGULATION 40 CFR 355 EXTREMELY HAZARDOUS SUBSTANCES (SARA SECTIONS 301-304): NO NE.
Federal Regulatory Information: CERCLA HAZARDOUS SUBSTANCES: NONE KNOWN. IF THIS PRODUCT IS ACCIDENTALLY SPILLED, IT IS NOT SUBJECT TO ANY SPECIAL REPORTING UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA). WE RECOMMEND YOU CONTACT LOCAL AUTHORITIES TO DETERMINE IF THERE MAY BE OTHER LOCAL REPORTING REQUIREMENTS. US TSCA INVENTORY: ALL COMPONENTS OF THIS MATERIAL ARE ON THE US TSCA INVENTOR Y. DLA-: THIS PRODUCT MAY BE CLASSIFIED AS AN OIL UNDER SECTION 311 OF THE CLEAN WATER ACT AND T HEREFORE ANY SPILL AFFECTING SURFACE WATERS MAY REQUIRE NOTIFICATION OF THE NATIONAL RESPONSE CENTER, 800-424-8802.
State Regulatory Information: NO DATA PROVIDED BY MANUFACTURER.
==========
Other Information
==========
Other Information: EMPTY CONTAINERS: DO NOT ATTEMPT TO CLEAN SINCE RESIDUE IS DIFFICULT TO REMOVE. EMPTY DRUMS SHOULD BE COMPLETELY DRAINED, PROPERLY BUNGED AND PROMPTLY RETURNED TO A DRUM RECONDITIONER. ALL OTHER CONTAINERS SHOULD BE DISPOSED OF IN AN ENVIRONMENTALLY SAFE MANNER AND IN ACCORDANCE WITH GOVERNMENTAL REGULATIONS. NFPA HAZARD IDENTIFICATION: HEALTH-1, FLAMMABILITY-1, REACTIVITY-0.
==========
Transportation Information
==========
Responsible Party Cage: 40310
Trans ID NO: 155537
Product ID: DRYDENE NON-DETERGENT MOTOR OILS, SAE 10, 20, 30, 40 ,50.
MSDS Prepared Date: 01/29/1997
Review Date: 12/08/2000
MFN: 2
Net Unit Weight: 1.8 LBS
Multiple KIT Number: 0
Unit Of Issue: QT
Container QTY: 1
Type Of Container: CAN
Additional Data: NOT REGULATED PER MSDS.
==========
Detail DOT Information
==========
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
==========
Detail IMO Information

DRYDEN OIL INC -- DRYDENE NON-DETERGENT MOTOR OILS

==========
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
==========
Detail IATA Information
==========
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
==========
Detail AFI Information
==========
AFI PSN Code: ZZZ
AFI Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
==========
HAZCOM Label
==========
Product ID: DRYDENE NON-DETERGENT MOTOR OILS, SAE 10, 20, 30, 40 ,50.
Cage: 40310
Company Name: DRYDEN OIL CO INC
Street: 9300 PULASKI HWY
City: BALTIMORE MD
Zipcode: 21220
Health Emergency Phone: 800-777-1466
Label Required IND: Y
Date Of Label Review: 12/08/2000
Status Code: A
Origination Code: F
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: CAUTION
Respiratory Protection IND: NO
Health Hazard: Slight
Contact Hazard: Slight
Fire Hazard: Slight
Reactivity Hazard: None
Hazard And Precautions: SKIN: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE SKIN IRRITATION. EYE: MAY CAUSE EYE IRRITATION. INGESTION: RELATIVELY NON-TOXIC.
==========

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Haltermann
Products

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identification

Product Name:	Rocket Propellant (NSN: 9130-00-543-7429)
Customer Product Name:	RP-1, MIL-25576E
Product Number(s):	HF 0229
Contract Number:	SP0600-09-D-1513
CAGE Code:	8A906
Synonyms:	Kerosene
CAS Number:	8008-20-6

Company Identification

Company Name:	Haltermann Products	
Company Address:	15635 Jacintoport Blvd. Houston, TX 77015 USA	
Product Information:	1-800-969-2542	Fax: 281-457-1469
24 HR Emergency Assistance:	832-376-2026	
24 HR CHEMTREC:	800-424-9300	

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Listing

Chemical Name	CAS #	Amount
DISTILLATES, PETROLEUM, HYDROTREATED LIGHT	64742-47-8	70-100%
SOLVENT NAPHTHA, PETROLEUM, MEDIUM ALIPHATIC	64742-88-7	0-30%

(See section 8 for exposure guidelines)

(See section 15 for regulatory information)

COMPOSITION COMMENT:

Kerosene [CAS # 8008-20-6] may contain 0-10 % Naphthalene (CAS # 91-20-3).

HAZARDS DISCLOSURE:

This product contains hazardous materials as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200.

As defined under SARA 311 and 312, this product contains materials that are designated as the following hazards: Acute Chronic Fire

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Flammable liquid.
May be harmful if ingested or inhaled.
Irritating to eyes and skin.
May be harmful to aquatic organisms.

NFPA Rating:

Health:	1
Flammability:	2
Reactivity:	0

POTENTIAL HEALTH EFFECTS

EYE:
Irritating, and may injure eye tissue if not removed promptly.

SKIN:
May cause skin irritation.

INHALATION:
Inhalation of this material may cause cough, sore throat, dizziness, drowsiness, headache, nausea, and unconsciousness.

INGESTION:
Substance is harmful if swallowed. May cause abdominal pain, labored breathing, nausea, vomiting, and unconsciousness.

CHRONIC EFFECTS:

Long term or repeated exposure to this material may have effects on the central nervous system and defat the skin.

Naphthalene may have effects on the blood resulting in chronic haemolytic anemia. Napthalene may have effects on the eye resulting in cataracts.

SUBCHRONIC EFFECTS:

Exposure to this material at high levels may cause effects on the CNS and may lead to a lowering of consciousness.

Naphthalene may cause effects on the blood resulting in lesions of blood cells (hemolysis).

CARCINOGENICITY INFORMATION:
Cancer hazard.

Naphthalene is listed as a possible carcinogen by NTP and IARC (Category 2B).

REPRODUCTIVE EFFECTS:

No information available.

TARGET ORGANS:
Target organs include: eyes, skin, respiratory system, GI tract, central nervous system.

4. FIRST AID MEASURES

EYE CONTACT FIRST AID:
Immediately flush with plenty of water.
After initial flushing, remove contacts if possible and continue flushing.
Get medical attention if irritation develops.

SKIN CONTACT FIRST AID:

Remove contaminated clothing and shoes. Thoroughly wash (or discard) clothing and shoes before reuse.
Wash affected area immediately with large amounts of soap and water.
Seek medical attention if irritation develops.

INHALATION FIRST AID:
If inhaled, remove to fresh air.
If not breathing, give artificial respiration or give oxygen by trained personnel.
Get medical attention if cough or other symptoms develop.

INGESTION FIRST AID:
If swallowed, do NOT induce vomiting. Contact physician or poison control center immediately.

NOTES TO PHYSICIAN:

Swallowing this liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.

The symptoms of chemical pneumonitis often do not become manifest until several hours or even a few days have passed. Careful monitoring is recommended.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	152-157 °F	66.7-69.4 °C
AUTOIGNITION TEMPERATURE:	N.D.	
FLAMMABLE LIMITS:	N.D.	

N.D. - No data available

EXTINGUISHING MEDIA:

Use water spray to cool fire exposed containers.

Use carbon dioxide, dry chemicals, alcohol-resistant foam, or water spray when fighting fires involving this material.

FIRE FIGHTING INSTRUCTIONS:

Evacuate non-emergency personnel to a safe area.

As in any fire, wear self-contained breathing apparatus pressure-demand (OSHA/NIOSH approved or equivalent) and full protective gear.

COMBUSTION PRODUCTS:

In the case of fire, oxides of carbon, hydrocarbons, fumes and smoke may be produced.

MISCELLANEOUS:

The vapor is heavier than air and may travel along the ground; distant ignition is possible.

6. ACCIDENTAL RELEASE MEASURES

SAFEGUARDS (PERSONNEL):

Eliminate all sources of ignition - heat, sparks, flame, electricity, impact and friction.
Wear appropriate personal protective equipment.
Ventilate spill area.

INITIAL CONTAINMENT:

Eliminate all sources of ignition - heat, sparks, flame, electricity, and impact.
Collect leaking and spilled material in sealable containers as far as possible.
Absorb remaining liquid with inert material and remove to safe place.

LARGE SPILLS PROCEDURE:

Stop the source of the leak or release.

Clean up spills as soon as possible, observing precautions in Exposure Controls/Personal Protection section.
Contain liquid to prevent further contamination of soil, surface water, or groundwater.

MISCELLANEOUS:

Notify local, state, and federal authorities as required by law.

7. HANDLING AND STORAGE

HANDLING (PERSONNEL):

Ground and bond containers when transferring material.
Do not inhale or ingest.
Avoid contact with eyes, skin, and clothing.
Wash thoroughly after handling.

HANDLING (PHYSICAL ASPECTS):
Avoid contact with strong oxidizing agents.
Eliminate all sources of ignition - heat, sparks, flame, electricity, impact and friction.

STORAGE PRECAUTIONS:
Store in a cool, dry place with good ventilation.
Keep away from heat, sparks, and flame.

MISCELLANEOUS:
Prevent build up of electrostatic charges (by grounding, etc).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Use only with adequate ventilation.

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

EYE/FACE PROTECTION REQUIREMENTS:
Chemical goggles are recommended to avoid contact with eyes.

SKIN PROTECTION REQUIREMENTS:
Where contact is likely, wear chemical resistant gloves, a chemical suit, rubber boots, and chemical safety goggles.

RESPIRATORY PROTECTION REQUIREMENTS:

When there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection.

EXPOSURE GUIDELINES:

Compound Name	CAS #	Exposure Guidelines
DISTILLATES, PETROLEUM, HYDROTREATED LIGHT	64742-47-8	OSHA TWA: 500 ppm (as Petroleum Distillates - Naphtha, Rubber Solvents)
SOLVENT NAPHTHA, PETROLEUM, MEDIUM ALIPHATIC	64742-88-7	OSHA TWA: 500 ppm (as Petroleum Distillates - Naphtha, Rubber Solvents)
KEROSENE	8008-20-6	ACGIH TWA: 200 mg/m3
NAPHTHALENE	91-20-3	ACGIH TWA: 10 ppm; ACGIH STEL: 15 ppm; OSHA TWA: 10 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Liquid
Odor: Mild

Boiling Point:	170 - 365	°F
Gravity:	33 - 42	°API

10. STABILITY AND REACTIVITY

STABILITY:
This compound is stable at ambient conditions.

POLYMERIZATION:
Hazardous polymerization will not occur.

INCOMPATIBILITY WITH OTHER MATERIALS:
Avoid contact with strong oxidizing agents.

DECOMPOSITION:
In the case of a fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.

CONDITIONS TO AVOID:
Keep away from all sources of ignition including static electricity.
Prevent build-up of electrostatic charge by grounding.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

Compound Name	CAS #	TEST - SPECIES - RESULT
DISTILLATES, PETROLEUM, HYDROTREATED LIGHT	64742-47-8	N.D.
SOLVENT NAPHTHA, PETROLEUM, MEDIUM ALIPHATIC	64742-88-7	Oral LD50 - Rat: >2000 mg/kg
KEROSENE	8008-20-6	Oral LD50 - Rat: >5 g/kg
NAPHTHALENE	91-20-3	Oral LD50 - Rat: 2.6 g/kg

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL HAZARDS:
This material may be harmful to the environment.
Kerosene, naphthalene, and hydrotreated light petroleum distillates are harmful to aquatic organisms.

According to the National Library of Medicine's Hazardous Substances Data Bank:

"Kerosene is a mixture of hydrocarbons, chiefly C10-C16 alkanes, and a typical analysis includes the identification of n-dodecane, alkyl benzene derivatives, naphthalene, and tetrahydronaphthalenes. It is used as a fuel and solvent. If released to soil, kerosene is expected to biodegrade under both aerobic and anaerobic conditions. Some components of kerosene may adsorb very strongly to soil. Kerosene may rapidly volatilize from both moist and dry soil although its expected strong adsorption may significantly attenuate the rate of this process. If released to water, kerosene is expected to biodegrade under both aerobic and anaerobic conditions. Some components of kerosene may significantly bioconcentrate in fish and aquatic organisms and strongly adsorb to sediment and suspended organic matter. The estimated half-life for volatilization of kerosene from a model river is 3-6 hrs while that from a model lake is >130 days; the former model does not account for the attenuating effect of adsorption. If released to the atmosphere, kerosene may undergo oxidation by a gas-phase reaction with photochemically produced hydroxyl radicals with an estimated half-life of 2-3.4 days."

ECOLOGICAL DATA:

Compound Name	CAS #	TEST-SPECIES-RESULTS
SOLVENT NAPHTHA, PETROLEUM, MEDIUM ALIPHATIC	64742-88-7	LC 50 - Fish: >1000 mg/L; LC 50 - Algae: >2000 mg/L
NAPHTHALENE	91-20-3	LC 50 - Oncorhynchus Gorbuscha: 1.4mg/L/96 Hr; EC 50 - Pandalus Goniurus: 2.2 mg/L/96 Hr; EC 50 - Pimephales Promelas: 6.35 mg/L/48 Hr

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:

Recover or recycle if possible.

It is the responsibility of the waste generator to determine the physical characteristics and toxicity of the material generated in order to properly designate the waste classification and disposal methods in compliance with applicable regulations.

Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

CONTAMINATED MATERIALS:

Treat or dispose of contaminated material in accordance with all local, state/provincial, and national requirements.

CONTAINER DISPOSAL:

Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

14. TRANSPORTATION INFORMATION

PRODUCT LABEL: RP-1, MIL-25576E
D.O.T. SHIPPING NAME: Kerosene
UN NUMBER: UN 1223
PRODUCT RQ (LBS): 1000

D.O.T. PLACARD: Combustible
PACKAGE CLASS: III

15. REGULATORY INFORMATION

REGULATORY DISCLOSURES:

This material or all of its components are listed on the Inventory of Existing Chemical Substances under the Toxic Substance Control Act (TSCA) or are exempt from reporting.

This material or all of its components are listed on the Canadian Domestic Substances List (DSL) or Non-Domestic Substances List (NDSL).

FEDERAL REGULATORY LISTS:

Compound Name	CAS #	SARA 313	CERCLA	RCRA	CAA
HYDROTREATED LIGHT	64742-47-8	N.L	N.L	N.L	N.L
PETROLEUM, MEDIUM ALIPHATIC	64742-88-7	N.L	N.L	N.L	N.L
KEROSENE	8008-20-6	N.L	N.L	N.L	N.L
NAPHTHALENE	91-20-3	313	100	U165	N.L

N.L. - Not listed on regulatory list

CALIFORNIA REGULATIONS:

WARNING: This product contains substances known to the State of California to cause cancer at levels which would require a warning under the statute.

This product contains no listed substances known to the State of California to cause birth defects or other reproductive harm, at levels which would require a warning under the statute.

Compound Name	CAS #	TYPE OF TOXICITY	AMOUNT
NAPHTHALENE	91-20-3	CANCER	0-10%

PENNSYLVANIA REGULATIONS:

The following product components are cited on the Pennsylvania Hazardous Substances List and/or the Pennsylvania Environmental Hazardous Substances List, and are present at levels which require reporting.

To the best of our knowledge, this product does not contain any components cited on the Pennsylvania Special Hazardous Substances List.

Compound Name	CAS #	LISTING	AMOUNT
KEROSENE	8008-20-6	PA RTK	100%
NAPHTHALENE	91-20-3	PA RTK	0-10%

ADDITIONAL STATE REGULATIONS:

Components of this product are found on the following state lists.

Compound Name	CAS #	STATE LISTS
KEROSENE	8008-20-6	FL, MA, NJ, RI

NAPHTHALENE	91-20-3	DE, FL, MA, NJ, NY, RI, WI

CANADIAN REGULATIONS:

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) classification for this product is:
B3 - Combustible liquid with a flash point between 37.8° C and 93.3° C.
D2A - Contains material which is a possible, probable or known human carcinogen according to classifications by IARC or ACGIH.

D2B - Eye or skin irritant.

Compound Name	CAS #	REPORTING LIMIT (%)
DISTILLATES, PETROLEUM, HYDROTREATED LIGHT	64742-47-8	N.L.
SOLVENT NAPHTHA, PETROLEUM, MEDIUM ALIPHATIC	64742-88-7	1.0
KEROSENE	8008-20-6	1.0
NAPHTHALENE	91-20-3	0.1

Refer elsewhere in the MSDS for specific warnings and safe handling information.
Refer to the employer's workplace education program.

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

REASON FOR ISSUE: New MSDS
PREPARED BY: PH
APPROVED BY: MO
TITLE: Director of Manufacturing and Supply Chain
APPROVAL DATE: February 17, 2010
SUPERSEDES DATE: New

****

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END OF MSDS

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ANSUL®
ANSUL FIRE PROTECTION
MARINETTE, WI 54143-2542

MATERIAL SAFETY DATA SHEET

ANSULITE 6% AFFF (AFC-5)
QUICK IDENTIFIER (In Plant Common Name)

Manufacturer's Name:	ANSUL FIRE PROTECTION, WORMALD U.S., INC.	Emergency Telephone No.:	(715) 735-7411
Address:	One Stanton Street, Marinette, WI 54143-2542	Other Information Calls:	Same
Prepared By:	Safety and Health Department	Date Prepared:	June 1, 1989

SECTION 1 — IDENTITY

Common Name: (used on label) (Trade Name and Synonyms)	ANSULITE 6% AFFF (AFC-5)	CAS No.:	N/A
Chemical Name:	N/A This is a Mixture	Chemical Family:	Mixture
Formula:	N/A		

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (chemical and common name(s)):	%	CAS No.	ACGIH TLV	Acute Toxicity Data
Diethylene Glycol Monobutyl Ether (Butyl Carbitol)	18.5	112-34-5	NDA	Dermal LD_{50} (rat) 4120 mg/kg Oral LD_{50} (rat) 8560 mg/kg

PART B — OTHER INGREDIENTS

Other Component(s) (chemical and common name(s)):	%	CAS No.	Acute Toxicity Data
Proprietary mixture of hydrocarbon surfactants, fluorosurfactants, and inorganic salts not otherwise specified; and water.	81.5	N/A	NDA

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point:	97 °C			Specific Gravity (H_2O = 1):	1.02	Vapor Pressure (mm Hg):	Not Determined
Percent Volatile by Volume (%):	Approx. 95	Vapor Density (Air = 1):	1	Evaporation Rate (Butyl Acetate = 1):	0.48		
Solubility in Water:	100%			Reactivity in Water:	Unreactive		
Appearance and Odor:	Clear straw colored liquid, mild sweet odor.						
Flash Point:	None to boiling	Flammable Limits in Air % by Volume:	N/A	Extinguisher Media:	N/A	Auto-Ignition Temperature:	N/A
Special Fire Fighting Procedures:	NONE – THIS IS AN EXTINGUISHING AGENT						
Unusual Fire and Explosion Hazards:	None						

SECTION 4 – PHYSICAL HAZARDS

Stability:	Unstable ☐ Stable ☒	Conditions to Avoid:	N/A
Incompatibility (Materials to Avoid):	Reactive metals, electrically energized equipment, any materials reactive with water.		
Hazardous Decomposition Products:	None known		
Hazardous Polymerization:	May Occur ☐ Will Not Occur ☒	Conditions to Avoid:	N/A

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value:	None established by ACGIH or OSHA.
Routes of Entry: Eye Contact:	May cause mild transient irritation.
Skin Contact:	May cause mild transient irritation.
Inhalation:	Inhalation is not anticipated to be a problem.
Ingestion:	Irritating to mucous membranes. Large oral doses could produce narcosis.
Signs and Symptoms: Acute Overexposure:	Irritation of the eyes, skin and mucous membranes.
Signs and Symptoms: Chronic Overexposure:	Delayed kidney injury, possible liver damage.
Medical Conditions Generally Aggravated by Exposure:	Diseases of the kidney and liver.
Chemical Listed as Carcinogen or Potential:	National Toxicology Program: Yes ☐ No ☒ — I.A.R.C. Monographs: Yes ☐ No ☒ — OSHA: Yes ☐ No ☒

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Flush with large amounts of water; if irritation persists, seek Medical attention.
Skin Contact:	Wash with soap and water; if irritation persists, seek Medical attention.
Inhalation:	Remove victim to fresh air. Seek Medical attention if discomfort continues.
Ingestion:	If patient is conscious, give large amounts of water and induce vomiting. Seek Medical help.

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Not normally necessary.		
Ventilation:	Local Exhaust: N/A	Mechanical (General):	Recommended
Protective Gloves:	N/A	Eye Protection:	Chemical goggles recommended.
Other Protective Clothing or Equipment:	Eye wash and safety showers are good safety practice.		

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage:	Store in original container. Note incompatibility information in Section 4.
Other Precautions:	Do not mix agents. Avoid skin and eye contact. Avoid ingestion.
Steps to be Taken in Case Material is Released or Spilled:	Rinse floor thoroughly with water as material is slippery. Prevent material from reaching sewers or waterways to avoid nuisance foaming.
Waste Disposal Methods:	Dispose of in compliance with local, state, and federal regulations.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS

HAZARD INDEX:	
4 Severe Hazard	1 HEALTH
3 Serious Hazard	
2 Moderate Hazard	0 FLAMMABILITY
1 Slight Hazard	0 REACTIVITY
0 Minimal Hazard	

N/A = Not Applicable NDA = No Data Available

ANSUL and ANSULITE are registered trademarks.

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBIL DTE OIL HEAVY MEDIUM**
Product Description: Base Oil and Additives
Product Code: 201560501590, 600163-00, 970172
Intended Use: Turbine oil

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1900.1200.

PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS

No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
2,6-DI-TERT-BUTYLPHENOL	128-39-2	0.1 - < 1%	H315, H319(2A), H400(M factor 1), H410(M factor 1)

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Sulfur oxides, Smoke, Fume, Incomplete combustion products, Aldehydes, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >223°C (433°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways,

sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.87
Flammability (Solid, Gas): N/A
Flash Point [Method]: >223°C (433°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F) [Estimated]
Decomposition Temperature: N/D
Vapor Density (Air = 1): > 2 at 101 kPa [Estimated]
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]
Evaporation Rate (n-butyl acetate = 1): N/D

pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]
Solubility in Water: Negligible
Viscosity: 67.9 cSt (67.9 mm2/sec) at 40 °C | 8.7 cSt (8.7 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION
Freezing Point: N/D
Melting Point: N/A
Pour Point: -27°C (-17°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on

	physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

Contains:
Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY
Material -- Not expected to be harmful to aquatic organisms.

MOBILITY
Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY
Biodegradation:
Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL
Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, IECSC, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	68649-42-3	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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SAFETY DATA SHEET

Section 1. Identification

Product name Brayco 717

SDS # 454447

Historic SDS #: 27012

Code 454447-US03

Relevant identified uses of the substance or mixture and uses advised against

Product use Hydraulic fluid
For specific application advice see appropriate Technical Data Sheet or consult our company representative.

Supplier

Castrol Industrial North America, Inc.
150 W. Warrenville Road
Naperville, IL 60563
Product Information: +1-877-641-1600

BP Lubricants USA Inc.
1500 Valley Road
Wayne, NJ 07470
Telephone: (973) 633-2200

EMERGENCY SPILL INFORMATION: 1 (800) 424-9300 CHEMTREC (USA)

Section 2. Hazards identification

OSHA/HCS status This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture Not classified.

GHS label elements

Signal word No signal word.

Hazard statements No known significant effects or critical hazards.

Precautionary statements

Prevention Not applicable.

Response Not applicable.

Storage Not applicable.

Disposal Not applicable.

Hazards not otherwise classified
Defatting to the skin.
Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency.
See 'Notes to physician' under First-Aid Measures, Section 4 of this Safety Data Sheet.

Section 3. Composition/information on ingredients

Highly refined base oil and additives

Substance/mixture Mixture

Ingredient name	CAS number	%
Distillates (petroleum), hydrotreated, light naphthenic	64742-53-6	≥25 - <50
Distillates (petroleum), hydrotreated light paraffinic	64742-55-8	≥25 - <50
Distillates (Petroleum) hydrotreated light	64742-47-8	≥5 - <10
Distillates (petroleum), hydrotreated, light naphthenic	64742-53-6	≥5 - <10
Distillates (Petroleum) hydrotreated light	64742-47-8	≥5 - <10

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Check for and remove any contact lenses. Get medical attention.

Skin contact Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if symptoms occur.

Inhalation If inhaled, remove to fresh air. Get medical attention if symptoms occur.

Ingestion Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Protection of first-aiders No action shall be taken involving any personal risk or without suitable training.

Most important symptoms/effects, acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician Treatment should in general be symptomatic and directed to relieving any effects.
Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discolored and extremely painful with extensive subcutaneous necrosis.
Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimize tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

Specific treatments No specific treatment.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media In case of fire, use foam, dry chemical or carbon dioxide extinguisher or spray.

Unsuitable extinguishing media Do not use water jet.

Specific hazards arising from the chemical In a fire or if heated, a pressure increase will occur and the container may burst.

Section 5. Fire-fighting measures

Hazardous combustion products

Combustion products may include the following:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters

Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment. Floors may be slippery; use care to avoid falling.

For emergency responders

If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill

Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill

Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Store and use only in equipment/containers designed for use with this product. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Distillates (petroleum), hydrotreated, light naphthenic	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993
Distillates (petroleum), hydrotreated light paraffinic	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction **ACGIH (United States).** TWA: 5 mg/m³ 8 hours. Form: Mineral oil, mist **OSHA (United States).** TWA: 5 mg/m³ 8 hours. Form: Mineral oil, mist **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993
Distillates (Petroleum) hydrotreated light	**ACGIH TLV (United States). Absorbed through skin.** TWA: 200 mg/m³, (as total hydrocarbon vapor) 8 hours. Issued/Revised: 1/2003
Distillates (petroleum), hydrotreated, light naphthenic	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Mineral oil, mist **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993 Form: Oil mist, mineral TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993
Distillates (Petroleum) hydrotreated light	**OSHA PEL (United States). Absorbed through skin.** STEL: 10 mg/m³ 15 minutes. Form: Mist TWA: 5 mg/m³ 8 hours. Form: Mist **ACGIH TLV (United States). Absorbed through skin.** TWA: 200 mg/m³, (as total hydrocarbon vapor) 8 hours. Issued/Revised: 1/2003

While specific OELs for certain components may be shown in this section, other components may be present in any mist, vapor or dust produced. Therefore, the specific OELs may not be applicable to the product as a whole and are provided for guidance only.

Appropriate engineering controls

All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained. Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards.
Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.
The final choice of protective equipment will depend upon a risk assessment. It is

Section 8. Exposure controls/personal protection

important to ensure that all items of personal protective equipment are compatible.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Safety glasses with side shields.

Skin protection

Hand protection

Wear protective gloves if prolonged or repeated contact is likely. Wear chemical resistant gloves. Recommended: Nitrile gloves. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/ manufacturer and with a full assessment of the working conditions.

Consult your supervisor or Standard Operating Procedure (S.O.P) for special handling instructions.

Body protection

Use of protective clothing is good industrial practice.
Cotton or polyester/cotton overalls will only provide protection against light superficial contamination that will not soak through to the skin. Overalls should be laundered on a regular basis. When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is a risk of splashing) then chemical resistant aprons and/or impervious chemical suits and boots will be required.
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.
The correct choice of respiratory protection depends upon the chemicals being handled, the conditions of work and use, and the condition of the respiratory equipment. Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Section 9. Physical and chemical properties

Appearance

Physical state Liquid.

Color Colorless.

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point Not available.

Boiling point Not available.

Flash point Open cup: 104°C (219.2°F) [Cleveland.]

Evaporation rate Not available.

Flammability (solid, gas) Not applicable. Based on - Physical state

Section 9. Physical and chemical properties

Lower and upper explosive (flammable) limits	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Density	<1000 kg/m³ (<1 g/cm³) at 15.6°C
Solubility	insoluble in water.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Kinematic: 25 mm^2/s (25 cSt) at 40°C

Section 10. Stability and reactivity

Reactivity	No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	No specific data.
Incompatible materials	Reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Aspiration hazard

Name	Result
Distillates (petroleum), hydrotreated, light naphthenic	ASPIRATION HAZARD - Category 1
Distillates (petroleum), hydrotreated light paraffinic	ASPIRATION HAZARD - Category 1
Distillates (Petroleum) hydrotreated light	ASPIRATION HAZARD - Category 1
Distillates (petroleum), hydrotreated, light naphthenic	ASPIRATION HAZARD - Category 1
Distillates (Petroleum) hydrotreated light	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact	No known significant effects or critical hazards.
Skin contact	No known significant effects or critical hazards.
Inhalation	Vapor inhalation under ambient conditions is not normally a problem due to low vapor pressure.
Ingestion	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact No specific data.

Section 11. Toxicological information

Skin contact	Adverse symptoms may include the following: irritation dryness cracking
Inhalation	No specific data.
Ingestion	No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	Not available.
Potential delayed effects	Not available.

Long term exposure

Potential immediate effects	Not available.
Potential delayed effects	Not available.

Potential chronic health effects

General	No known significant effects or critical hazards.
Carcinogenicity	No known significant effects or critical hazards.
Mutagenicity	No known significant effects or critical hazards.
Teratogenicity	No known significant effects or critical hazards.
Developmental effects	No known significant effects or critical hazards.
Fertility effects	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

No testing has been performed by the manufacturer.

Persistence and degradability

Expected to be biodegradable.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC})	Not available.
Mobility	Non-volatile. Liquid. insoluble in water.

Other adverse effects	No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods

The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-
Transport hazard class(es)	-	-	-	-
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.
Additional information	-	-	-	-

Special precautions for user

Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not available.

Section 15. Regulatory information

U.S. Federal regulations

United States inventory (TSCA 8b)

All components are listed or exempted.

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 311/312

Classification

Not applicable.

SARA 313

Form R - Reporting requirements

This product does not contain any hazardous ingredients at or above regulated thresholds.

Supplier notification

This product does not contain any hazardous ingredients at or above regulated thresholds.

State regulations

Section 15. Regulatory information

Massachusetts	The following components are listed: MINERAL OIL, PETROLEUM DISTILLATES, HYDROTREATED LIGHT NAPHTHENIC; MINERAL OIL, PETROLEUM DISTILLATES, HYDROTREATED LIGHT NAPHTHENIC; MINERAL OIL, PETROLEUM DISTILLATES, HYDROTREATED LIGHT PARAFFINIC
New Jersey	The following components are listed: MINERAL OIL (UNTREATED and MILDLY TREATED); MINERAL OIL (UNTREATED and MILDLY TREATED); MINERAL OIL (UNTREATED and MILDLY TREATED)
Pennsylvania	None of the components are listed.
California Prop. 65	No products were found.

Other regulations

Australia inventory (AICS)	All components are listed or exempted.
Canada inventory	All components are listed or exempted.
China inventory (IECSC)	All components are listed or exempted.
Japan inventory (ENCS)	All components are listed or exempted.
Korea inventory (KECI)	All components are listed or exempted.
Philippines inventory (PICCS)	All components are listed or exempted.
Taiwan inventory (CSNN)	All components are listed or exempted.
REACH Status	The company, as identified in Section 1, sells this product in the EU in compliance with the current requirements of REACH.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	1
Flammability	1
Physical hazards	0
Personal protection	X

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

National Fire Protection Association (U.S.A.)

History

Date of issue/Date of revision	10/07/2015.
Date of previous issue	07/08/2015.
Key to abbreviations	ACGIH = American Conference of Industrial Hygienists ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor CAS Number = Chemical Abstracts Service Registry Number GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) OEL = Occupational Exposure Limit SDS = Safety Data Sheet

Section 16. Other information

STEL = Short term exposure limit
TWA = Time weighted average
UN = United Nations
UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.
Varies = may contain one or more of the following 101316-69-2, 101316-70-5, 101316-71-6, 101316-72-7, 64741-88-4, 64741-89-5, 64741-95-3, 64741-96-4, 64741-97-5, 64742-01-4, 64742-44-5, 64742-45-6, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-57-0, 64742-58-1, 64742-62-7, 64742-63-8, 64742-64-9, 64742-65-0, 64742-70-7, 72623-85-9, 72623-86-0, 72623-87-1, 74869-22-0, 90669-74-2

Indicates information that has changed from previously issued version.

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from BP Group.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken. You can contact the BP Group to ensure that this document is the most current available. Alteration of this document is strictly prohibited.

Section 1. Identification

Product name	Brayco Micronic 781-2
SDS #	459681
Historic SDS #:	27064
Code	459681-US03

Relevant identified uses of the substance or mixture and uses advised against

Product use	Hydraulic fluid/Gear lubricant For specific application advice see appropriate Technical Data Sheet or consult our company representative.
Manufacturer	Castrol Industrial North America, Inc. 150 W. Warrenville Road Naperville, IL 60563
Supplier	Castrol Industrial North America, Inc. 150 W. Warrenville Road Naperville, IL 60563 Product Information: +1-877-641-1600
EMERGENCY SPILL INFORMATION:	1 (800) 424-9300 CHEMTREC (USA)

Section 2. Hazards identification

OSHA/HCS status	This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	Not classified.

GHS label elements

Signal word	No signal word.
Hazard statements	No known significant effects or critical hazards.
Precautionary statements	
Prevention	Not applicable.
Response	Not applicable.
Storage	Not applicable.
Disposal	Not applicable.
Hazards not otherwise classified	Defatting to the skin. Note: High Pressure Applications Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. See 'Notes to physician' under First-Aid Measures, Section 4 of this Safety Data Sheet.

Section 3. Composition/information on ingredients

Highly refined mineral oil and additives Poly-alpha-olefin

Substance/mixture Mixture

Ingredient name	CAS number	%
Base oil - highly refined	Varies	≥50 - <75
Dec-1-ene, dimers, hydrogenated	68649-11-6	≥10 - <25
Base oil - highly refined	Varies	≥10 - <25
Calcium alkylarylsulfonate	Proprietary	≥1 - <3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Check for and remove any contact lenses. Get medical attention.

Skin contact Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if symptoms occur.

Inhalation If inhaled, remove to fresh air. Get medical attention if symptoms occur.

Ingestion Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Protection of first-aiders No action shall be taken involving any personal risk or without suitable training.

Most important symptoms/effects, acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician Treatment should in general be symptomatic and directed to relieving any effects.

Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discolored and extremely painful with extensive subcutaneous necrosis.
Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimize tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

Specific treatments No specific treatment.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media In case of fire, use foam, dry chemical or carbon dioxide extinguisher or spray.

Unsuitable extinguishing media Do not use water jet.

Specific hazards arising from the chemical In a fire or if heated, a pressure increase will occur and the container may burst.

Section 5. Fire-fighting measures

Hazardous combustion products	Combustion products may include the following: carbon dioxide carbon monoxide sulfur oxides
Special protective actions for fire-fighters	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment. Floors may be slippery; use care to avoid falling.
For emergency responders	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill	Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	Put on appropriate personal protective equipment (see Section 8).
Advice on general occupational hygiene	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Store and use only in equipment/containers designed for use with this product. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Base oil - highly refined	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993
Base oil - highly refined	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993

While specific OELs for certain components may be shown in this section, other components may be present in any mist, vapor or dust produced. Therefore, the specific OELs may not be applicable to the product as a whole and are provided for guidance only.

Appropriate engineering controls

All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained. Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards.
Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.
The final choice of protective equipment will depend upon a risk assessment. It is important to ensure that all items of personal protective equipment are compatible.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Safety glasses with side shields.

Skin protection

Hand protection

Wear protective gloves if prolonged or repeated contact is likely. Wear chemical resistant gloves. Recommended: Nitrile gloves. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/ manufacturer and with a full assessment of the working conditions.

Consult your supervisor or Standard Operating Procedure (S.O.P) for special handling instructions.

Section 8. Exposure controls/personal protection

Body protection	Use of protective clothing is good industrial practice. Cotton or polyester/cotton overalls will only provide protection against light superficial contamination that will not soak through to the skin. Overalls should be laundered on a regular basis. When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is a risk of splashing) then chemical resistant aprons and/or impervious chemical suits and boots will be required. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. The correct choice of respiratory protection depends upon the chemicals being handled, the conditions of work and use, and the condition of the respiratory equipment. Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Section 9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Color	Brown.
Odor	Mild.
Odor threshold	Not available.
pH	Not available.
Melting point	Not available.
Boiling point	Not available.
Flash point	Open cup: 165°C (329°F) [Cleveland.]
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable. Based on - Physical state
Lower and upper explosive (flammable) limits	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Density	<1000 kg/m³ (<1 g/cm³) at 16°C
Solubility	insoluble in water.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Kinematic: 100 mm²/s (100 cSt) at 40°C

Section 10. Stability and reactivity

Reactivity	No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	No specific data.

Section 10. Stability and reactivity

Incompatible materials Reactive or incompatible with the following materials: oxidizing materials.

Hazardous decomposition products Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Aspiration hazard

Name	Result
Dec-1-ene, dimers, hydrogenated	ASPIRATION HAZARD - Category 1
Base oil - highly refined	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact No known significant effects or critical hazards.

Skin contact No known significant effects or critical hazards.

Inhalation Vapor inhalation under ambient conditions is not normally a problem due to low vapor pressure.

Ingestion No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact No specific data.

Skin contact Adverse symptoms may include the following:
irritation
dryness
cracking

Inhalation No specific data.

Ingestion No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects Not available.

Potential delayed effects Not available.

Long term exposure

Potential immediate effects Not available.

Potential delayed effects Not available.

Potential chronic health effects

General No known significant effects or critical hazards.

Carcinogenicity No known significant effects or critical hazards.

Mutagenicity No known significant effects or critical hazards.

Teratogenicity No known significant effects or critical hazards.

Developmental effects No known significant effects or critical hazards.

Fertility effects No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Inhalation (vapors)	63.6 mg/l

Section 11. Toxicological information

Section 12. Ecological information

Toxicity

No testing has been performed by the manufacturer.

Persistence and degradability

Not expected to be rapidly degradable.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC})	Not available.
Mobility	Non-volatile.Liquid.insoluble in water.

Other adverse effects No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name		-	-	-
Transport hazard class(es)	-	-	-	-
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.
Additional information	-	-	-	-

Special precautions for user Not available.

Section 14. Transport information

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not available.

Section 15. Regulatory information

U.S. Federal regulations

United States inventory (TSCA 8b)	All components are listed or exempted.

SARA 302/304

Composition/Information on ingredients

No products were found.

SARA 311/312

Classification	Not applicable.

SARA 313

Form R - Reporting requirements	This product does not contain any hazardous ingredients at or above regulated thresholds.
Supplier notification	This product does not contain any hazardous ingredients at or above regulated thresholds.

State regulations

Massachusetts	None of the components are listed.
New Jersey	None of the components are listed.
Pennsylvania	None of the components are listed.
California Prop. 65	**WARNING:** This product contains a chemical known to the State of California to cause cancer. arsenic **WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. lead; Cadmium (Non-pyrophoric)

Other regulations

Australia inventory (AICS)	At least one component is not listed.
Canada inventory	At least one component is not listed.
China inventory (IECSC)	All components are listed or exempted.
Japan inventory (ENCS)	All components are listed or exempted.
Korea inventory (KECI)	At least one component is not listed.
Philippines inventory (PICCS)	All components are listed or exempted.
REACH Status	For the REACH status of this product please consult your company contact, as identified in Section 1.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	1
Flammability	1
Physical hazards	0
Personal protection	**X**

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Section 16. Other information

National Fire Protection Association (U.S.A.)

History

Date of issue/Date of revision	12/02/2014.
Date of previous issue	11/12/2014.
Key to abbreviations	ACGIH = American Conference of Industrial Hygienists ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor CAS Number = Chemical Abstracts Service Registry Number GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) OEL = Occupational Exposure Limit SDS = Safety Data Sheet STEL = Short term exposure limit TWA = Time weighted average UN = United Nations UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.

Indicates information that has changed from previously issued version.

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Ergon Refining, Inc.

HYVOLT II

Material Safety Data Sheet

Date of Preparation: March 28, 2001

Section 1 - Chemical Product and Company Identification

Product Name: Hyvolt II
Chemical Name: Severely Hydrotreated Light Naphthenic Distillate
Chemical Family: Petroleum Distillate
Chemical Formula: Not Applicable
CAS Number: 64742-53-6
Other Designations: Contains Oil
Manufacturer: Ergon Refining, Inc., P.O. Box 309, Vicksburg, MS 39181
Company Contact: Will Poe, Phone (601) 630-8319

EMERGENCY TELEPHONE NUMBERS:
Ergon Refining, Inc. (601) 638-4960 Normal Business Hours
Chemtrec (800) 424-9300 After Business Hours

Section 2 - Composition / Information on Ingredients

A complex combination of hydrocarbons obtained by treating a petroleum fraction with hydrogen in the presence of a catalyst. It consists of hydrocarbons having carbon numbers predominantly in the range of C15 through C30 and produces finished oil with a viscosity near 60 SUS @ 100°F.

Ingredient Name	CAS Number	%
Severely Hydrotreated Light Naphthenic Petroleum Oil	64742-53-6	> 99.7
Butylated Hydroxytoluene (BHT) or 2,6-Di-*tert*-butyl-*p*-cresol (DBPC)	128-37-0	< 0.3

Trace Impurities:

Ingredient	OSHA PEL TWA	OSHA PEL STEL	ACGIH TLV TWA	ACGIH TLV STEL	NIOSH REL TWA	NIOSH REL STEL	NIOSH IDLH
Severely Hydrotreated Light Naphthenic Petroleum Oil	5 mg/m^3 (oil mist)	None estab.	5 mg/m^3 (oil mist)	10 mg/m^3 (oil mist)	none estab.	none estab.	none estab.

Section 3 - Hazards Identification

☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Not Expected to cause a severe emergency hazard.

HMIS	
H	1
F	1
R	0
PPE†	B

†Sec. 8

Potential Health Effects

Primary Entry Routes: Skin
Inhalation: Inhalation of vapors or mist may be irritating to respiratory passages. Prolonged exposure may result in dizziness and nausea.
Eye: Eye contact may result in irritation and redness.
Skin: Prolonged and repeated contact can defat the skin, which may result in dryness, dermatitis, and cracking of the skin.
Ingestion: May result in nausea or stomach discomfort.
Carcinogenicity: Based on OSHA 1910.1200 and IARC study requirements, this product does not require labeling. Meets EU requirement of less than 3% (w/w) DMSO extract for total polycyclic aromatic compound (PAC) using IP-346.
Medical Conditions Aggravated by Long-Term Exposure: Personnel with pre-existing skin disorders should avoid contact with this product.

U.S. Federal Regulatory Information:

SARA 311 Categories:	Immediate (Acute) Health Effects	No
	Delayed (Chronic) Health Effects	No
	Fire Hazard	No
	Sudden Release of Pressure Hazard	No
	Reactivity Hazard	No

EPA/TSCA Inventory: The components of this product are listed on the EPA/TSCA inventory of chemicals.
CAS No. 64742-53-6

Foreign Inventories: The components of this product are listed under the following foreign inventories:
European Union's EINICS No. 265-156-6
Koren's ECL No. KE-12552
Australia's AICS No. 64742-53-6
Canada's DSL No. 64742-53-6

Section 16 - Other Information

NFPA Hazard Rating
- **Health** 1 Slight
- **Fire** 1 Slight
- **Reactivity** 0 Least

Prepared By: Will Poe **Phone:** (601) 630-8319

Supersedes MSDS Dated: May 21, 1999
January 1, 2000 Changes: from 100% to > 99.7 %, in section 2

Disclaimer: Ergon Refining, Inc. believes this information is accurate but not all-inclusive in all circumstances. It is the responsibility of the user to determine suitability of the material for their purposes. No warranty, expressed or implied, is given.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: Clear, Bright Oily Liquid
Odor: Mild Petroleum Odor
Odor Threshold: Not determined
Vapor Pressure: < 1 mm Hg at 20°C
Vapor Density (Air=1): > 5
Specific Gravity (H_2O=1): 0.88

Water Solubility: Nil
Boiling Point: 500-700°F (260-370°C)
Melting Point: - 65°F (- 55°C)
% Volatile: Nil
Evaporation Rate: Not available
pH: Not applicable

Section 10 - Stability and Reactivity

Stability: Stable
Polymerization: Polymerization will not occur.
Chemical Incompatibilities: Strong Oxidizers.
Conditions to Avoid (Stability): Sources of ignition.
Hazardous Decomposition Products: Combustion products include carbon dioxide and carbon monoxide.

Section 11 - Toxicological Information

Acute Studies: Tests on similar materials show a low order of acute oral and dermal toxicity.
Eye Effects: Minimal irritation on contact.
Skin Effects: Practically non-toxic if absorbed. May cause mild irritation with prolonged and repeated exposure.
Acute Oral Effects: Tests on similar materials indicate low order of acute oral toxicity.
Acute Inhalation Effects: Low acute toxicity expected on inhalation.

This product is severely hydrotreated. Severely hydrotreated naphthenic petroleum oils have not been found to be carcinogenic or potential carcinogens.

Section 12 - Ecological Information

Aquatic Release: Advise authorities if product has entered or may enter watercourses or sewer drains.

Section 13 - Disposal Considerations

Follow Federal, State, and Local regulations. Not a RCRA hazardous waste if uncontaminated. If "used", RCRA criteria must be determined. Do not flush to drain / storm sewer. Contract to authorized disposal service. If permitted incineration may be practical. Consider recycling.

Section 14 - Transport Information

Proper Shipping Name: Not regulated by DOT (Contains Oil)
Hazard Class: Not Applicable
DOT ID No.: Not Applicable
DOT Shipping Label: Not regulated by DOT

Section 15 - Regulatory Information

Section 4 - First Aid Measures

Inhalation: Remove to fresh air. Assist breathing if necessary. Seek medical help.
Eye Contact: Wash with water. If irritation or redness persists seek medical help.
Skin Contact: Wash thoroughly with soap and water. Remove contaminated clothing. Reuse only after cleaning.
Ingestion: If swallowed, observe for signs of stomach discomfort or nausea. If symptoms persist, seek medical help.

Section 5 - Fire-Fighting Measures

NFPA

Flash Point: 295°F (145 °C)
Flash Point Method: COC
Burning Rate: Not available
Autoignition Temperature: > 600 °F (> 315 °C)
Lower Explosive Level (LEL): Not determined
Upper Explosive Limit (UEL): Not determined
Flammability Classification: OSHA Class III-B Combustible Liquid
Extinguishing Media: Halon, dry chemical, foam, CO2 and water mist or fog. Water may be used to cool below flash point.
Unusual Fire or Explosion Hazards: Do not use forced stream as this could cause fire to spread.
Combustion Products: Fumes, smoke and carbon monoxide.
Fire-Fighting Instructions and Equipment: Use water to cool containers exposed to flames. Do not enter enclosed or a confined work space without proper protective equipment. Fire fighting personnel should wear respiratory protection (positive pressure if available).

Section 6 - Accidental Release Measures

Spill /Leak Procedures: Stop spill at source if possible without risk. Contain spill. Eliminate sources of ignition. Spill area will be slick. Recover all possible material for reclamation. Use non-flammable absorbent material to pick up remainder of spill.

Section 7 - Handling and Storage

Handling and Storage Precautions: Keep away from flames, sparks or hot surfaces. Never use a torch to cut or weld on or near container. Empty oil containers can contain explosive vapors. NFPA Class IIIB storage. Wash thoroughly after handling.

Work / Hygienic Practices: Wash hands with soap and water before eating, drinking, smoking or use of toilet facilities. Do not use gasoline, solvents, kerosene, or harsh abrasive skin cleaners for washing exposed skin areas. Take a shower after work if general contact occurs. Remove oil-soaked clothing and launder before reuse. Discard contaminated shoes and leather gloves.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Adequate ventilation is required where excessive heating or agitation may occur to maintain concentration below exposure limits.
Eye / Face Protection: Safety glasses or face shield where splashing is possible.
Skin Protection: As needed to prevent repeated skin contact. Solvent resistant gloves should be used if needed.
Respiratory Protection: Not Normally Needed. Respirator should be used in areas where vapor concentrations are excessive due to high temperatures or where oil misting occurs.

APPENDIX O

STORAGE TANK PIPING DIAGRAMS

Piping diagrams for the following tanks were not included because their piping is contained within the equipment:

WI-R40-AST-01, MPS-4, USCG Housing, NOAA BT-1, NOAA BT-2, NOAA BT-3, NOAA BT-4

Spill Flow Direction maps are located in Appendix B.

Documents in this Appendix include the following:

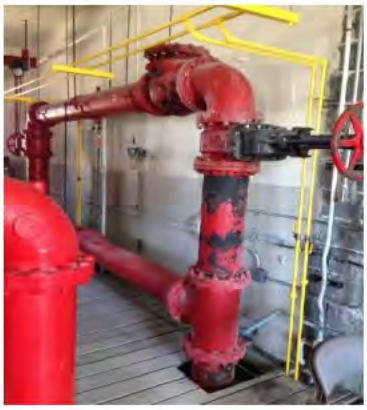
Figure O.1	Piping Diagram AST D-1 and D-2-17
Figure O.2	Piping Diagram AST D-04-14
Figure O.3	Piping Diagram AST D-8 Generator Day Tank
Figure O.4	Piping Diagram AST D-9A and AST D-9B
Figure O.5	Piping Diagram AST D-50B
Figure O.6	Piping Diagram AST F-26-1A and F-26-1B
Figure O.7	Piping Diagram AST WI-R1-AST-01
Figure O.8	Piping Diagram UST WI-R20-UST-01
Figure O.9	Piping Diagram UST WI-R20-UST-02
Figure O.10	Piping Diagram UST WI-R30-AST-01
Figure O.11	Piping Diagram UST WI-R30-UST-01
Figure O.12	Piping Diagram AST MPS-1 and MPS-2
Figure O.13	Piping Diagram AST MPS-3
Figure O.14	Piping Diagram AST NOAA-3 and NOAA-4
Figure O.15	Piping Diagram UST NOAA-1 and NOAA-2
Figure O.16	Piping Diagram AST NOAA Day Tank
Figure O.17	Piping Diagram AST U-12A-13 and AST U-12B-13
Figure O.18	Piping Diagram AST U-30-15
Figure O.19	Piping Diagram AST U-48-15
Figure O.20	Piping Diagram AST U-65-15
Figure O.21	Piping Diagram AST WI-V3-AST-01
Figure O.22	Piping Diagram AST WI-V10-AST-01
Figure O.23	Piping Diagram AST WI-V18-AST-01
Figure O.24	Piping Diagram AST WI-V21-AST-01
Figure O.25	Piping Diagram AST WI-V24-AST-01
Figure O.26	Piping Diagram AST WI-V24-AST-03
Figure O.27	Piping Diagram UST WI-V10-UST-01
Figure O.28	Piping Diagram UST WI-V20-UST-01
Figure O.29	Piping Diagram AST V-62
Figure O.30	Piping Diagram AST W-20A-10
Figure O.31	Piping Diagram AST X-16

Figure O.32 Piping Diagram AST Z-62
Figure O.33 Piping Diagram AST MARS-33
Figure O.34 Piping Diagram AST MARS Hydraulic Reservoir

The fill port for the D-1 AST is located aboveground and accessed at the top of the tank. Piping is accessed through a roll-up door to the mechanical enclosure at the north end of the AST.

The new AST D-2-17 includes the same piping configuration as AST D-1.

Figure O.1 Piping Diagram AST D-1



Approximately 15 feet of overhead piping connects the tank to the inside of Building D-4 through a masonry wall. Approximately 50 feet of overhead piping connects to a series of fire pumps.

Figure O.2 Piping Diagram AST D-04-14

Approximately 175 feet of outdoor piping (in a concrete trench) connects the D-8 Day Tank to the D-9A and D-9B tanks. Approximately 15 feet of piping connects the tank to the inside of Building D-8 through a masonry wall. Approximately 10 feet of piping connects to a diesel powered emergency generator.

Figure O.3 Piping Diagram AST D-8 Generator Day Tank

Approximately 125 feet of outdoor underground piping connects the tanks to D-8 Generator Day Tank, then inside of Building D-8 through a masonry wall. Approximately 10 feet of piping connects to an emergency generator.

Figure O.4 Piping Diagram AST D-9A and AST D-9B

Approximately 15 feet of outdoor piping connects the tank to the inside of Building D-50 through a masonry wall connecting to a generator.

Figure O.5 Piping Diagram AST D-50B

Supply line from F-26-1A to pump

Supply line from F-26-1B to Diesel pump

Approximately 37 ft of underground pipe connects F-26-1A to the gasoline pump and a
piping connects F-26-1B to the diesel fuel pump.

Figure O.6 Piping Diagram AST F-26-1A and F-26-1B

Approximately 25 total feet of piping connect the tank to the boiler.

Figure O.7 Piping Diagram AST WI-R1-AST-01

A total of 100 feet of outdoor underground and indoor aboveground piping connects the underground storage tank to the boiler.

Figure O.8 Piping Diagram UST WI-R20-UST-01

Approximately 100 total feet of piping connects the underground storage tank to a boiler. The piping is underground outside and the inside.

Figure O.9 Piping Diagram UST WI-R20-UST-02

The piping length is inside the generator.

The spill flow map for this tank is found in Appendix B.

Figure O.10 Piping Diagram AST WI-R-30-AST-01

Approximately 25 total feet of piping connects the underground storage tank to the boiler via outdoor underground and inside piping.

Figure O.11 Piping Diagram UST WI-R-30-UST-01

MPS-1 and MPS-2 are configured identically. Approximately 10 feet of exterior aboveground piping connects the tank to the generator within the trailer. Piping enters the trailer body and travels approximately 3 feet before connecting to the generator.

Figure O.12 Piping Diagram AST MPS-1 and AST MPS-2

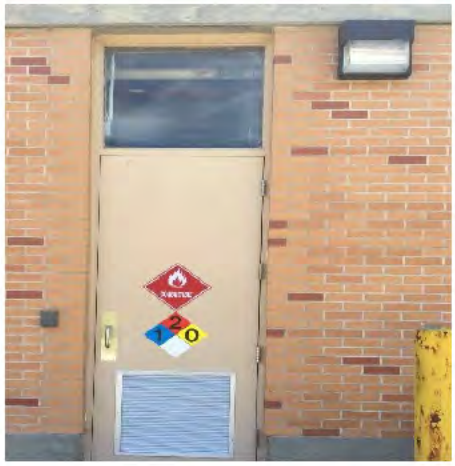
Approximately 30 feet of outside flexible piping connects in two directions to both ends of the exterior of the mobile trailer. Piping enters the steel trailer body and travels approximately 3 feet before connecting to the generator.

Figure O.13 Piping Diagram AST MPS-3

No associated piping.

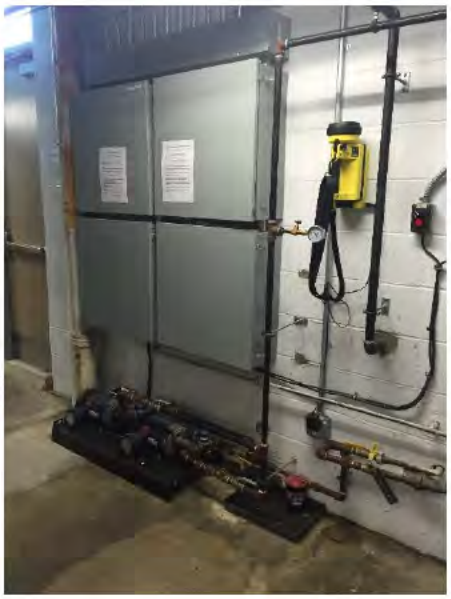
The spill flow map for this tank is found in Appendix B.

Figure O.14 Piping Diagram AST NOAA-3 and NOAA-4



Approximately 36 feet of underground piping travels from the underground tank to the building.

Figure O.15 Piping Diagram UST NOAA-1 and NOAA-2



The inside piping travels from the lift pump to the elevated day tank, then returns to the boiler.

Figure O.16 Piping Diagram AST NOAA Day Tank

An aboveground supply line runs for approximately 15 feet from the easternmost of two fuel tanks, to Building U-12, through the wall, and into the building.

Inside Building U-12, the supply line is split into four lines which extend 3 feet from the wall before descending for 12 ft. and entering a covered duct bank and becoming horizontal once more. Two lines turn at 18 and 22 inches towards Generator #1 and the remaining two lines continue for 13 feet before turning towards Generator #2.

The two supply lines for Generator #1 continue for 12 feet, extend vertically for 2 feet, and attach to Generator #1 with an additional 3 feet of pipe.

Note: Each generator also contains 110 gallons of motor oil.

The two supply lines for Generator #2 continue for 15 feet and attach to Generator #2 with an additional 3 feet of pipe.

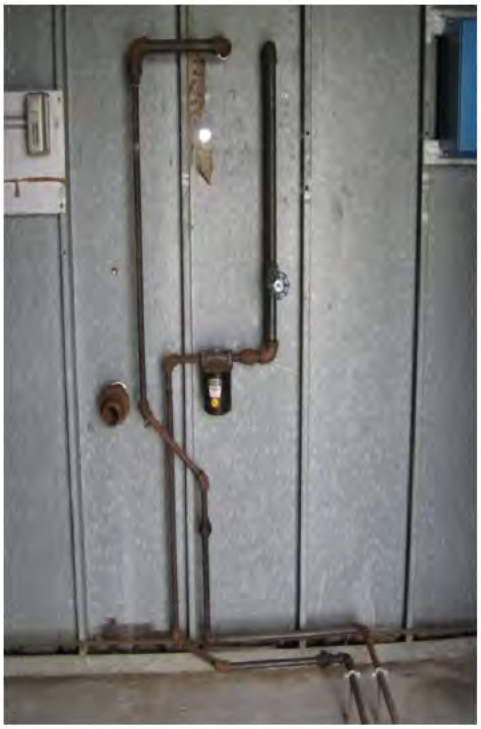
Figure O.17 Piping Diagram AST U-12A-13 and AST U-12B-13

AST U-30-15 is connected to aboveground fuel supply and return lines, each approximately 40 feet in length, which are piped into building U-30. Inside Building U-30, the fuel lines continue along the floor, connecting the tank to the boiler.

Figure O.18 Piping Diagram AST U-30-15

AST U-48-15 is connected to aboveground fuel supply and return lines, each approximately 35 feet in length, which are piped through the wall of building U-50. Inside Building U-50, the fuel lines continue down the wall and along the floor, connecting the tank to the diesel fire pump.

Figure O.19 Piping Diagram AST U-48-15



AST U-65-15 is connected to aboveground fuel supply and return lines, each approximately 27 feet in length, which are piped through the wall of building U-65. Inside Building U-65, the fuel lines continue down the wall and along the floor, connecting the tank to the generator with approximately 16 feet of indoor piping.

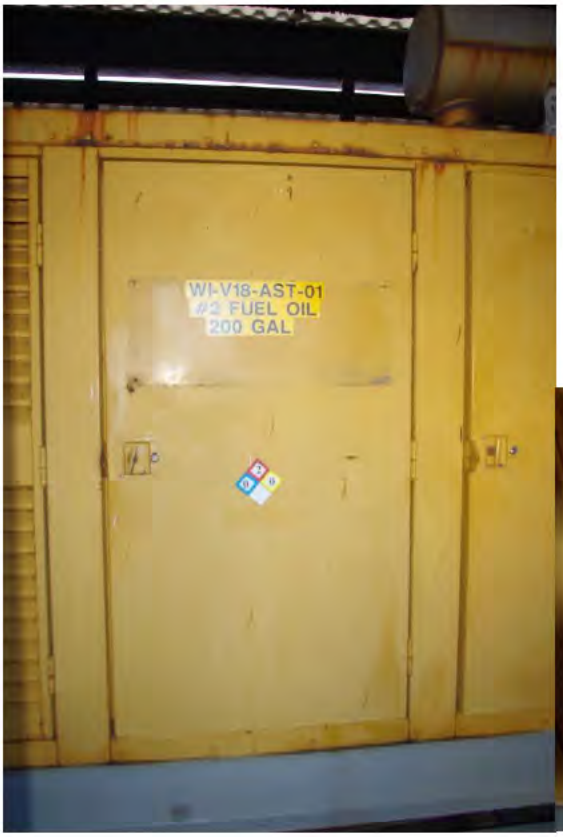
Figure O.20 Piping Diagram AST U-65-15

Approximately 8 feet of indoor piping connects the tank to the fire pump.

Figure O.21 Piping Diagram AST WI-V3-AST-01

Approximately 13 total feet of aboveground outside and inside piping connect the tank to the fire pump.

Figure O.22 Piping Diagram AST WI-V10-AST-01



The piping length is inside the generator.

Figure O.23 Piping Diagram AST WI-V18-AST-01

Approximately 28 feet of outdoor aboveground piping travels above the tank and enters Building V-20 where it connects to a pump and then a boiler.

The spill flow map for this tank is found in Appendix B.

Figure O.24 Piping Diagram AST WI-V21-AST-01

Outdoor aboveground and indoor piping connects the tank to the boiler. The outdoor aboveground piping travels through an elevated concrete slab before entering the building. The total length of the piping is approximately 18 feet.

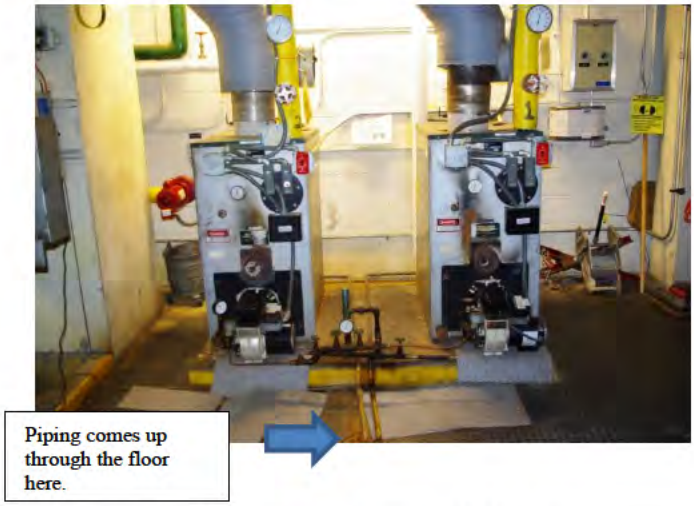
The spill flow map for this tank is found in Appendix B.

Figure O.25 Piping Diagram AST WI-V24-AST-01

Outdoor aboveground piping travels from the tank through an elevated concrete slab before connecting to the fire pump. The total length of the piping is approximately 12 feet.

The spill flow map for this tank is found in Appendix B.

Figure O.26 Piping Diagram AST WI-V24-AST-03



Approximately 60 feet of outside underground and indoor piping connects the underground storage tank to two boilers.

Figure O.27 Piping Diagram UST WI-V10-UST-01

The piping travels for approximately 4 feet outside underground. Once entering the building the piping travels for approximately 55 feet around the building before connecting to the boiler.

Figure O.28 Piping Diagram UST WI-V20-UST-01

The piping routes from the tank for approximately 10 feet, along the inside floor of Building V-62 to a generator inside the room.

Figure O.29 Piping Diagram AST V-62

W-20A-10's supply line runs approximately 175 feet aboveground then runs into Building W-20 connecting to a boiler.

Figure O.30 Piping Diagram AST W-20A-10

The piping routes from the tank, along the side of Building X-16, and out through the masonary wall. The outside piping then travels underground for approximately 60 feet and connects to Ast X-15.

Figure O. 31 Piping Diagram AST X-16

The piping routes from the tank for approximately 10 feet, along the inside floor of Building Z-62 to a generator inside the room.

Figure O.32 Piping Diagram AST Z-62

Fill Port Piping - East End

North Side View

South Side View

Figure O.33 Piping Diagram AST MARS-33

Approximately 6 feet of flexible inside piping connects the storage tank to the pumps which distribute the mineral oil through the hydraulic lines of the erector.

Figure O.34 Piping Diagram AST MARS Hydraulic Reservoir

APPENDIX P

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Pollution Prevention Plan

Virginia Pollutant Discharge Elimination System

Permit No. VA0024457

National Aeronautics and Space Administration

Goddard Space Flight Center

Wallops Flight Facility

Wallops Island, Virginia

Revision 9

March 2019

STORM WATER POLLUTION PREVENTION PLAN

National Aeronautics and Space Administration

Goddard Space Flight Center

Wallops Flight Facility

Wallops Island, Virginia

Prepared by

LJT and Associates

Wallops Island, Virginia 23337

THIS REVISION SUPERSEDES ALL PREVIOUS EDITIONS OF THE WALLOPS FLIGHT FACILITY STORM WATER POLLUTION PREVENTION PLAN

March 2019

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List of Acronyms

AAOC	Administrative Agreement on Consent
ADAS	Advanced Data Acquisition Support
AFTF	Aviation Fuel Tank Farm
AOC	Area of Concern
AST	Aboveground Storage Tank
BMP	Best Management Practice
BOD	Biological Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CAP	Corrective Action Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Con	Containerized
CSCE	Comprehensive Site Compliance Evaluation
DCR	(Virginia) Department of Conservation and Recreation
DEQ	(Virginia) Department of Environmental Quality
DMR	Discharge Monitoring Report
DoT	Department of Transportation
DoD	Department of Defense
DRO	Diesel Range Organics
EPA	(United States) Environmental Protection Agency
FFTA	Former Fire Training Area
FMB	Facilities Management Branch
FOTW	Federally Owned Treatment Works
FS	Feasibility Study
FUDS	Formerly Utilized Defense Site
GRO	Gasoline Range Organics
GSFC	Goddard Space Flight Center
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTPB	Hydroxyl-Terminated Polybutadiene
HTRW	Hazardous, Toxic, and Radioactive Waste
ICP	Integrated Contingency Plan
JP	Jet Propulsion Fuel
JPTS	Jet Propulsion Fuel, Thermally Stable
MARS	Mid-Atlantic Regional Spaceport
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
MGD	Million Gallons per Day
MMRP	Military Munitions Response Program
MSDS	Material Safety Data Sheet

List of Acronyms

NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
PID	Photoionization Detector
ppm	Parts per Million
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SIC	Standardized Industrial Classification
SPCC	Spill Prevention, Control, and Countermeasures
SVOC	Semi-volatile Organic Compounds
SWCB	(Virginia) State Water Control Board
SWP3	Storm Water Pollution Prevention Plan
SWPPT	Storm Water Pollution Prevention Team
TAL	Target Analyte List
TPH	Total Petroleum Hydrocarbon
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VAC	Virginia Administrative Code
VOC	Volatile Organic Compounds
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Storm Water Management Program
WFF	Wallops Flight Facility
WOD	Waste Oil Dump
WWTP	(Old) Wastewater Treatment Plant

1 Purpose

The purpose of this Storm Water Pollution Prevention Plan (SWP3) is to meet the requirements of the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility's (WFF's) current Virginia Pollutant Discharge Elimination System (VPDES) permit, No.: VA0024457. This document is intended to describe current storm water management and to reflect revisions to storm water management systems and the associated outfalls from the previous edition of the WFF SWP3, dated March 2018. Through the use of best management practices (BMP), quarterly and annual inspections, Storm Water Pollution Prevention Team (SWPPT) meetings, and personnel training, WFF remains proactive in storm water pollution prevention.

This SWP3 is a dynamic document that is revised as appropriate to reflect changes in WFF operations. More specifically, this SWP3 is updated whenever there is a change in design, construction, operation, or maintenance that presents the potential for discharge of pollutants to waters of the Commonwealth of Virginia. This SWP3 is also amended if it proves to be ineffective in eliminating or minimizing pollutants.

This SWP3 is a part of WFF's Integrated Contingency Plan (ICP). The ICP is an Environmental Protection Agency (EPA) mandated document, which details a facility's preparedness and responses to emergencies, particularly to hazardous waste and fuel/oil spills. The ICP was prepared for WFF in order to combine Spill Prevention, Control, and Countermeasures (SPCC) and Hazardous Waste Contingency plans; it complies with the *9 VAC 25-91-10* Aboveground Storage Tank (AST) Pollution Prevention regulations (original SPCC plan Aug 16, 2002) and requirements for SPCC Plans promulgated under *40 CFR 112* (Amended and implemented no later than November 10, 2011).

1.1 Introduction

Wallops Flight Facility is located in Accomack County, Virginia within the area known as the Delmarva Peninsula. The facility consists of three separate landmasses in close proximity to each other: The Main Base, the Mainland, and Wallops Island, which total approximately 6,530 acres. Figure 1 depicts the location of the WFF and delineates the areas of the three landmasses with their associated land uses.

The Main Base is composed of approximately 2,230 acres. It is bordered on the east by extensive marshland, swales, and tidal creeks, which lead into Chincoteague Bay and Chincoteague Inlet. The Main Base is bordered on the north and west by an estuarine area known as Little Mosquito Creek and tributaries. State Routes 175 and 798 border the remainder of the Main Base to the south and southeast, respectively.

Figure 1 NASA WFF Vicinity Map

Wallops Island is approximately 7 miles long, 0.5 mile wide, and is surrounded by water. It is comprised of approximately 4,200 acres, including the marsh area. Chincoteague Inlet borders Wallops Island on the north, the Atlantic Ocean forms the eastern border, and Assawoman Island borders to the south. The entire western approach to Wallops Island is marshland interlaced with small tidal creeks and is bisected by the Virginia Inside Passage. The Mainland area, which consists of 1,207 acres including approximately 100 acres of usable land, contains extensive marshland and swales to the east. Private lands, currently used for agricultural and livestock (poultry house) operations, to the south, west, and north, border the Mainland.

2 Storm Water Pollution Prevention Team

The WFF has established a Storm Water Pollution Prevention Team (SWPPT) comprised of individuals from various NASA and partner organizations. The SWPPT is responsible for the following:

- Implementing all VPDES and SWP3 requirements;
- Defining and agreeing upon an appropriate set of goals for the facility's storm water management program;
- Being aware of any changes in WFF or partner operations in order to determine changes (if needed) in the SWP3;
- Reviewing the Comprehensive Site Compliance Evaluation (CSCE) (detailed in Section 5.0 of this SWP3) and the Environmental Office Incident Reports; and
- Identifying pollutant sources and risks, making decisions on BMPs, and directing the actual implementation of the BMPs and regular evaluations to measure the effectiveness of the SWP3.

The SWPPT meets at least annually to discuss the goals of the SWP3, review BMP progress, address comments and suggestions received from others, and determine if changes are necessary. Members of the SWPPT suggest revisions to the SWP3, including the BMP implementation schedule, as necessary.

The NASA Environmental Office Water Program Manager is the storm water program manager. The Environmental Office also maintains the SWP3, and it is approved by the Head, Facilities Management Branch (FMB). The Environmental Office provides facility-wide annual training in the use of the SWP3, and conducts permit-required inspections. The WFF Analytical Laboratory staff perform permit-required chemical analyses on storm water discharges for which the lab holds certifications. The lab staff also collects samples that are analyzed by third-party labs. The Facilities Management Branch maintains and inspects fuel storage tanks, the storm water system, and wastewater treatment plant. An on-site Fire Department is available for primary response during spill incidents. Partner organizations supply facility specific storm water related

information. Listed in Table 1 are the members of the SWPPT with organization and responsibilities identified:

Table 1 Storm Water Pollution Prevention Team

Team Member	Code	Phone	Responsibility
Mr. Richard. O. Hooks NASA Environmental Office	250.W	757-824-1941	Water Programs Manager
Ms. Marianne Simko NASA Environmental Contractor Support	250.W	757-824-2127	Contract Environmental Lead
Mr. Brian Cornwell NASA Contractor Chemistry Laboratory Analyst	250.W	757-824-1155	VPDES Permit Compliance and Analytical Support
Mr. Wayne Redmond NASA Facilities Management	228	757-824-1191	Storm Water System Manager
Mr. James Atkins Fire Department Chief	200	757-824-2487	HAZMAT/Spill Responder
Mr. Michael Hooks U. S. Navy Surface Combat Systems Center Environmental Coordinator	Navy	757-824-7705	Point of Contact to WFF for Environmental Compliance
Mr. James Deck NOAA Systems Support Branch Chief	NA	757-824-7346	Point of Contact to WFF for Environmental Compliance
Mr. Kerry Bowden U. S. Coast Guard Engineering	NA	757-336-2860	Point of Contact to WFF for Environmental Compliance
Mr. John Besecker Chincoteague Bay Field Station Facilities Manager	NA	757-824-5636	Point of Contact to WFF for Environmental Compliance
Mr. Daryl Moore Mid-Atlantic Regional Spaceport Manager	NA	540-450-4044	Point of Contact to WFF for Environmental Compliance

3 Description of Pollutant Sources

3.1 Site Drainage

The WFF currently holds VPDES permit VA0024457 for 11 industrial storm water outfalls on the Main Base, labeled 003 through 010, and 012 through 014. Four non-industrial storm water outfalls are located on the Wallops Main Base, NOAA1 (021) - NOAA4 (024). The Federally

Owned Treatment Works (FOTW) process outfall, labeled 001, is also located on the Main Base; Wallops Island has three industrial Storm Water Outfalls, labeled WI-07(037), WI-08(038), and WI-09(039) and six non-industrial storm water outfalls, labeled WI-01(031) - WI-06(036) (see Figures 2 and 3). Figures 2 and 3 also show the numbered drainage areas (DA) across WFF. Descriptions of the outfalls are provided in Table 2 and outfall locations in Appendix C.

On the northern portion of the Main Base, both naturally flowing storm water and the man-made storm network drain to Little Mosquito Creek, which drains to Cockle Creek and eventually flows to the Atlantic Ocean. On the eastern and southeastern portions of the Main Base, the natural drainage pattern flows to Jenney's Gut and Simoneaston Bay, then into Cockle Creek, Shelly Bay, and Chincoteague Bay before draining to the Atlantic Ocean. On the western and southwestern portions of the Main Base, the natural drainage pattern is toward Wattsville Branch, an unnamed tributary of Little Mosquito Creek, then Little Mosquito Creek to Mosquito Creek, Cockle Creek, and on to the Atlantic Ocean.

The National Oceanic and Atmospheric Administration (NOAA), one of WFF's partners, operates a satellite tracking station (correlating with Standardized Industrial Classification [SIC] code 4899, Communications Services) on the northeast corner of the Main Base. Four outfalls channel storm water from the north side of the NOAA facility. The outfalls are labeled on Figure 2 as NOAA1 (021) - NOAA4 (024). However, based upon NOAA's SIC code, the facility does not produce discharges associated with industrial activity.

With the exception of several cross-culverts, storm drainage at Wallops Mainland is primarily toward Bogues Bay, Hog Creek, and Cat Creek, all of which separate Wallops Mainland from Wallops Island. The Mainland portion of the facility, consisting primarily of radar tracking facilities, does not generate storm water discharge associated with industrial activity as specified within regulatory classifications. However, this portion of the facility includes operations that could impact storm water quality; therefore, it is addressed in the SWP3.

The northern portion of Wallops Island drains by overland flow to Bogues Bay and Chincoteague Inlet via Sloop Gut and Ballast Narrows. The central portion of the island drains primarily to the west toward Bogues Bay and the southern end drains primarily by sheet flow to Hog Creek and the Atlantic Ocean. Wallops Island has three industrial Storm Water Outfalls, labeled WI-07(037), WI-08(038), and WI-09(039) and six non-industrial storm water outfalls, labeled WI-01(031) - WI-06(036). Wallops Island launch pad wash waters, deluge system, and Wallops Island liquid fueling facility are operations that drain into Outfalls WI-07(037) and WI-08(038), and the Northern Wallops Island spacecraft fueling facility WI-09(039) and could potentially impact storm water quality.

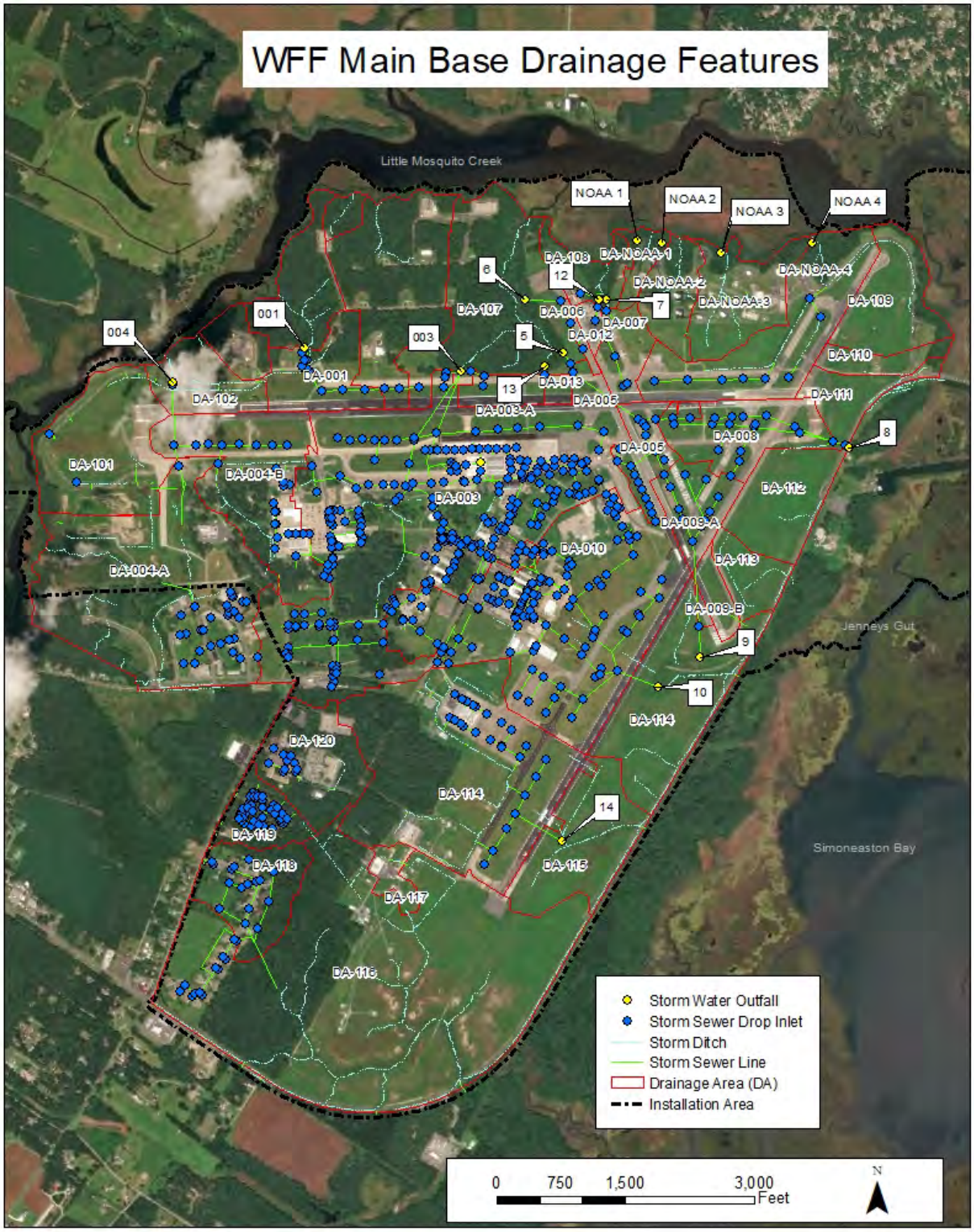

Figure 2 WFF Main Base Drainage Features

Figure 3 WFF Mainland and Island Drainage Features

Table 2 WFF VPDES permitted Outfalls		
Permit Number	**Outfall Number**	**Description**
001	**MB-001**	**Outfall for Federally Owned Treatment Works (FOTW)**
003	MB-003	Drains airfield runways, taxiways, aprons, and a hangar; satellite accumulation areas; aboveground fuel storage tanks; office buildings; roadways, parking areas, and grassy areas. This outfall discharges to Little Mosquito Creek. Potential sources of pollution include possible fuel spills from airfield activities or releases from fuel delivery vehicles or possible hazardous waste spills from a satellite accumulation area. A chance of storm water contamination from hazardous wastes exists; however, all satellite accumulation areas are required to have secondary containment and are located inside covered structures. During heavy rains and pending hurricanes the oil/water separator valve would be diverted to Outfall 003 from the FOTW. The diverter valve is at the end (after) the separator, the water to the outfall goes through the separator first. Only the inlet from the wash rack area ties into the separator, the surrounding inlets go to the outfall directly. This outfall drains approximately 204.6 acres and its weighted runoff coefficient is low at 0.39. During a 24-hour, 2-year storm event, approximately 8.03 million gallons per day (MGD) would discharge from this outfall.
004	MB-004	Drains airfield runways and taxiways, satellite accumulation areas, an enclosed salt storage facility, an automobile fueling facility and a maintenance garage, aboveground fuel storage tanks, roadways, parking areas, office and storage buildings, and grassy areas. This outfall discharges to an unnamed tributary of Little Mosquito Creek. Potential sources of pollution include possible fuel spills from automobile fueling and maintenance, releases from fuel delivery vehicles, or airfield activities. The possibility of hazardous waste spills from satellite accumulation areas also exists; however, all satellite accumulation areas are required to have secondary containment and are located inside covered structures. This outfall drains approximately 54.1 acres and its weighted runoff coefficient is low at 0.31. During a 24-hour, 2-year storm event, approximately 1.72 MGD would discharge from this outfall.
005 006 007 008	MB-005 MB-006 MB-007 MB-008	Drain airfield runways, taxiways, and grassy areas. These outfalls discharge to Little Mosquito Creek. Potential sources of pollution include possible fuel spills from airfield activities. These outfalls drain approximately 18.9 acres, 2.3 acres, 12.4 acres and 29.0 acres, respectively. Weighted runoff coefficients range from medium to high and are 0.52, 0.67, 0.40, and 0.46, respectively. During a 24-hour, 2-year storm event, discharges would be approximately 1.00 MGD from Outfall 005, 0.16 MGD from Outfall 006, 0.51 MGD from Outfall 007, and 1.36 MGD from Outfall 008.
009	MB-009	Drains airfield runways, taxiways, and grassy areas. This outfall discharges to Jenneys Gut. Potential sources of pollution include fuel spills from airfield activities. This outfall drains approximately 18.2 acres and its weighted runoff coefficient is medium at 0.46. During a 24-hour, 2-year storm event, approximately 0.85 MGD would discharge from this outfall.

Table 2 WFF VPDES permitted Outfalls		
Permit Number	**Outfall Number**	**Description**
010	MB-010	Drains airfield runways, taxiways, and aprons, satellite accumulation areas, a less-than-90-day accumulation area (Building B-29),one restoration site with petroleum related groundwater impacts, and aboveground fuel storage tanks; office buildings, roadways, parking areas, and grassy areas. This outfall discharges to Jenney's Gut. Potential sources of pollution include fuel spills from airfield activities or releases from fuel delivery vehicles or hazardous waste spills from either a satellite accumulation area or the less-than-90-day accumulation area. The possibility of storm water contamination from hazardous wastes exists; however, all satellite accumulation areas are required to have secondary containment and are located inside covered structures. In addition, the less-than-90-day accumulation area is located in a concrete building that is protected by drains and troughs that would contain a spill within the area. The potential for contaminated runoff from the restoration sites exist, but due to site topographies, is highly unlikely. This outfall drains approximately 127.7 acres and its weighted runoff coefficient is low at 0.34. During a 24-hour, 2-year storm event, approximately 4.43 MGD would discharge from this outfall.
012 013	MB-012 MB-013	Drain airfield runways and taxiways and grassy areas. These outfalls discharge to Little Mosquito Creek. Potential sources of pollution include fuel spills from airfield activities. These outfalls drain approximately 3.2 acres and 2.6 acres, respectively. Their weighted runoff coefficients are medium at 0.54 and 0.52, respectively. During a 24-hour, 2-year storm event, approximately 0.17 MGD would discharge from outfall 012 and 0.14 MGD from outfall 013.
014	MB-014	Drains airfield runways, taxiways, and a hangar; satellite accumulation areas and an aboveground fuel storage tank; roadways and parking areas; office and storage buildings; and grassy areas. This outfall discharges to Simoneaston Bay. Potential sources of pollution include fuel spills from runway activities or releases from fuel delivery vehicles or hazardous waste spills from satellite accumulation areas. However, all satellite accumulation areas are required to have secondary containment and are located inside covered structures. This outfall drains approximately 113.1 acres with a low weighted runoff coefficient of 0.28. During a 24-hour, 2-year storm event, approximately 3.32 MGD would discharge from this outfall.
021 022	NOAA-1 NOAA-2	Drain spacecraft tracking facilities and grassy areas. These outfalls discharge to Little Mosquito Creek. Potential pollution sources include oils and lubricants; however the equipment is regularly inspected and maintained by trained NOAA personnel. These outfalls drain approximately 6.6 acres and 16.2 acres, respectively. Weighted runoff coefficients are low at 0.22 and 0.25. During a 24-hour, 2-year storm event, approximately 0.15 MGD would discharge from NOAA-1 and 0.41 MGD would discharge from NOAA-2.
023 024	NOAA-3 NOAA-4	Drain spacecraft tracking facilities, aboveground fuel storage tanks, office buildings, parking areas, and grassy areas. NOAA-4 also drains an airfield runway and taxiway. These outfalls discharge to Little Mosquito Creek. Potential sources of pollution include fuel spills from airfield activities or releases from fuel delivery vehicles and radar oils and lubricants. To minimize storm water risk, tanks are surrounded by secondary containment and spill kits are readily available; Radar equipment is regularly inspected and maintained by trained NOAA personnel. These outfalls drain approximately 28.3 acres and 51.0 acres, respectively. Weighted runoff coefficients are low to moderate at 0.29 and 0.42. During a 24-hour, 2-year storm event, approximately 0.82 MGD would discharge from NOAA-3 and 2.15 MGD would discharge from NOAA-4.

Table 2 WFF VPDES permitted Outfalls		
Permit Number	**Outfall Number**	**Description**
031 032	WI-01, WI-02	Drain small launch facilities, office buildings, fuel storage tanks, roadways, parking areas, and grassy areas. WI-2 also drains a payload assembly, Building W-065. Drainage involves retention basins with sluice gates and tidal flaps leading first to tidal marshland and then to Cat Creek. To minimize the risk of storm water pollution, all fueling and payload assembly operations are performed by trained personnel. Additionally, spill kits are readily available. These outfalls drain approximately 36.9 acres and 74.3 acres, respectively. Weighted runoff coefficients are low at 0.22 and 0.20. During a 24-hour, 2-year storm event, approximately 0.93 MGD would discharge from WI-1 and 1.49 MGD would discharge from WI-2.
033 034	WI-03, WI-04	Drain office buildings, fuel storage tanks, roadways, and parking areas. Drainage involves retention basins with sluice gates and tidal flaps leading first to tidal marshland and then to Cat Creek. Potential sources of pollution include fuel spills from delivery vehicles. To minimize the risk of storm water pollution, all fueling operations are performed by trained personnel. Additionally, spill kits are readily available. These outfalls drain approximately 45.0 acres. Their weighted runoff coefficient is low at 0.19. During a 24-hour, 2-year storm event, approximately 0.86 MGD would discharge from these outfalls.
035	WI-05	Drains radar and tracking facilities, aboveground fuel storage tanks, office buildings, parking areas, and grassy areas. Drainage involves a culvert with tidal flaps leading first to tidal marshland and then to Cat Creek. Potential sources of pollution include fuel spills from delivery vehicles and radar oils and lubricants. To minimize storm water risks, tanks are surrounded by secondary containment and spill kits are readily available; radar equipment is regularly inspected and maintained by trained personnel. This outfall drains approximately 7.7 acres. The weighted runoff coefficient is low at 0.19. During a 24-hour, 2-year storm event, approximately 0.15 MGD would discharge from this outfall.
036	WI-06	Drains office buildings, roadways, parking areas, and grassy areas that drain to Hog Creek. Potential sources of pollution include fuel spills from delivery vehicles. This outfall drains approximately 47.8 acres. The weighted runoff coefficient is low at 0.23. During a 24-hour, 2-year storm event, approximately 1.1 MGD would discharge from this outfall.

Table 2 WFF VPDES permitted Outfalls		
Permit Number	**Outfall Number**	**Description**
037	WI-07	Drains orbital launch facilities, small launch facilities, office buildings, fuel storage tanks, hypergolic fuels storage, RP-1 storage, roadways, parking areas, and grassy areas. Drainage involves retention basins with sluice gates and tidal flaps that drain to Hog Creek. Potential sources of pollution include orbital launch operations and fuel spills from delivery vehicles, fueling rockets, and fueling space craft. To minimize the risk of storm water pollution, all orbital launch vehicle fueling is performed by highly trained personnel during closely controlled conditions. Also, all launch pad wash waters are tested prior to discharge. All tank fueling operations are performed by trained personnel. Additionally, spill kits are readily available. This outfalls drains approximately 27.9 acres. The weighted runoff coefficient is low at 0.23. During a 24-hour, 2-year storm event, approximately 0.64 MGD would discharge from WI-7. Liquid Fueling Facility with deluge system –Discharge to containment basin, 110% containment for hydrocarbon fuels, test for release to surface water structures. Release to surface water structures is anticipated based on similar operations at other NASA launch sites. If necessary, water will be tested and treated (pH adjustment) before release, or collected and removed for disposal as necessary. The quantities may be significant requiring release over a period of several days (up to 200,000 gallons per event).
038	WI-08	Drains the surrounding vegetative area and does not receive routine discharge from Pads 0-A or 0-B. Drainage involves tidal marshland to Hog Creek. However, firefighting water following a nominal or off-nominal launch at Pad 0-B could drain to this outfall. Potential sources of pollution include orbital launch operations and fuel spills from delivery vehicles. This outfalls drains approximately 22.5 acres. The weighted runoff coefficients is low at 0.17. During a 24-hour, 2-year storm event, approximately 0.38 MGD would discharge from WI-8.
039	WI-09	Space Craft/Payload Fueling (Wallops Island) V-55 – Northern Wallops Island liquid fueling facility, with indoor deluge system for emergencies and off-nominal release (releases greater than ½ gallon). Wastewater would be contained within a trench system inside V55, neutralized, containerized, and disposed as hazardous waste. Only a large off-nominal release during fueling would create a discharge through a small overflow drainage trench designed to carry waste liquids outdoors. No monitoring shall be required for this outfall until commencement of a discharge. Upon commencement of a discharge, information will be included in discharge monitoring reports (DMRs) at the frequency required by the permit, otherwise “no discharge” will be reported.

3.2 Existing Structural Control Measures

An oil/water separator, which is a catch basin for the wash rack, is located west of the D-1 hangar. The valve at the wash rack is diverted to FOTW and locked so it cannot discharge to Outfall 003 (ref: email dtd. March 31, 2004, Raleigh Smith, Appendix D). At all times, a diversion valve located at the wash rack conveyance is locked in the “open” position to divert both wash waters and storm water to the FOTW. Mobile aircraft fueling vehicles are regularly parked within an area adjacent to the wash rack. This area also drains to the oil/water separator and the mobile equipment

is inspected regularly by the "on site" facilities maintenance contractor, for containment integrity and proper mechanical function. The wash rack/mobile equipment storage area oil/water separator is inspected monthly and emptied as necessary by the FMB.

During large storm events (hurricanes, nor'easter), the oil/water separator directional flow valve can be temporarily diverted from the FOTW to Outfall 003. This avoids potential storm flow surges to the FOTW. Notification and concurrence are required to DEQ when the oil/water separator is diverted to Outfall 003.

3.3 Spill Direction of Flow and Identification of Type of Pollutants

The ICP details the facility's preparedness and responses to emergencies particularly to hazardous waste and fuel/oil spills. The ICP was prepared for WFF in order to combine SPCC and Hazardous Waste Contingency Plans. An Incident Briefing Plan also provides details on tank locations and by predicting potential spill direction, suggests the type and placement of response supplies to prevent a release from reaching any drainage features. Spill direction of flow drainage to stormwater outfalls are in Appendix F

3.4 Inventory of Exposed Materials

An inventory of exposed materials was developed from data collected through field surveys, inspections, and personnel interviews. Table 3 summarizes materials exposed to precipitation by location. Hangar N-159 contains chemicals in rooms with floor drains that are connected to the storm water management system. Drains inside this hangar are covered with magnetic drain covers that prevent released materials from reaching the storm drains. Hangar D-1 has floor drains beneath the large doors at the east and west ends of the hangar main bay. Magnetic covers cannot be used because they interfere with the movement of the hangar bay doors. However, Engineering controls are employed in workspaces where chemicals are used to prevent releases to floor drains. The GSFC's website **https://code200-external.gsfc.nasa.gov/250/environmental/find-safety-data-sheet-sds** contains chemical inventories, along with links to the corresponding MSDSs and SDSs, for each building at the facility.

Table 3 Inventory Of Materials Exposed To Precipitation

Location	Materials
B-30/B-31 - Outdoor equipment repair area	Oils, lubricants, gasoline, diesel fuel
D-1- Apron-mobile equipment storage	Jet Fuels, diesel fuel, hydraulic oils, glycols
D-1-Wash Rack **(**oil/water separator**)**	Diesel fuel, hydraulic oils, JP-8, Jet A
D-1 -Hangar (floor drains at large doors)	Used oil, Jet A, hydraulic oils, JP-8
D-54 -Sludge Drying Beds **D-53-** Sludge Drying Beds	Sludge waste potential overflow, metals
E-Area- Mobile tracking pad	Diesel fuel, hydraulic oil, glycols
F-11 Mobile Generator Storage	Diesel fuel, hydraulic oil, glycols

Table 3 Inventory Of Materials Exposed To Precipitation	
Location	**Materials**
F-16- Garage/parking lot	Gasoline, biodiesel fuel, diesel fuel, hydraulic oil, motor oils, glycols, brake fluids, methanol, battery acids
F-10 to F-20 – Outdoor storage	Diesel fuel, hydraulic oil
F-26 - Fuel station	Gasoline, biodiesel fuel, diesel fuel, & absorbents
F-33 - Salt/sand storage and mixing	Salt & sand
M-1- Outdoor storage	Mineral oil (electrical transformers), No.2 Fuel Oil
N-159- Hangar (floor drains in main bay)	Jet A, used oil, lubricating oils, hydraulic oils
Launch Pad 0-A (Island)	Launch pad & gantry wash waters, deluge waters, RP-1, diesel fuel
Launch Pad 0-B (Island)	Launch pad & gantry wash waters, diesel fuel
V-80 -Storage	Diesel fuel, hydraulic oil
N222- Scrap Yard	Diesel fuel, hydraulic oil, motor oils, battery acids, , glycols
Cropper Center – Navy (oil water separator)	Diesel fuel, cooking oils

3.5 Spills and Leaks

The WFF Environmental Office maintains records of spills, leaks, and releases of hazardous or toxic pollutants. Spills in reportable quantities or threats to waterways are reported to the appropriate agencies. Releases are remediated as effectively and expeditiously as possible, in accordance with applicable regulations and the WFF ICP. A table summary of spills and leaks from January 2014 through December 2018 is located in Appendix E.

3.6 Sampling Data

Scheduled sampling of storm water discharges is performed to meet VPDES monitoring requirements. The WFF's current VPDES permit specifies the constituents to sample and sampling frequency for both processes for FOTW Outfall 001 and storm water industrial Outfall 003 on the Main Base; and industrial Outfalls037 (WI-07)), 038 (WI-08)), and 039 (WI-09) on the Island are currently WFF's outfalls with required sampling and chemical analysis under VPDES permit #VA0024457. Analysis is conducted in accordance with EPA analytical laboratory test methods. Sampling and analysis include quality control and quality assurance (QA/QC) review to ensure validity of analytical results. A description of each discharge and the receiving stream is presented in Table 2. The Discharge Monitoring Reports (DMR) forwarded to VDEQ are presented in Appendix A. They include: pH, Total Petroleum Hydrocarbon (TPH), flow, and observations every quarter and semi-annually. Sample results are reported in the DMR at the frequency specified by the VPDES permit.

3.6.1 Record of Sampling History

Initial storm water sampling was performed to meet the requirements for the original Application for Permit to Discharge Storm Water Associated with Industrial Activity and submitted to the Virginia Department of Environmental Quality State Water Control Board (SWCB) and approved on October 1, 2014. The following constituents were analyzed for the permit renewal:

- Chemical Oxygen Demand (COD);
- Biological Oxygen Demand (BOD);
- Total Suspended Solids (TSS);
- Oil and Grease;
- Total Nitrogen;
- Total Phosphorus;
- pH; and
- TPH Diesel Range Organics (DRO) and Gasoline Range Organics (GRO).

Main Base outfall 003 and Island outfalls 037 (WI-07), 038(WI-8), and 039 (WI-09) are currently WFF's only Storm Water Outfalls with permit required sampling and chemical analysis under VPDES permit #VA0024457. Outfall 039 (WI-09) is located at Building V-055 for fueling spacecraft with hypergolic products. There is a deluge system at Building V-055 for emergencies and off-nominal releases (releases greater than 0.5 gallon). It includes wall mounted garden hose connections inside the building to provide water to flood the indoor fuel loading area for releases between the one quart to a couple gallons range. This waste would be contained within a trench system inside Building V-055, neutralized, containerized, and disposed as Hazardous Waste. There is also a fire suppression sprinkler system within the building if needed. This can only be activated by personnel within Building V-055, or the Safety Officer monitoring activities from Building V-050 video monitors. Activation of this system would be a life-saving measure, and significant damage to the building would be likely. Liquid waste released to the environment would be the same as in any catastrophic event. There is one designated discharge point to the outdoors for liquids, a pump/educator system is used to pump contaminated water from nominal operations into the waste tanker trailers. No monitoring shall be required for Island outfall 039 (WI-09) until commencement of a discharge. Sampling results indicated no significant discharge of pollutants has occurred, historically.

Table 5 represents the summary of the 2013 to 2018 VPDES permit required sampling from the storm water Outfall 003:

Table 4 Historic VPDES Storm Water Compliance Sampling Summary, CY 2013- CY 2018

Outfall 003				
Parameter	**Annual Average**	**Lowest Value**	**Highest Value**	**Regulatory Limit**
pH	6.8	6.0	8.8	6.0-9.0
TSS, (mg/L)	20.8	1.38	223.2	No Limit
TPH, (mg/L)	<1.0	<1.0	<1.0	No Limit
Outfall 037				
pH	7.4	6.8	8.1	6.0-9.0
TSS, (mg/L)	44.3	3.6	208	No Limit
TPH, (mg/L)	<1.0	<1.0	<1.0	No Limit
Perchlorate, (mg/L)	<0.022	<0.001	<0.040	1.4
Outfall 038				
Parameter	**Annual Average**	**Lowest Value**	**Highest Value**	**Regulatory Limit**
pH	7.4	6.8	7.8	6.0-9.0
TSS, (mg/L)	94.1	3.7	487	No Limit
TPH, (mg/L)	<1.0	<1.0	<1.0	No Limit
Perchlorate, (mg/L)	<0.022	<0.001	<0.040	1.4
mg/L – milligrams per liter				

The permit is renewed every 5 years. The permit allows for the permittee, who has two or more outfalls that discharge substantially identical effluents, to group the similar outfalls and collect a representative sample from one outfall for each group. The Main Base Storm Water Outfalls that are examined for storm water quality are 003, 004, 006, 008, 010, and 014 and are visually inspected on a quarterly basis. All WFF outfalls will be inspected annually.

3.7 Potential Pollutant Sources Associated with Industrial Activity

Potential pollutants entering the storm water conveyance system are associated with automobile use, airfield operations, and space vehicle parts manufacturing. These operations are permanent functions at the facility. NASA WFF may conduct up to approximately 61,000 annual flight operations, or passes, where one pass consists of two operations: a landing or low approach followed by an immediate takeoff or climb-out (touch and go). An operation could also be one arrival or one departure to and from the airfield. Minimal aircraft de-icing is conducted at the facility via the use of a propylene glycol/water mixture.

3.7.1 Petroleum Storage and Airfield Operations

Petroleum storage tanks at the facility contain fuels associated primarily with vehicle fueling, airfield activities, generators and heating utilities. ASTs are registered with the DEQ per *9 VAC 25-91 Facility and AST Registration* regulations. A list of storage tanks indicating tank contents, volume, location, and spill risk analysis with flow direction is included in WFF's current ICP.

The WFF topography is generally flat with very porous soils; therefore, most major spills are likely to flow equidistantly around the source. However, if release occur during flood conditions, flow mass move with the predominant wind direction. In accordance with WFF's ICP, tanks and secondary containment structures are inspected on a daily, weekly, or monthly basis. If secondary containment is present, structure is emptied of debris or precipitation as needed. Inventory control is practiced per *9 VAC 25-91*.

Trained personnel monitor fueling to ensure that no releases occur. In addition, all personnel involved in fueling operations (both onsite and contract fuel delivery personnel) are provided annual training on fueling procedures and pollution prevention practices. All delivery drivers are required by contract to carry spill containment kits on their fuel delivery trucks.

In addition to the fuel storage systems maintained at the facility, outside contractors frequently bring portable aboveground storage tanks of varying capacities onto the facility for the duration of their contract. Prior to commencing work, these contractors are required to submit a Health and Safety Plan for approval by the WFF Safety Office. Contractors are typically encouraged to limit the use of contractor owned mobile ASTs on the facility. Contractors are required to notify WFF of ASTs brought to the facility with a capacity greater than 55 gallons, and tanks of 1,000 gallons or greater must have FMB approval and include a storm water pollution prevention plan or other approved spill response plan. If the tank will be in use on WFF for more than 120 days, the contractor must provide proof that the tank is registered with the DEQ. Possible releases from these tanks must be addressed in the contractor's Hazardous Materials Spill Plan or contractor's other approved spill response plan. WFF requires that contractors provide 110 percent capacity with impermeable secondary containment for all ASTs brought onto the facility.

Airfield structures at WFF include fueling stations, wash rack facilities, taxiways, aprons, arresting gear engines, runways, and storage/maintenance hangars. The facility maintains a fueling station for government owned passenger and service vehicles. The fueling station consists of one 10,000-gallon Aboveground Storage Tank (AST) containing gasoline and one 10,000-gallon AST containing an 80/20 blend of diesel fuel/biodiesel fuel. These ASTs are equipped with appropriate leak detection, spill overfill containers, corrosion protection, and interstitial monitoring. Storm water from this area drains northerly over the parking lot to a drop inlet at Building F-26. This is considered a high-risk area in the SWP3.

A single bay car wash is attached to the fueling station. Vehicles are washed by hand in the car wash. Wash water is passed through a sand filter. No discharges result from the car wash. The Building D-001 wash rack at WFF is used for the cleaning of large equipment, fire trucks, and

NASA aircraft. The catch basin for the wash rack is equipped with an oil/water separator. At all times, a diversion valve located at the wash rack conveyance is locked in the "open" position to divert both wash waters and storm water to the FOTW. Mobile aircraft fueling vehicles are regularly parked within an area adjacent to the wash rack. This area also drains to the oil/water separator and the mobile equipment is inspected regularly by the Logistics Team for containment integrity and proper mechanical function. The wash rack/mobile equipment storage area oil/water separator is inspected monthly and emptied as necessary by the FMB.

Emergency response vehicles on Wallops Island are washed with biodegradable soaps at Building V-27 Wallops Island Fire Station over the drain which passes the wash water through the oil water separator. In all other cases personnel are advised to wash using biodegradable soaps in vegetated areas away from storm drainage system inlets or similar drainage features.

3.7.2 Hazardous Waste Storage

WFF currently maintains 122 satellite and 3 less-than-90-day hazardous waste accumulation areas, all are within secondary containment and most are covered. The accumulation areas in Building D-001 and N-159 hangars are located in areas of the buildings in which hangar floor drains are connected to the storm sewer. Although these areas are not exposed to storm water, the occurrence of a spill in conjunction with a storm event presents a substantial risk (see Table 6).

To ensure the integrity of all accumulation areas and to minimize storm water risk, they are inspected at least annually by the WFF Environmental Office. Less than one 55-gallon drum of any hazardous waste or 1 kilogram of an acute hazardous waste, P-listed (*40 CFR 261.33*), may be stored at any of the above mentioned satellite accumulation areas.

Table 5 Hazardous Waste Satellite Accumulation Areas With Storm Water Risk
WFF MAIN BASE EPA ID No. VA8800010763
WFF MAINLAND/ISLAND EPA ID No. VA7800020888

Bldg.	Waste Codes	Waste Description
D-1	D001, F003, F005, D035, Non Reg	Jet A, JP-8, Used Oils, Fuel and Solvent rags
N-159	D001, F003, F005, D035, Non Reg	Jet A, JP-8, Used Oils, Fuel and Solvent rags

3.7.3 Environmental Restoration Program

Formal environmental investigations on a facility-wide basis began in 1988 and continue today as an active program with EPA and DEQ providing oversight. A series of facility-wide surveys, assessments, and inspections were performed by NASA between 1988 and 1996. The purpose of these investigations was to assess the site conditions and identify Areas of Concern (AOCs) that may pose a potential threat to human health or the environment through a release of hazardous materials or substances (see Figures 5 and 6). Actions conducted at the AOCs include supplemental

investigations, sampling programs, removals, product recovery, remedial investigations (RIs), feasibility studies (FSs), remediation, and closeout.

Effective December 8, 2004, NASA and the EPA entered into an Administrative Agreement on Consent (AAOC) [U.S. EPA Docket Number: RCRA-03-2004-0201TH]. The AAOC was issued under the authority of the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments, and by agreement integrates the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act, into meeting the obligations of the AAOC. As the model for the environmental restoration program, the AAOC applies to past releases of hazardous substances, waste and/or constituents at WFF and identifies CERCLA response requirements, policies, and guidance as the primary process for planning for and performing the work necessary to complete remedial and corrective actions appropriate to those releases.

In addition to NASA environmental programs at WFF, the U.S. Army Corps of Engineers (USACE) has an active environmental restoration program at WFF. NASA acquired the property from the Department of Defense (DoD) in 1959. Prior to NASA operations, the Navy initially operated an aviation training facility and coastal surveillance operations from 1943-1945, housing a few hundred personnel. After World War II, the facility expanded to the present size as the Naval Air Station with several squadrons, and the Naval Aviation Ordnance Test Station for ordnance, weapons, and radar testing, with a combined housing of 1,500 to 2,000 personnel. Some of the AOCs identified in the initial surveys were identified as being associated with activities that solely took place during DoD ownership, prior to NASA presence. Because of this finding, the USACE, in consultation with NASA, EPA, and DEQ, has conducted a series of assessments and investigations to determine responsibility and eligibility for these AOCs under the Formerly Used Defense Sites (FUDS) Program. This program authorizes the USACE as the lead DoD agency for the environmental restoration of properties that were formerly under DoD control. The FUDS program, which initially began at WFF in 1998 and increased investigation efforts in 2008, evaluated approximately 200 Areas of Interest, within sixteen active projects which were categorized by program type including: Hazardous, Toxic and Radioactive Waste (HTRW) Projects, Containerized (Con) HTRW Projects, Military Munitions Response Program (MMRP) Projects, and Potentially Responsible Party Projects. Each project area may include several sites designated as potential Areas of Interest related to historic DoD activities conducted at the sites. Many of these Areas of Interest were eliminated as AOCs during the finalization of the Site Investigation phase.

NASA and the Department of the Army signed a Memorandum of Agreement (MOA) on February 26, 2015, authorizing NASA to complete actions on behalf of the DoD at the AOCs. Under the agreement, the DoD will continue to fund the FUDS Program and NASA WFF will be responsible for implementing the program. Table 6 summarizes the status of the NASA and FUDS AOCs:

Table 6 WFF Areas Of Concern

Site	Contaminant	Status
Former Fire Training Area	Groundwater: VOCs, SVOCs, Arsenic, Manganese, PFAS	Remedy of biostimulation completed in 2008, institutional controls and monitoring documented in ROD. Long-term monitoring in place.
Waste Oil Dump	Groundwater: Benzene, Arsenic	Remedy of biostimulation completed in 2008, institutional controls and monitoring documented in ROD. Long-term monitoring in place.
Main Base Firing Range (Pistol and Rifle Ranges)	Soil/Sediment: Metals, Nitroglycerin	Site Investigation completed; NASA completed the Engineering Evaluation/Cost Analysis in FY 16 and a Non-Time Critical Removal Action was completed in FY 16. No Further Action Consensus was completed in March 2017.
Old Aviation Fuel Tank Farm	Groundwater: TPH, VOCs, BTEX	Air Sparge/Soil Vapor Extraction Corrective Action Implemented and closed; Air Sparge and Soil Vapor Extraction treatment systems were removed in FY 13; Long-term monitoring in place.
Area of Interest 20 and North Island Transformer (NIT) Sites	Soil/Sediment: PCBs	Site screening activities conducted in FY 15. Time Critical Removal Action completed for Area of Interest 20 in FY 15 and for NIT Sites NIT-1, NIT-7, NIT-14, and NIT-17 in FY 16-17. No Further Action Consensus was completed in March 2017 for Area of Interest 20 and the NIT Sites.
Structures F-10A/F-10B (Paint Locker and Battery Shop)	Soil: metals, SVOCs Groundwater: Hexavalent chromium	Site Investigation completed in FY18; Supplemental sampling planned.
Former Circular Area	Soil: Metals	Site Investigation competed in FY18; Supplemental sampling planned
PFAS Investigation	Groundwater: PFAS	Quarterly perimeter well sampling ongoing; Preliminary Assessment completed in FY18; Site Investigation planned for FY19. Monthly drinking water sampling underway.
FUDS Project 3 (MMRP) – Gunboat Point, Strafing Target, Target Center, and Explosive Ordnance Disposal Area	MEC, metals	Site Investigation conducted in 2011; MEC institutional controls in place. RI anticipated in FY 20.
FUDS Project 4 (MMRP) – Machine Gun Rocket Firing Range	MEC, metals	Site Investigation fieldwork conducted in 2011; MEC institutional controls in place. RI anticipated in FY 21.

Table 6 WFF Areas Of Concern

Site	Contaminant	Status
FUDS Project 5 (MMRP) – Grebe Range and Explosive Ammunition Test Facility,	MEC, metals, VOCs, SVOCs	Site Investigation fieldwork conducted in 2011. MEC institutional controls in place. RI anticipated in FY 22.
FUDS Project 6 (HTRW) – Wallops Island NAOTS Cantonment Area	Metals, VOCs, SVOCs	Site Investigation fieldwork conducted in 2009, 2011, and 2014. Final Site Investigation Report with No Further Action completed in FY17.
FUDS Project 7 (MMRP) – Boat Basin/Visitor Center	MEC, metals, MC	Site Investigation fieldwork conducted in 2011; Remedial Investigation field work conducted in FY 13-16. Feasibility Study anticipated in FY 19 pending completion of the RI.
FUDS Project 8 (HTRW) – Boat Basin Area	Metals, VOCs, SVOCs	Site Investigation fieldwork conducted in 2011; No further actions planned.
FUDS Project 9 (MMRP) – Main Base Ranges (Skeet Range)	Metals, PAHs	Site Investigation report submitted in 2012; Remedial Investigation planned for FY 19.
FUDS Project 10 (MMRP) – Practice Bombing Target	MEC, metals	Site Investigation conducted; No Further Action required.
FUDS Project 11 (HTRW) – Main Base Areas of Interest	Metals, VOCs, SVOCs	Site Investigation fieldwork conducted in Summer 2012 and 2014; RI anticipated in FY19.
FUDS Project 12 (Con-HTRW) Petroleum, Oil, and Lubricants (POL) Storage and Distribution	VOCs, SVOCs, PCBs	Site Investigation fieldwork conducted in Spring 2012 and 2014. Final Site Characterization Report for the two 600K- Gallon USTs was completed in October 2014; Site closed in November 2014.
FUDS Project 13 (HTRW) – Sewage Treatment Facilities	Metals, PAHs	Remedial Investigation conducted in 2010; Proposed Plan completed in FY16 and ROD will be completed in FY 19. Remedial Design and remedial action planned for FY 19.
FUDS Project 14 (MMRP) – Regulus Launch Area	MEC, BTEX, perchlorate	Site Investigation fieldwork completed Feb/March 2012. No further actions planned.
FUDS Project 15 (HTRW) – Active Remediation Projects	Metals, VOCs, SVOCs	Site 9 – Abandoned Drum Dump Proposed Plan completed in FY 16 and the ROD completed in FY 19; Construction Debris Landfill Feasibility Study additional investigations completed in FY 16; Sites 14 and 15 Proposed Plan completed in FY 16 and the ROD will be finalized in FY 19; Old Route 175 Site Investigation completed in FY 15 and closed in FY17.
FUDS Project 17 – Potentially Responsible Party/Hazardous, Toxic, Radioactive Waste Main Base	-Metals, VOCs, SVOCs, PAHs	Study Area Screening Evaluation completed in FY 16; No further action consensus was completed in March 2017.

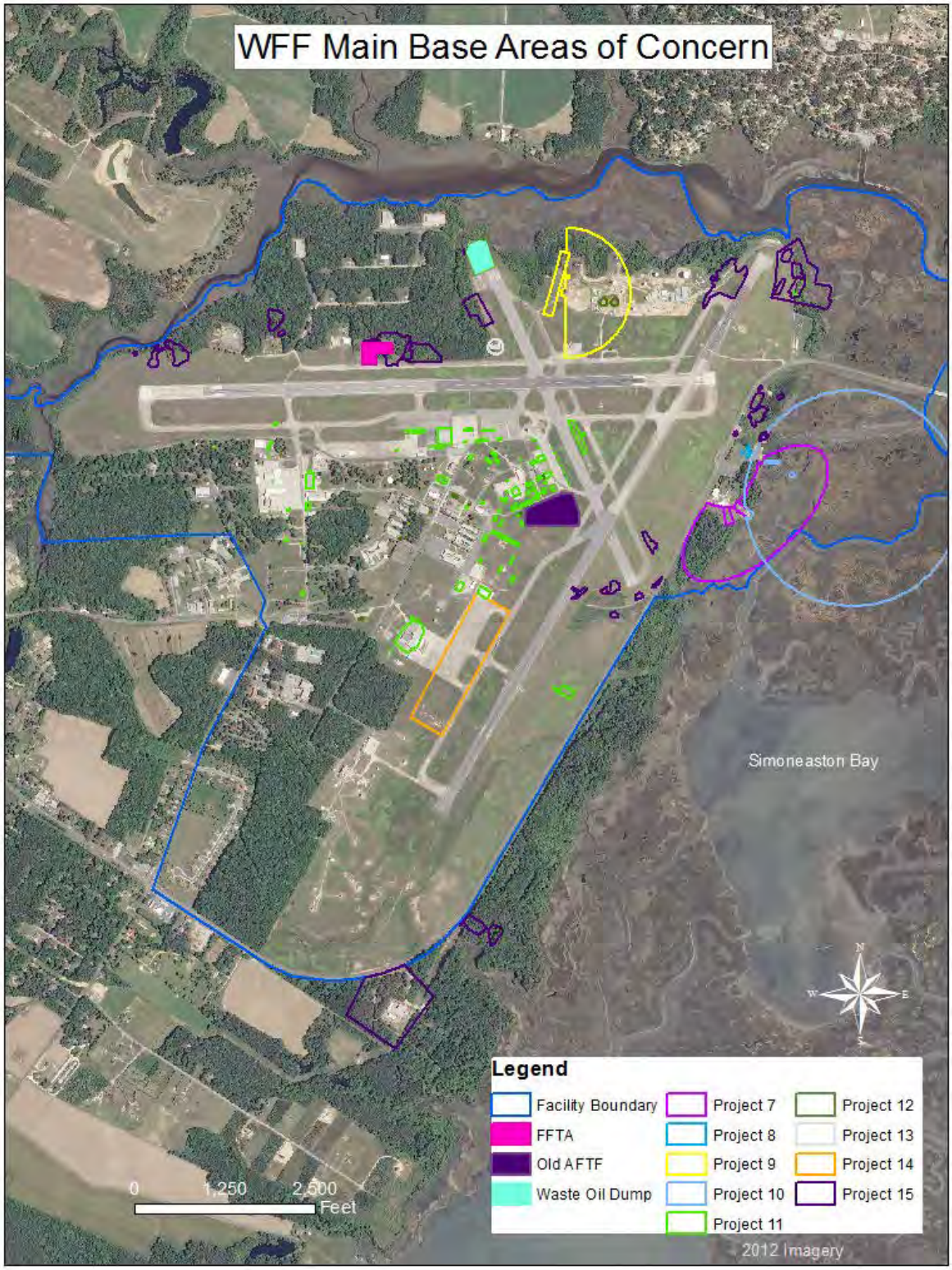

Figure 4 WFF Main Base Areas of Concern

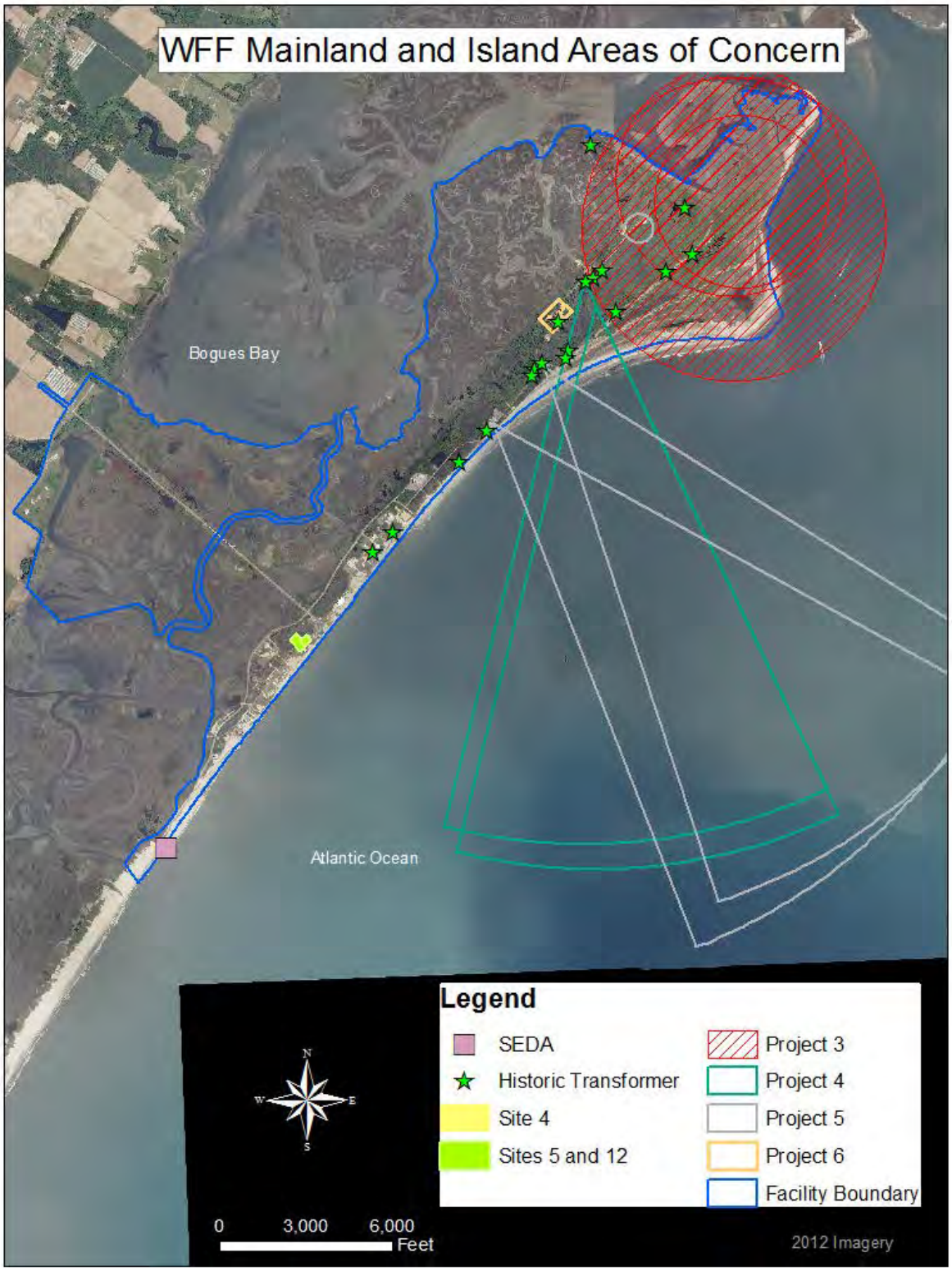

Figure 5 WFF Mainland and Island Areas of Concern

3.7.3.1 Current Status of Active AOCs

3.7.3.1.1 Waste Oil Dump (WOD)

The WOD is located beyond the end of Runway 17/35. The AOC was reportedly used by the Navy and NASA for the disposal of waste oils and other flammable liquids (possibly solvents). Petroleum contaminated soils were excavated and removed from the site by NASA in 1986. A records review and sampling conducted identified the area as an AOC due to the presence of contamination in soils and groundwater. An RI conducted at the WOD in 2001 confirmed the presence of contamination at the site. NASA conducted a Supplemental RI at the site in 2003 and issued a final RI Report in 2004. In April 2008, NASA prepared a final Record of Decision recommending enhanced bio-remediation as the preferred alternative to remediate the site. A Pilot Study was conducted in December 2008 to determine if the application of an Oxygen Releasing Compound could significantly reduce the impact benzene, and indirectly, arsenic, in site groundwater and to determine the amount of the compound necessary for full scale implementation. Remedial action field work was conducted in December 2009, with quarterly sampling conducted through 2010 and semi-annual monitoring completed through 2018. The sampling frequency was reduced to twice every five years with one sampling event in the spring and one in the fall, with the last round completed in October 2017. A Five-Year Review was completed in January 2014. The second Five-Year Review was completed in December 2018.

3.7.3.1.2 Old Aviation Fuel Tank Farm (AFTF)

The Old AFTF, located near the center of the Main Base and adjacent to the active runway, consisted of a fuel tank farm for the storage and distribution of fuels for airplanes and vehicles. The facility was constructed and operated by the Navy and later used by NASA until 1982 when a new aviation fuel tank farm was constructed. Releases from the site were identified in 1988. Further sampling and analysis conducted at the site identified petroleum-related contamination present in soils and groundwater. In 1991, all of the tanks, pumps, buildings, and 4,700 tons of petroleum-contaminated soil were removed from the AFTF site. NASA reported the findings. Actions under federal and state petroleum and UST programs were initiated. These actions have included the completion of site characterization studies and the design and implementation of Corrective Action Plans (CAPs). NASA operated an Air Sparge/Soil Vapor Extraction remediation system from 2004 through 2010 and conducted routine monitoring and reporting at the Old AFTF under the DEQ Storage Tank program. These treatment systems were abandoned in FY 13. NASA is currently conducting annual sampling in accordance with Virginia DEQ recommendations.

3.7.3.1.3 Former Fire Training Area (FFTA)

The FFTA is located along Runway 10/28 in the northern portion of the Main Base. The site was used by the Navy and NASA for fire fighter training exercises. It is reported that flammable liquids were dispersed onto the ground, into a pit, onto an abandoned plane fuselage, and/or into

a tank and ignited for these exercises. Petroleum contaminated soils were excavated and removed from the site by NASA in 1986. A series of site inspections were conducted at the site and the data indicated a release had occurred at the FFTA. An RI conducted at the FFTA in 1996 confirmed the presence of contamination at the site. NASA conducted additional sampling and analysis at the FFTA in 2000 and 2003 and a Supplemental RI Report was issued in 2004. In December 2007, NASA prepared a final Record of Decision (ROD) recommending enhanced bio-remediation as the preferred alternative to remediate the site. A Pilot Study was conducted in December 2008 to determine if the application of an Oxygen Releasing Compound could significantly reduce the impact of VOCs and SVOCs in site groundwater and to determine the amount of the compound necessary for full scale implementation. Remedial action field work was conducted in December 2009, with quarterly sampling conducted through 2010. Currently Long-Term Monitoring is conducted every nine months. A Five-Year Review was completed in January 2014. The second Five-Year Review was completed in December 2018.

3.7.3.1.4 Main Base Firing Range

A review of historical aerial photographs and records conducted by USACE, and a review of current facility practices identified the Main Base Firing Range Complex as a potential AOC. The range, which includes a pistol, rifle, machine gun testing, and skeet range, was first noted as being present at WFF in 1949. The range is located in the northeast corner of the Main Base and was in use through 1999. NASA conducted a Site Investigation in 2007 and submitted the Final Site Investigation report in 2008. A Technical Memorandum proposing removal action cleanup goals was submitted in April 2009, with supplemental sampling in July 2009. NASA prepared a Potentially Responsible Party Analysis in 2010, which suggests that NASA and DoD have shared responsibilities for cleanup activities at the Pistol and Rifle Ranges, with sole DoD responsibility at the Skeet Range. The Skeet Range is addressed under FUDS Project 9. NASA completed a Summary Status Report for the Main Base Firing Range Complex in February 2015. The report summarized and re-evaluated the data collected at the Pistol and Rifle Ranges during the Site Investigation, updated the human health and ecological risk screenings, and recommended a Non-Time Critical Removal Action for the sites. An Engineering Evaluation/Cost Analysis, Removal Action Work Plan, and Action Memorandum was completed in FY 16. The Non-Time Critical Removal Action was completed in in August 2016 and the Construction Completion Report with a No Further Action Consensus Statement was completed in March 2017.

3.7.3.1.5 Area of Concern 20 and North Island Transformer Sites

Area of Interest 20 and the North Island Transformers sites are located on the north end of Wallops Island and include 18 former electrical poles/transformers. The pole/transformer locations were identified on historical facility drawings during the USACE assessment of Area of Interest 20, which was identified during a Preliminary Assessment under the FUDS Program. NASA conducted site screening investigations at all transformer locations in FY 15. The site screening

investigations recommended a Time Critical Removal Action be performed at AI-20 and four other North Island Transformer locations (NIT-1, NIT-7, NIT- 14, and NIT-17). A Time Critical Removal Action was completed for Area of Interest 20 in FY 15 and at the four North Island Transformer locations in FY 16. A No Further Action Consensus Statement was signed in March 2017.

3.7.3.1.6 Structures F-10A/F-10B

Structures F-10A and F-10B are located on the western portion of the Main Base. The buildings were constructed during the Navy tenure and have been used by NASA since 1960 for the temporary storage of drums containing oils, solvents, and lubricants, and to store batteries and house a metal cutting and paint shop. A Site Investigation was completed in FY 18 and a supplemental sampling effort is planned to begin in FY 19.

3.7.3.1.7 Former Circular Area

The Former Circular Area, which is located south of the Main Base Boat Basin, was originally identified as a potential disturbed area on historic aerial photographs. The USACE completed test pit excavations and identified construction, road, and building debris in 2015. NASA completed a Site Investigation in FY18 and a supplemental sampling effort is planned to begin in FY 19.

3.7.3.1.8 PFAS Investigation Areas

In response to detecting per- and poly-fluorinated alkyl substances (PFAS) in the FFTA groundwater, NASA began a drinking water sampling and a perimeter groundwater sampling program in FY17 and FY18. A series of shallow and deep groundwater monitoring wells were installed and sampled, in addition to several existing groundwater monitoring wells. NASA currently conducts monthly PFAS sampling of the drinking water and a Preliminary Assessment/Site Investigation is ongoing to identify the nature and extent of the PFAS contamination with a focus on potential source areas.

3.7.3.1.9 FUDS Project 3

Project 3 consists of four MEC sites located on northern Wallops Island, including Gunboat Point Bombing Area, Strafing Target, Explosive Ordnance Disposal Area, and Target Center. Potential media of concern include soil, surface water, sediment, and groundwater. Site Investigation fieldwork was conducted by the USACE in 2011, with the final report submitted in 2012. Future remedial activities for Project 3 will be determined during the finalization of the Memorandum of Agreement. MEC institutional controls are currently in place. A Remedial Investigation is anticipated to begin in FY 20.

3.7.3.1.10 FUDS Project 4

Project 4 consists of the Machine Gun and Rocket Firing Area on northern Wallops Island. Potential media of concern include soil, surface water, sediment, and groundwater. Site

Investigation fieldwork was conducted by the USACE in 2011, with the final report submitted in 2012. Future remedial activities for Project 4 will be determined during the finalization of the Memorandum of Agreement. MEC institutional controls are currently in place. A Remedial Investigation is anticipated to begin in FY 21.

3.7.3.1.11 FUDS Project 5

Project 5 consists of the Grebe Range/20-mm Gun Slab, and Explosive Ammunition Test Facility located on northern Wallops Island. Potential media of concern include soil, surface water, and groundwater. Site Investigation fieldwork was conducted by the USACE in 2011, with the final report submitted in 2012. No further actions are currently planned for Project 5. A Remedial Investigation is anticipated to begin in FY 22.

3.7.3.1.12 FUDS Project 6

Project 6 is identified as the Wallops Island NAOTS Cantonment Area, which includes the former location of several DoD structures used historically for carpentry, painting, and storage. The area is currently unused and wooded. Potential media of concern includes soil and groundwater. Site Investigation fieldwork was conducted by the USACE in 2009, 2011, and 2014. The final Site Investigation Report for Project 6 with a No Further Action Consensus Statement was completed in 2017.

3.7.3.1.13 FUDS Project 7

Project 7 consists of the Pyrotechnic Dump, Gun Butts Nos. 1 and 2, and South Bank Boat Basin, which includes the former site known as the Boat Basin Munitions Debris Area. Potential media of concern include soil, surface water, and groundwater. Site Investigation fieldwork was conducted by the USACE in 2011, with the final report submitted in 2012. Remedial Investigation fieldwork was conducted in FY 13-16. A feasibility study is anticipated to begin in FY 19 following the completion of the Remedial Investigation.

3.7.3.1.14 FUDS Project 8

Project 8 consists of the former Boat Basin structures utilized during the DoD ownership. Site Investigation fieldwork was conducted by the USACE in 2011, with the final report submitted in 2012. No further actions are planned at Project 8.

3.7.3.1.15 FUDS Project 9

Project 9 is identified as the Main Base Ranges, formerly identified as the NASA Main Base Firing Range Complex. NASA completed the Site Inspection Report in February 2012. During Potentially Responsible Party negotiations, NASA agreed to accept responsibility for further investigation and actions related to the former Pistol and Rifle ranges; USACE accepted responsibility for the Skeet Range, however NASA will be responsible for conducting FUDS response actions at the Skeet Range. A Remedial Investigation will be conducted in FY 19.

3.7.3.1.16 FUDS Project 10

Project 10, the Practice Bombing Target, is located in the marshland southeast of the Boat Basin and Visitor Center. The target was constructed by the DoD in 1943 and was utilized for practice bombs. Site Investigation activities were conducted in spring 2012. No further action was required for Project 10.

3.7.3.1.17 FUDS Project 11

Project 11, Main Base Areas of Interest, consists of over 90 Areas of Interest in which historic DoD operations had the potential to result in impacts to the environment. These types of historic activities include hangar and aircraft maintenance operations, painting activities, vehicle maintenance, electrical, carpentry, and sheet metal shops, photographic laboratories, laundry and dry-cleaning operations, chemical storage activities, and petroleum, oil, and lubricant operations. Site Investigation activities were conducted in summer 2012 and 2014. The Site Investigation report was finalized in 2017. NASA will be conducting a Remedial Investigation in FY 19.

3.7.3.1.18 FUDS Project 12

Project 12, CON/HTRW-POL Storage and Distribution, is located on the Main Base and includes 19 Areas of Interest where petroleum and PCB operations were historically conducted. These areas include fuel storage tanks, bulk oil storage, filling stations, and transformer banks. Site Investigation activities were conducted in summer 2012 with additional investigations conducted in FY 14. The final Site Characterization Report for the Two 600,000 Gallon Underground Storage Tanks was completed in October 2014 and site closure was achieved on November 10, 2014. The final Transformer Site Inspection Report was completed in September 2015 and no further action is anticipated. The final POL Storage Site Inspection Report was completed in February 2016 and site closure was achieved in January 2016.

3.7.3.1.19 FUDS Project 13

Project 13, Sewage Treatment Facilities, was formerly known as the Old Wastewater Treatment Plant, which was constructed by the DoD in the early 1940s. Project 13, which is located on the northwest portion of the Main Base and west of Runway 17/35, is approximately 0.8 acres in size. Six Areas of Interest were identified within the project. The USACE conducted an Interim Removal Action in 2006, followed by a Site Investigation in 2007 and a Remedial Investigation in 2010. A Feasibility Study was completed in 2014; NASA completed a Proposed Plan in 2016 and the Record of Decision will be finalized in FY 19.

3.7.3.1.20 FUDS Project 14

Project 14, Regulus Launch Areas, consists of three Areas of Interest on the south-central portion of the Main Base, where the DoD historically launched the Regulus missile. The USACE conducted a Site Investigation in 2012; No Further Action is planned for Project 14.

3.7.3.1.21 FUDS Project 15

Project 15, Active Remediation Projects, includes the initial eight USACE FUDS which were under investigation prior to 2008. These sites include Site 9 – Abandoned Drum Dump, Construction Debris Landfill, Old Route 175 Landfill, Site 14 – Debris Pile, Site 15 – Debris Pile, M-Area Disturbed Soil Area, Runway 10/28 Disturbed Soil Area, Main Base Boat Dock Disturbed Soil Area, Airport Parts Disposal Area, and Runway 04 Approach Construction Debris. No Further Action was necessary for the M-Area Disturbed Soil Area, Runway 10/28 Disturbed Soil Area, Main Base Boat Dock Disturbed Soil Area, Airport Parts Disposal Area, or the Runway 04 Approach Construction Area. The remaining Project 15 Areas of Potential Concern are summarized below.

3.7.3.1.22 Site 9 – Abandoned Drum Dump

Site 9 – Abandoned Drum Dump site is an area approximately 2 acres in size and consisted of abandoned drums located within the tree line along Runway 17/35. A removal action was conducted in 2005 in which numerous drums and tar-like material were removed from surface and subsurface soil. A Remedial Investigation was conducted in 2008 with the final report issued in 2011. NASA completed a Proposed Plan for Site 9 soils in 2016 and a No Further Action ROD for the soils will be finalized in 2019. Site 9 groundwater will be investigated with Project 11.

3.7.3.1.23 Construction Debris Landfill

The Construction Debris Landfill, which encompasses approximately 2 acres, is located in the northeast corner of the Main Base, east of Runway 22 between the access road to the NOAA facility and adjacent to Little Mosquito Creek to the east. A Site Investigation was conducted in 2004, followed by a Remedial Investigation in 2009. A Feasibility Study was submitted by the USACE in 2012 to address metals, VOCs, and SVOCs detected at the site. Additional supplemental investigations are planned by the USACE and NASA will complete a feasibility study in FY 19.

3.7.3.1.24 Old Route 175 Landfill

The Old Route 175 Landfill, located on the east side of Route 175, on US Fish and Wildlife property, was identified in 2013, following anecdotal information from former DoD employees. The USACE conducted a Site Investigation in 2011 at a separate location; results were not indicative of a landfill or release. In FY 13, WFF prepared a Potentially Responsible Party analysis for the Route 175 Landfill area, and identified the site as the Southern Boundary Area. The analysis concluded all landfill activities occurred during DoD ownership. As such, the site was transferred to the USACE FUDS Program. The USACE conducted a geophysical investigation in 2014 and a Site Investigation was completed for the Route 175 Landfill site in 2015. A No Further Action Consensus for the Old Route 175 Landfill was completed in FY17.

3.7.3.1.25 Site 14 – Debris Pile

Site 14 consists of a debris pile located on a steep slope to the north of the abandoned taxiway for Runway 10-28 on the Main Base. The USACE completed an RI for Site 14 in 2013. The RI concluded the Site 14 contamination did not present an unacceptable risk. NASA completed a Proposed Plan in 2016 and a No Further Action ROD will be finalized in FY 19.

3.7.3.1.26 Site 15 – Debris Pile

Site 15 consists of a debris pile located to the west and adjacent to Runway 17-35 on the Main Base. The USACE completed an RI for Site 15 in 2013. The RI concluded the Site 15 contamination did not present an unacceptable risk. NASA completed a Proposed Plan in 2016 and a No Further Action ROD will be finalized in FY 19.

3.7.3.1.27 Project 17

Project 17 consists of several potential areas of interest that were identified in the USACE Preliminary Assessment and were later designated Potential Responsible Party sites, which deferred FUDS eligibility. In FY 2016, NASA completed Study Area Screening Evaluations which determined if the former Navy structures/buildings should be considered a source of a release of hazardous substances that require investigation under CERCLA. A no further action consensus was completed in 2017.

3.7.4 Potential Pollutant from Construction Activities

Table 7 Scheduled and Recently Completed Construction Projects

Project	NEPA Document Year/Name
Stockpile Aggregate at Pad 5	2017 FMB REC
Drainage and Parking Renovations at Building X-079	2017 FMB REC
MARS Payload Processing Facility	2017 MARS PPF REC
Demolition/Reconstruction of Building Z-041	2018 FMB REC
Roof Repair/Replacement at Multiple Buildings	2018 FMB REC
Drainage Repairs at Buildings F-010, F-019, D-001 and X-035	2018 FMB REC
IT Room Fire Suppression System	2018 FMB REC
Install Rain Canopy at Building Y-025	2018 FMB REC
Wallops HVAC Efficiency Project	2018 FMB REC
Wallops Shoreline Protection	2019 Shoreline EA

Table 7 Scheduled and Recently Completed Construction Projects	
Project	**NEPA Document Year/Name**
Wallops Main Base Airfield Solar Project	2018 Solar REC
Demolition of E-005 and J-017	2018 FMB REC
Island Gate Redesign	2018 Island Gate REC
Island Gate Final Denial Barrier	2019 FMB REC
B-129 Water Intrusion Prevention	2016 FMB REC
PFAS Groundwater Treatment System	2018 TOC PFAS GAC REC
FlexDAR Tower	2018 FlexDAR REC

3.7.4.1 Center-Funded Project Description

Center-Funded projects are those that are funded by GSFC and have an estimated cost of less than $1,000,000.

3.7.4.1.1 Stockpile Aggregate at Pad 5

In order to facilitate repairs to roads and parking areas on Wallops Island, aggregate from airfield restoration project would be stockpiled at Pad 5 to be utilized as needed. Wetland consultation would be completed prior to any utilization of the aggregate.

3.7.4.1.2 Drainage and Parking Renovations at Building X-079

This project would provide drainage improvements to prevent stormwater flooding in the immediate area of Building X-079. Increased parking demand would also be addressed by the creation of additional graveled parking spaces.

3.7.4.1.3 MARS Payload Processing Facility

The Virginia Commercial Space Flight Authority (VCSFA) has proposed to construct and operate a new Payload Processing Facility (PPF) on the northern portion of Wallops Island. The proposed PPF would be utilized to perform identical functions those currently conducted in Building V-055. Building V-055 was constructed in 1963 and VCSFA has identified a need for a safer, more efficient, and more technologically advanced facility for processing payloads, fueling payloads with hypergolic fuels and oxidizers, and integrating those payloads with the upper launch vehicle stages. Additionally, because Wallops Island is an operational facility, a number of hazardous operations typically occur simultaneously. The increased activity level is challenged by limits due to imposed hazard arcs, primarily during launch preparation activities. Constructing the PPF would provide increased separation between hazardous operations thereby enabling different range

operations to proceed when a safety arc is activated, resulting in non-disruption of various missions and/or lost opportunities.

3.7.4.1.4 Demolition/Reconstruction of Building Z-041

VCSFA would demolish the existing building Z-041 and replace it with a new shop and office building to support VCSFA missions. The new building would not exceed the footprint or the height of the existing building.

3.7.4.1.5 Roof Repair/Replacement at Multiple Buildings

Maintenance activities to extend the service life of existing buildings at WFF would include roof repair, coating, replacement, and design at Buildings J-020, N-159, U-040, X-086, V-055, V-045, and F-006. There would be no increase in the footprint of these buildings, nor would the roofing activities negatively affect existing drainage systems or stormwater infrastructure.

3.7.4.1.6 Drainage Repairs at Buildings F-010, F-019, D-001 and X-035

Corrective maintenance would be required to repair failing storm inlets, underground drainage piping, and drainage features leading from, or in the vicinity of, Buildings F-010, F-019, D-001, and X-035 to existing WFF drainage infrastructure to prevent backflow of drainage and to eliminate an existing sinkhole at Building X-035. All necessary measures would be implemented to prevent sediment from escaping the construction sites during concrete cutting/removal, excavation, and backfilling activities.

3.7.4.1.7 IT Room Fire Suppression System

A clean agent fire suppression system that includes a Very Early Smoke Detection (VESDA) and an Emergency Power Off (EPO) systems would be installed in Buildings N-184, F-002, U-006, Z-062, and V-062. The EPO system would consist of a manual push button near the primary exit doors and a shunt trip breaker before the main power panel but after the uninterrupted power supply (UPS) or battery disconnect. The newly constructed Mission Operations Control Center (MOCC) rooms already have VESDA and EPO systems installed. These systems would provide increased safety and earlier notification, allowing faster response times by emergency firefighting personnel, should there be a fire inside any of the above-referenced locations.

3.7.4.1.8 Install Rain Canopy at Building Y-025

An open-air canopy would be installed with minimum dimensions of 50 feet wide by 20 feet deep to cover the loading dock and roll up door area of magazine bunker Building Y-025 on Wallops Island. The canopy roof line would have a ridge at centerline slightly higher that the concrete bunker wall and would be designed to drain away from the dock loading area and doorway by means of an expanded roof line and gutters. All primary and secondary framing would be manufactured with galvanized steel. The underside of the canopy would be constructed to prevent birds from roosting on exposed ledges. After completion of the roof canopy, a lightning protection

system conforming to National Fire Protection Act (NFPA) Standard 780 would be integrated into the existing system at the Y-025 bunker.

3.7.4.1.9 Wallops HVAC Efficiency Project

This project would provide for HVAC efficiency improvements at Buildings E-104, E-106, E-109, N-159, U-25, and U-30.

A dry cooler would be installed to function as a water side economizer to serve Buildings E-104, E-106, and E-109. This reconfiguration would provide an auto-feed glycol system, preventing off-cycle pipe freezing during low ambient conditions, eliminating the need to circulate water through the two associated chillers. Waterside economizing would occur whenever outside ambient temperatures are at or below 45 degrees F, and when the system is able to maintain water temps at or below 50 degrees F.

Building N-159 would be improved by the installation of a dry cooler in to function as a water side economizer. The project would reconfigure the current two loop chiller water distribution system and replace it with a single loop system with redundant chiller pumps. As in Buildings E-104, E-105, and E-109, an auto-feed glycol system would be installed and both dry cooler projects would include programming for outside air/fresh air damper settings and would be interfaced with the existing MetaSys control system.

Installation of geothermal heat pumps with waste heat recovery would be installed at Buildings U-025 and U-030. A similar system would be installed at Building X-079 to provide floor heating. A Dedicated Heat Recovery Chiller (DHRC) and an 80-ton equivalent geothermal well field would be installed to provide chilled water from geothermal loop and hot water from waste heat. The DHRC would be connected to the existing air handling units in both U-025 and U-030. Piping connections from U-030 to U-025 would be installed via directional boring. A small building addition would be constructed to house the new DHRC. The floor pre-heating project at X-079 would require piping modifications to capture waste heat from the existing cooling tower.

3.7.4.1.10 Wallops Shoreline Protection

This project would provide for the restoration of the Wallops Island shoreline, allowing for the placement of up to approximately 1.3 million cubic yards of sand sourced from either the north Wallops Island beach or dredged from offshore Unnamed Shoal A. Additionally, NASA could construct a series of offshore parallel breakwaters approximately 200 feet offshore from the re-nourished beach.

3.7.4.1.11 Wallops Main Base Airfield Solar Project

This proposed project would implement a 4.5 megawatt (MW) solar photovoltaic (PV) system at WFF Main Base. Phase 1 of the renewable energy system would install Solar Array 1, a 4.5 MW solar PV array on the southeasterly end of Runway 04-22; construct a gravel access road from Building N-162 to Solar Array 1; construct a 2 MW Battery Energy Storage System (BESS)

located near building N-132; install Solar Array 2, PV carports in the parking area adjacent to Building F-006; and connect with the local electric utility.

3.7.4.1.12 Demolition of Buildings E-005 and J-017

This project would provide for the demolition of buildings which are no longer needed on the Wallops Main Base.

3.7.4.1.13 Wallops Island Gate Redesign

This project would allow for the reconfiguration of the Wallops Island entrance gate to create an additional entrance lane, widen existing exit lane, add security features, and install traffic controls.

3.7.4.1.14 Wallops Island Final Denial Barrier

This project would include the construction of a final barrier to vehicular traffic between the Island gate and the causeway bridge. Barrier would be constructed to allow for normal traffic flow to occur, yet allow for rapid deployment of the net-like barrier from below the road surface.

3.7.4.1.15 B-129 Water Intrusion Prevention

This project would allow for the construction of building features such as guttering, canopy roofs, window repairs, and other features to reduce or eliminate the intrusion of rainwater during storm events.

3.7.4.1.16 PFAS Groundwater Treatment System

This project would provide for the construction of an approximately 1,080 square foot, metal sided building near the NOAA access road. The building would house a carbon filtration system for the Town of Chincoteague drinking water supply.

3.7.4.2 Navy Projects

3.7.4.2.1 FlexDAR Tower

The Navy proposes to construct a FlexDAR system, comprised of two, 20-foot shipping containers stacked on a platform on top of the elevated tower. The tower would be constructed of steel with a 30-square foot base, would not exceed 65 feet in height, and would have a concrete piling foundation. Standard power and communications connections would be installed along the westerly side of the UAV runway. Existing underground utilities would be abandoned and replaced with new cable. Underground utilities would be installed in conduit utilizing directional boring equipment to minimize land disturbance. Six new primary junction boxes would be installed above ground along the UAV runway to provide electricity to support FlexDAR and future missions.

3.7.5 Other Potential Pollutant Sources

Other potential pollutant sources at the WFF consist of the aircraft runways; rocket motor storage areas; paint spray, sandblasting grit, and drum storage locations; previous sites of contamination; wastewater treatment facilities, and orbital launch facilities. Figures 7 and 8 depict these potential storm water risks.

The Main Base contains three runways for aircraft flights (approximately 61,000 annual operations) and Wallops Island contains an Uninhabited Aerial System (UAS) runway. The majority of the flights are for aeronautical or airborne earth science research. Runways are designated by number (10/28, 17/35, 4/22, and UAS). Storm water conveyances are located around the runways on the Main Base and the Island UAS runway drains by sheet flow. Potential pollutants resulting from aircraft operations include benzene, toluene, ethyl benzene, xylene, and surfactants. Grass buffer strips are maintained between the runway surface and storm water inlets and surface waters. Additionally, runways are inspected daily for dirt and other particulate matter and vacuumed when needed. By utilizing this combination of practices, WFF reduces sediment and pollutant loading into nearby surface waters.

Space vehicle parts manufacturing is conducted for rocket launch activities at WFF and other off-site locations. Manufacturing facilities include Buildings F-007, F-010, H-100 (payload processing) and E-109 on the Main Base. Activities related to these buildings that are subject to storm water runoff include temporary outside storage of rocket components, and outdoor spray painting of manufactured rocket components. Buildings F-007 and F-010 contain machine shops, electronics assembly shops, and related facilities. Prior to machining, raw materials for metalworking are routinely stored outside Building F-010. Potential pollutant sources resulting from this storage include aluminum, iron, and magnesium. Permanent storage of finished components is under covered structures.

Launch vehicle fueling is conducted at Buildings X-079, Y-015 and Pad 0-A on the Island. Spacecraft fueling is conducted in Building V-055, Hypergolic fuel storage is located at Buildings Z-020 and Z-025. Potential sources of pollution include orbital launch operations and fuel spills from delivery vehicles. To minimize the risk of storm water pollution, all orbital launch vehicle fueling is performed by highly trained personnel during closely controlled conditions. Also, all launch pad wash waters are tested prior to discharge. All tank fueling operations are performed by trained personnel. Additionally, spill kits are readily available.

Most plant operation and maintenance activities, such as vehicle maintenance, electrical services, heating and cooling services, painting, and wood working, are housed in Building F-016. Operations are conducted inside, but heavy equipment is parked outside near the vehicle maintenance garage. Potential pollutants from parked equipment include gasoline, diesel, hydraulic and lubricating fluids, coolants, and various heavy metals. The garage stocks clay, vermiculite, and spill response kits for containing small leaks and spills.

Under WFF's current VPDES permit, the FOTW is permitted to treat domestic waste and to dry sludge on covered and uncovered drying beds. The FOTW's treatment basins are exposed to storm water, their design capacity (0.3 MGD average daily flow or 0.6 MGD maximum daily flow) is far greater than current daily flows (0.06 MGD); therefore, no overflow has ever occurred. Furthermore, WFF's uncovered Building D54 sludge drying beds have permeable bottoms that permit drainage to the pump station at Building D56 without overflowing. After drying and testing, all sludge is disposed of as solid waste in the Accomack County North Landfill.

High risk areas on the Mainland or Island, see Figures 7 and 8, that are not hazardous waste accumulation areas include Building V-080 (Wallops Island Boat Basin storage building), which stores Chinook heaters (portable diesel-fired heaters). At the south end of Wallops Island, Launch Pads 0-A and 0-B are considered a high risk areas due to wash down activities that must be implemented following a launch event. Potential sources of pollution include orbital launch operations, fuel spills from delivery vehicles, fueling rockets, fueling space craft, and launch failures. Liquid Fueling Facility for rockets at Pad 0-A with deluge system that discharges to a containment basin, 110 percent containment for hydrocarbon fuels, testing/analysis of water samples before release to surface water structures. Release to surface water structures is anticipated based on similar operations at other NASA launch sites. If necessary, water will be tested and treated (pH adjustment) before release, or collected and removed for disposal as necessary. The quantities of deluge water generated may be significant requiring release over a period of several days (up to 110,000 gallons per launch).

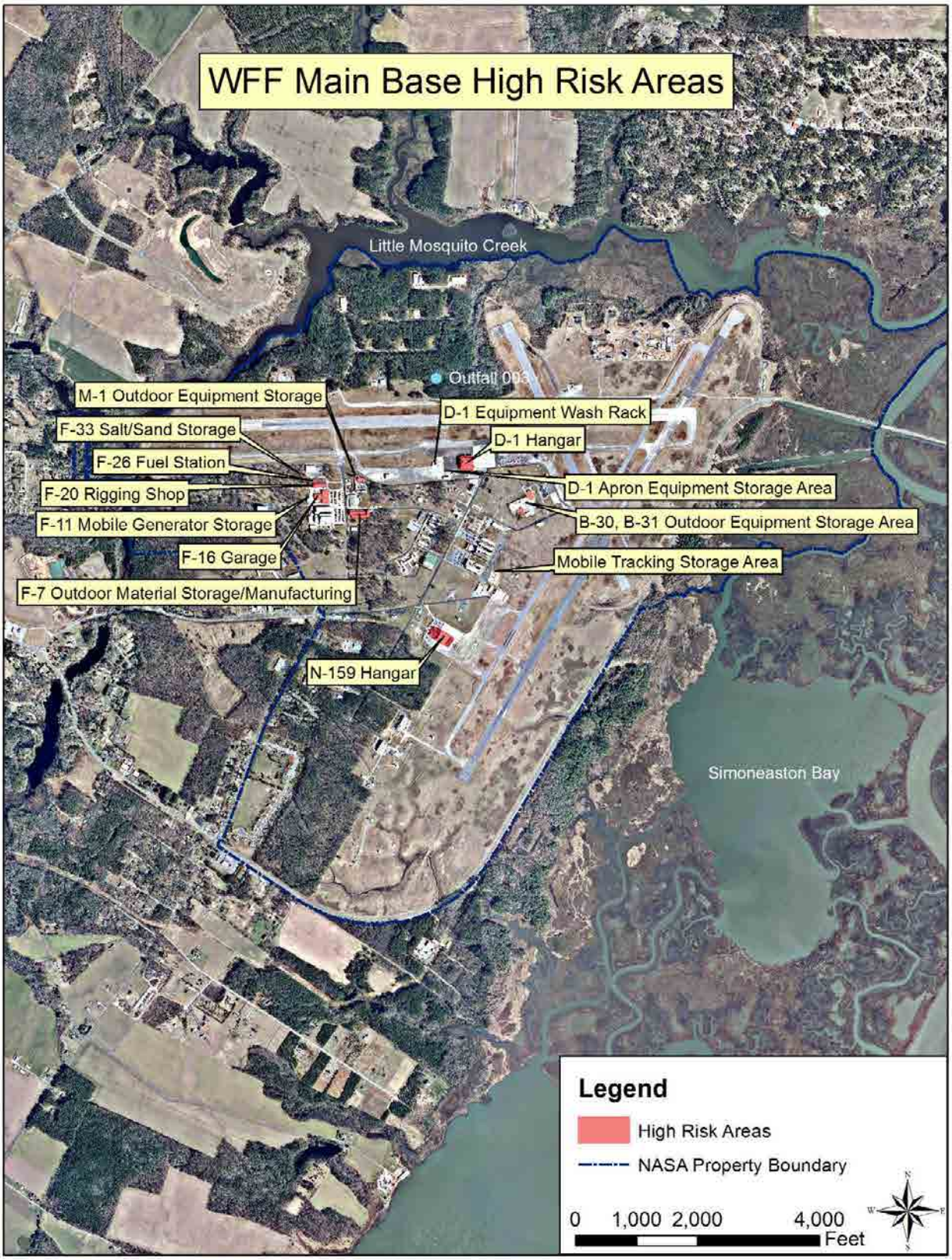

Figure 6 WFF Main Base High Risk Areas

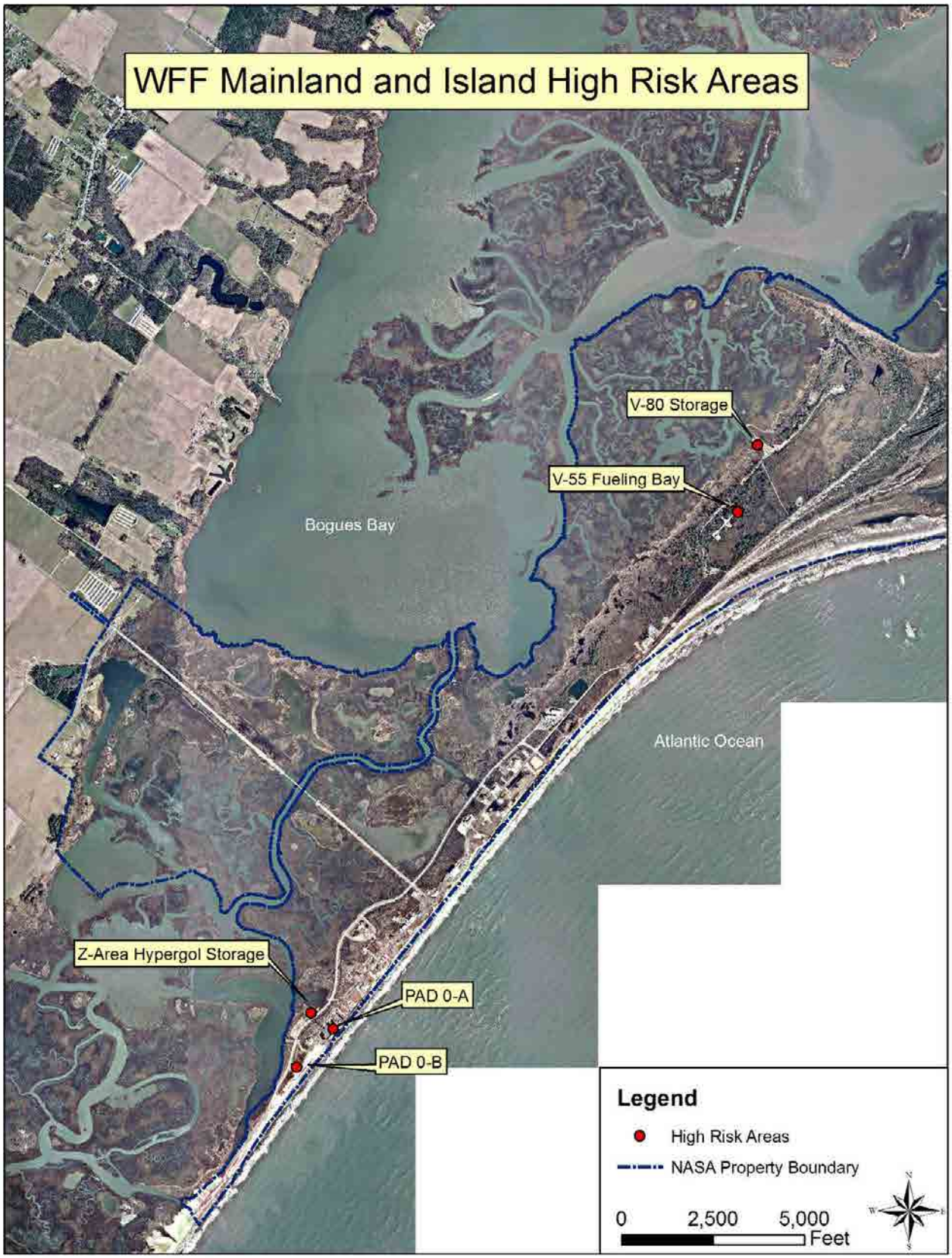

Figure 7 WFF Mainland and Wallops Island High Risk Areas

4 Measures and Controls

This SWP3 emphasizes pollutant source control as opposed to "end of pipe" control measures and devices. To reduce the potential for pollutant release at the facility, annual classroom and on-the-job training addresses materials management and emergency procedures. The potential for releases is reduced through source control measures such as secondary containment, storm water sediment and erosion controls, prudent housekeeping measures, periodic training, inspections, maintenance, and preventive measures.

The WFF Environmental Office monitors active and planned facility projects, environmental restoration programs, and mission projects for potential impacts to the environment. Potential impact to the storm water network is included in this monitoring process. Plans for construction and renovation as well as new operations are reviewed in the early planning stages to verify that appropriate storm water management procedures are planned and implemented. Should a proposed project impact the storm water network, WFF will take all necessary measures to ensure that it meets applicable storm water requirements and regulations.

4.1 Summary of Potential Pollutant Sources and Control Measures

The WFF has implemented the following control measures, listed in Table 9, to reduce the pollutant release risks associated with its industrial activities.

The WFF source control pollution prevention practices appear successful, since recent storm water sampling results (summarized in Table 5) do not indicate pollutants reaching surface waters.

4.2 Good Housekeeping and Preventive Measures

Source control measures have been implemented for the industrial activities subject to storm water.

4.2.1 Airfield Fueling Operations

Source controls for these operations include:

1. Daily fuel truck inspections to check tanker integrity and mechanical functions;
2. Monthly inspection/maintenance of oil/water separator at wash rack.
3. Fueling and wash rack areas maintained in a clean, orderly manner; and
4. Monitoring of fueling operations by trained personnel.

4.2.2 Airfield Runways

Runways are a secondary source of pollutants and are maintained to reduce runoff potential. Maintenance activities include:

1. Daily inspections by the Fire Department;
2. Sweeping and vacuuming surfaces as needed;

3. Maintenance of grass buffer zones between runways, taxiways, and storm water catch basins to intercept any loose debris and sediment not removed by airport maintenance; and
4. Annual cleaning of storm water drains.

Table 8 Current Control Measures For Potential Pollutant Sources

Standardized Industrial Classification Code	Industrial Activity	Control Measures
4581	Transportation	Warehouse loading/unloading is under roof
		Fuel loading/unloading conducted by trained personnel
		Single-Walled ASTs are being replaced with double-walled tanks Spill kits are located at each storage tank Fuel oil ASTs are diked
		Discontinued use of toxic materials/ practices on runway during training exercises
		Monitor storm water discharge under VPDES permit
		Lining of storm drain piping with polymer coating, also at Outfall 003 Main Base and Outfalls WI 06-08 Island Outfalls in limited areas.
		Leak detection systems at the gas station
		Fuel storage and incidents covered by ICP
		On-site emergency response HazMat Teams
		Oil/water separator at equipment wash rack
		Sorbent boom located downstream from Outfall 003
3460	Space Vehicles	Under roof (Payload Processing Facility), Launch vehicle fueling facility (Buildings H-100, V-055, X-079, V-139, Z-area)
	Parts Manufacturing	Reduced toxicity of materials (solvents Building F-007, F-010)
		Good housekeeping practices
	Scrapyard at N-222	No conveyance
		Restricted materials storage
		Good housekeeping practices
	Construction/ Demolition/ Restoration	Best Management Practices
		Soil Erosion and Sediment Control, Construction General Permits & BMPs
9661	Space Technology/ Research	No conveyances. Test deluge water before releasing.

4.2.3 Waste Collection

Major solid waste streams on WFF include domestic refuse, hazardous wastes, used oil, and recyclables. To ensure proper handling, the Environmental Office performs Annual RCRA Generator training for Satellite Accumulation Area points of contact. To encourage proper disposal, the Environmental Office provides collection, transportation, and storage of used or discarded hazardous wastes prior to final disposal through a permitted treatment, storage, and disposal facility. Training, coupled with these services, helps reduce the potential for releases from these waste streams. The WFF routinely provides hazardous waste management and disposal services for WFF partners and tenants at the Main Base and Wallops Island.

4.2.4 Fueling Operations

Trained personnel monitor fueling operations for facility heating and emergency generator equipment. Plant operations or logistics personnel monitor on-site fuel loading to ensure that proper procedures are followed. Spill kits are required on all delivery trucks. Aboveground storage tanks are inspected periodically for product release. If uncontrolled releases of hazardous substances occur, Wallops Fire Department is notified immediately. The WFF Environmental Office notifies DEQ within 2 hours if greater than 25 gallons of fuel spills onto the ground or has the potential to reach surface waters. After an incident investigation has been completed, that required DEQ notification, the Environmental Office submits an incident report with a corrective action report for approval to DEQ.

4.2.5 Drum Storage

The WFF Environmental Office actively works to reduce the pollution potential from outdoor drum storage and loading activities by moving the majority of these activities under shelter. An inventory of exposed materials is presented in Section 3.2. Exposed materials are periodically spot-checked to ensure no release has occurred.

4.2.6 Personal Vehicle Washing

Both the Navy and the Coast Guard maintain housing facilities for personnel stationed at Wallops Island and Chincoteague, respectively. Personnel living at these facilities are authorized to wash personal vehicles at their residences. Currently, no designated wash areas have been established. Therefore, WFF encourages its partners to instruct their personnel to not wash vehicles near storm drains but rather on vegetated areas using biodegradable detergents.

4.2.7 Launch Support

During some nominal rocket launches from Pad-0A and Pad-0B, the combustion of solid rocket fuel (ammonium perchlorate) produces hydrogen chloride (HCl), a gas which forms hydrochloric acid upon contact with water. To avoid the discharge of potentially acidic water from Pad 0-B, the drainage trench surrounding three sides of the pad is diked prior to washing and wash water is tested prior to discharge. A buffer solution (e.g., sodium bicarbonate) is added as needed to

neutralize pH to ensure that the discharge meets Virginia water quality standards. To avoid acid releases from Pad 0-A, a deluge trench and retention ponds have been constructed. Water samples are tested for pH, TSS, and sheens indicating of fuels before release. Building V-055 has an indoor deluge system for hypergol fueling emergencies and off-nominal release (releases greater than 0.5 gallon). Wastewater would be contained within a trench system inside Building V-055, neutralized, containerized, and disposed as hazardous waste. Only a large off-nominal release would create a surface or ground water discharge.

4.3 Preventive Maintenance

The Logistics Team performs biannual preventive maintenance on all government owned vehicles and equipment. Logs are retained by the Logistic steam. All contractor-owned vehicles and equipment are required to have periodic preventive maintenance in order to be used on the facility. Records are maintained by the contractor. The Ground Networks Office performs and tracks daily, weekly, monthly, quarterly, and annual preventive maintenance on all radar and antenna systems on the facility. Following the WFF ICP Work Instructions, the Facilities Management Branch periodically drains the secondary containment areas for the ASTs. The FMB also performs biannual preventive maintenance on all government owned large machinery (e.g., cranes, front end loaders, earth movers).

An oil/water separator is located near Building D-001 hangar, it is a catch basin for the wash rack. The Mobile aircraft fueling vehicles are regularly parked within an area adjacent to the wash rack. This area also drains to the oil/water separator and the mobile equipment is inspected regularly by the Logistics Team for containment integrity and proper mechanical function. The wash rack/mobile equipment storage area separator is inspected monthly and emptied as necessary by NASA FMB contractors.

A second oil/water separator is located on the east side of the cropper center. It is a catch basin for activities at the Cropper Center and the adjacent equipment maintenance facility. This oil/water separator is inspected by US Navy personnel and serviced as necessary by NASA FMB contractors.

A third oil/water separator is located at Building V-27 Wallops Island Fire Station. Wallops Island Emergency Vehicles are washed at this location. The oil water separator accepts water from vehicles washed in bays inside the building. As of the writing of this plan, washing has not occurred at this location. This oil water separator will be inspected monthly.

4.4 Spill Prevention and Response Procedures

The ICP delineates the spill prevention, response control, and cleanup procedures. These procedures are utilized in the event of a spill. The ICP was prepared for WFF in order to combine SPCC and Incident Briefing Plan book which details tanks, prediction of the spill direction and contact of storm water outfalls. Contractor personnel provide on-site fire, emergency, and hazardous material (Haz Mat) response services for WFF. Spill response kits are located in major

industrial areas such as satellite accumulation areas, 90-day hazardous waste storage buildings, vehicle maintenance garages, aboveground and underground storage tank locations, and airport hangars.

The ICP must identify and address the response to a realistic Worst Case Scenario (as defined by *9 VAC 25-91-170.11*). Based on the different missions and layout, (two operational areas, Main Base and Island operations), *more than one potential Worst Case Scenario for the facility is detailed.*

Scenario #1: D-9A and D-9B on the Main Base are the two largest single-wall ASTs within a concrete secondary containment. Both tanks are 20,000 gallons and sit within a shared containment area. The Building D-009A/D-009B AST spill scenario is the instantaneous release of the volume of either of these tanks, which contain #2 fuel oil. The volume of the dike is approximately 64,227 gallons which is greater than the 110 percent containment criteria of 44,000 gallons. If both tanks were to rupture simultaneously, the dike area would be sufficient to contain the total volume released. However, utilizing the calculation for the "slosh factor," 11,000 gallons of #2 fuel oil could potentially spill over the secondary containment dike if both tanks rupture.

Scenario #2: It was theorized that the worst case might involve the rupture of either the fuel hose or tank of an aircraft fueling tanker while it is on the apron of the tarmac. The largest tanker has a capacity of 6,000 gallons and a fueling rate of 100 gallons per minute (gpm). At regular grid intervals, storm water inlets are located on the apron of the runway. The inlets are interconnected by the storm water piping and drain to outfalls around the runway. Many of these outfalls lead to bodies of surface water. Therefore, if a tanker were to rupture on the apron, a potential release of 6,000 gallons of fuel oil could enter the surface waters of the Commonwealth (see Figure 2). Aircraft fueling operations occur at two locations on the facility: the east ramp of Hangar D-001 and the east ramp of Hangar N-159. Since more aircraft are fueled on the east ramp at Hangar D-001, a spill occurring at this site was considered as the "Worst Case Scenario" and a small percent occurring at Hangar N-159. To support this theory, the Environmental Office conducted a simulated spill exercise on the runway apron east of Hangar D-001. After 41 minutes, the released liquid had reached surface waters through Outfall 003. The released liquid failed to reach the tributary to Little Mosquito Creek after several hours. Further results and details of the simulated spill exercise are included in the ICP.

Scenario #3: Rupture of the Launch Pad 0-A Liquid Fueling Facility 30,000 gallon RP-1 (kerosene) AST and piping, at the Mid-Atlantic Regional Space Port (MARS). This MARS AST is the largest single wall tank on Wallops Island and sits within a concrete secondary containment. The AST, piping, and pumps are located within 100 yards of the Atlantic Ocean and 100 feet from a storm water inlet and wetlands. The RP-1 AST is used during fueling operations of expendable launch vehicles. The MARS AST spill scenario is the instantaneous release of the volume of the 30,000 gallons RP-1 AST. A concrete secondary containment dike surrounds the AST. The volume of the dike is approximately 43,000 gallons, which is greater than the 110% percent

containment criteria of 33,000 gallons. If the tank was to rupture, the diked area would be sufficient to contain the total volume released from the AST. However, utilizing the calculation for the "slosh factor," 2,750 gallons of RP-1 could potentially spill over the secondary containment dike if the tank ruptured and would be immediately reportable to authorities

In determining the worst-case spill for the tank area, it is assumed that a release would occur and not be contained due to a failure of the pumping system or tank fitting on the pressurized tank system which allows the product to spray under pressure outside the containment area. The area around the AST was designed to drain to a water retention basin located south of the tank farm. The retention basin has a controlled discharge that can be operated by MARS personnel to capture a large release. Further areas, located at the MARS site were reviewed to determine potential leak scenarios and are available in the ICP.

4.5 Inspections

The current VPDES permit requires WFF to perform quarterly visual inspections of its permitted storm water outfalls. One condition of this SWP3 is for WFF to perform quarterly inspections of high risk areas as listed in Table 9. Table 9 is a summary of Table 3, Inventory of Materials Exposed to Precipitation, Table 5 Hazardous Waste Satellite Accumulation areas and Section 3.7.5 Other Potential Pollutant Sources. A second condition of this SWP3 is to prepare an annual Comprehensive Site Compliance Evaluation (CSCE) report to determine if activities at or near storm water discharge points have the potential of polluting or negatively impacting waters of the Commonwealth. As a part of the CSCE, the Wallops Environmental Team also inspects all storm water drop inlets annually. All findings and recommendations are reported immediately to the appropriate department for corrective action (e.g., Facilities Management Branch, Logistics). Under conditions of the ICP, the Environmental Office also performs annual inspections on all AST systems and any other vessel that could contain 55 gallons or more of any animal, vegetable, mineral, or petroleum based oil. All findings and recommendations are reported immediately to the appropriate department for corrective action. Appendix B contains sample inspection forms.

Table 9 Quarterly High Risk Areas

Area to Inspect	Potential Pollutant Sources
B-30 and 31 - Outdoor storage	Oils, lubricants, gasoline, diesel fuel
D-1 Aprons - mobile equipment storage	Jet Fuels, Diesel fuel, hydraulic oils, Antifreeze
D-1 Equipment Wash Rack Oil/Water Separator	Diesel fuel, hydraulic oils
D-1 Hangar (floor drains) beyond doors	Used oil, Jet A, hydraulic oils
D-53 Sludge Drying Beds	Sludge waste potential overflow
E Area Mobile tracking pad	Diesel fuel, hydraulic oil, glycols
F-11 Mobile Generator Storage	Diesel fuel, hydraulic oil, glycols

Table 9 Quarterly High Risk Areas	
Area to Inspect	**Potential Pollutant Sources**
F-16 Garage	Gasoline, diesel fuel, hydraulic oil, motor oils, antifreeze, glycols, brake fluids, methanol, battery acids
F10 to F-20-outdoor storage	Diesel fuel, hydraulic oil
F-26 - Fuel station	Gasoline, diesel fuel, absorbents
F-33 - Salt/sand storage	Salt and sediment
M-1 - Outdoor storage	Mineral oil (electoral transformers), No. 2 Fuel
N-159 Hangar (floor drains)	Jet A, Used oil, lubricating oils, hydraulic oils
Pad 0-A	Launch pad and gantry wash water, deluge water, RP-1, diesel fuel
Pad 0-B	Launch pad and gantry wash water, diesel fuel, acids
V-80 Storage	Diesel fuel, hydraulic oil
N-222 Scrap Yard	Diesel fuel, hydraulic oil, motor oils, battery acids, antifreeze, glycols
Cropper Center – Navy (oil/water separator)	Diesel fuel

A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections and entered into a Safety, Health, and Environmental tracking database (SHE Track). The non-conformances will be reviewed and evaluated by a Responsible Supervisor or Manager. Non-conformances will be reviewed semiannually to ensure the action is closed with documentation/evidence of completion.

The basic outline for decision-making for a nonconformance is:

- Define the problem
- Assign responsibility for researching the problem
- Develop a corrective action plan to resolve the problem
- Implement and monitor corrective actions to ensure resolution
- Document the problem, the corrective actions taken, and the dates involved

The FMB performs the following: daily inspections of the Mobile Tanker Storage Area and of the mobile tankers, daily meter readings reconciled against biweekly stick-tests of the gasoline and diesel ASTs at the F-26 gas station. The FMB performs visual inspections on the two 20,000 gallon number 2 fuel oil ASTs daily as well as periodic visual inspections and draining of the secondary containment for all ASTs on the facility. The wash rack is inspected monthly and emptied when necessary. The FMB maintains inspection records for their water separator. Tank inspectors confirm that the inspections are completed.

Sediment and erosion control structures and construction site storm water measures are inspected by FMB as detailed below. Inspection logs are retained by FMB and the WFF Environmental Office when a construction Storm Water Management Plan is required.

Spill response equipment is inspected for contents, condition, and availability. This equipment is maintained in the Fire Department Buildings B-129 and X-005 and the Hazardous Waste Storage Buildings B-029 and U-081. These areas are inspected and maintained by the WFF Fire Department and the Environmental Office personnel, respectively.

4.6 Employee Training

The WFF maintains a staff trained in the implementation of the ICP, spill response, materials management practices, and hazardous waste response procedures. The WFF Fire Department maintains first level responder proficiency in all areas. Table 11 lists the training events and the frequency of event:

The WFF's VPDES permit requires employee storm water pollution prevention training. To meet this requirement, the training program for the ICP includes storm water management, pollution prevention, spill response, good housekeeping measures, and materials management modules. Facilities maintenance, environmental, logistics, aircraft operations, fire department, radar maintenance, and personnel involved in the maintenance and use of the storage tanks attend this annual training conducted by the Environmental Office.

Table 10 Training Events And Frequency Of Attendance

Training Program	Frequency
HAZMAT I	Every five years
HAZMAT II	Every five years
HAZMAT III	Every five years
EPA Spill Response & Boom Recovery	One time
OSHA HAZWOPER Refresher	Annual
RCRA Update	Annual
ICP/SWP3 Training	Annual
Hazardous Materials Awareness	One time
Fire Department Continuing Education	Monthly
Hypergol, Compressed Gas and Cryogenics Safety Training	Every three years
DOT HM-126-F HAZMAT Awareness	Every three years

4.7 Recordkeeping and Internal Reporting Procedures

The ICP specifies internal and external incident reporting requirements. All incidents must be reported to the WFF Fire Department. The WFF Fire Department logs incident reports that they respond to and sends a copy to the Environmental Office. Incident reports, reported releases, and remediation files that Wallops Environmental Team responds to are maintained by the Environmental Office.

The Environmental Office conducts, at a minimum, once quarterly visual inspections of the permitted storm water outfalls, quarterly inspections of high risk areas (areas exposed to precipitation as identified in Table 3) and annual visual inspections of all storm water drop inlets. The results of these inspections are compiled into the annual CSCE report. Copies of the monthly discharge monitoring reports are submitted electronically to DEQ by the WFF. The Logistics Team, FMB, and Ground Networks Office maintain records and logs within their areas of responsibility as described above.

4.8 Sediment and Erosion Control

The WFF is located on the Atlantic Coastal Plain of Virginia and occupies an area with elevations ranging from sea level to approximately 40 feet above sea level. Buildings are located on flat or gently sloping grades (0 to 2 percent). The WFF perimeters have occasional incised streambeds or embankments on the tidal fringe. Most of the site is not highly erodible, however its proximity to wetlands and its elaborate storm drainage system (a direct conduit to surface waters) elevate the risk of storm water pollution from land disturbing activities.

NASA has a formal process in place to ensure that new construction and demolition at WFF have a minimal impact on surface water resources and that all applicable permits and regulatory controls are in place. This process is depicted in the flow chart below. If a land disturbing activity disturbs at least 10,000 square feet or presents an elevated risk of storm water pollution, it man require a site specific Erosion and Sediment Control Plan is prepared and submitted to the WFF Environmental Office for review and FMB approval. Current BMPs employed for storm water management and erosion and sediment control include installing silt fences, utilizing stone construction vehicle entrances, maintaining vegetative buffer strips, and quickly reseeding bare soils. All Plans and applicable BMPs are consistent with the Virginia Erosion and Sediment Control Program, which is administered by the Virginia Department of Environmental Quality (VDEQ). Furthermore, any of these activities that impact at least 1 acre require coverage under a *Virginia Storm Water Management Program (VSMP)* General Construction permit.

The tenant and/or contractor typically holds several *VSMP General Permits* for various land disturbing activities at WFF. The SWP3s are prepared for these permits and are updated as needed to reflect current conditions at active construction, demolition, or land clearing sites. The SWP3s are available for inspection at each active land disturbing activity operating under the permit. The VSMP Permit mandates that qualified construction inspectors evaluate sediment and erosion control practices and controls every 14 calendar days or within 48 hours of a runoff producing

storm event; FMB inspectors perform this function. Any deficiencies or discrepancies are repaired within 7 calendar days. Inspection logs are maintained by FMB.

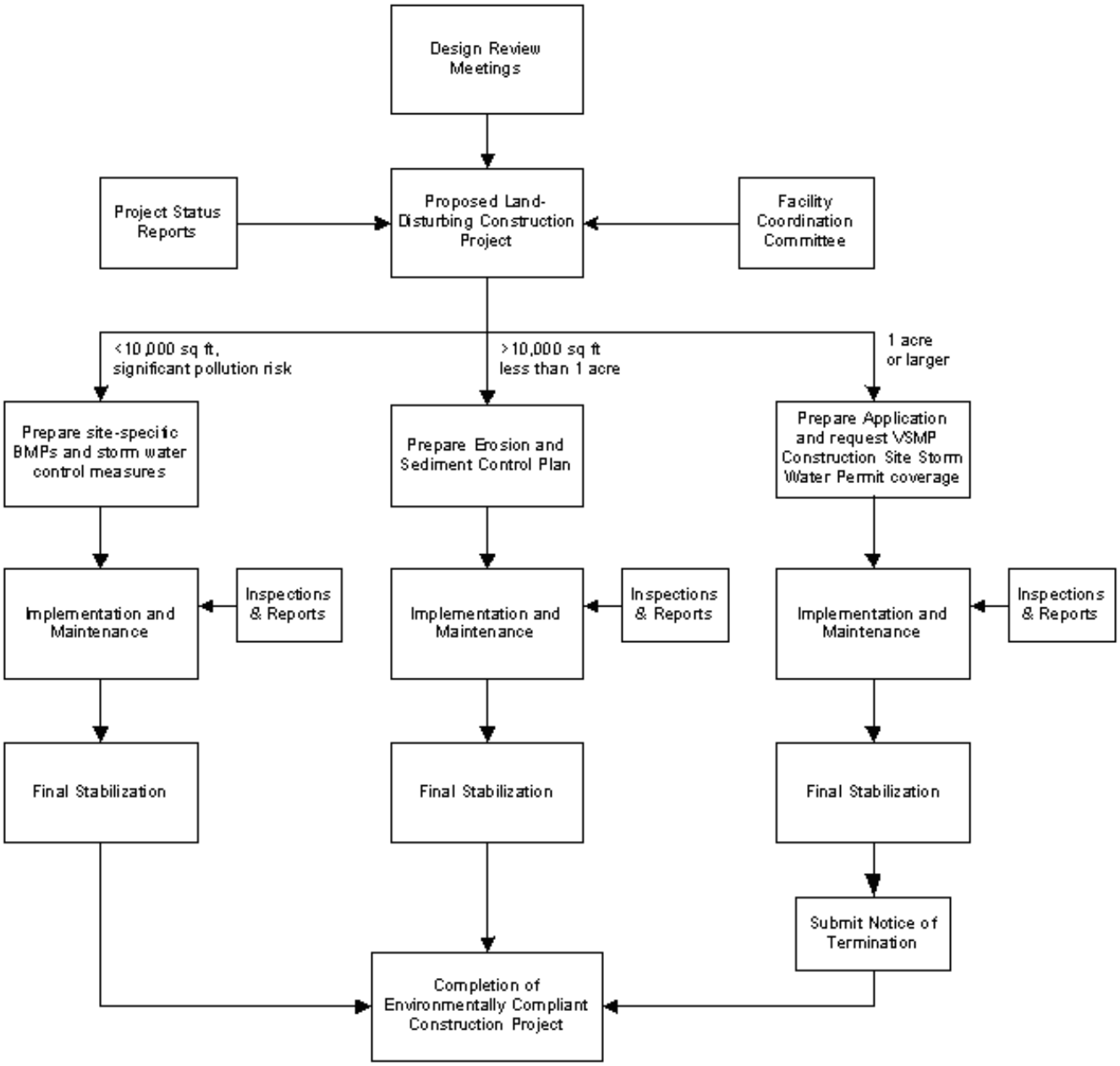

CHART 1

Process for Minimizing Environmental Impacts from Proposed Land-Disturbing Construction Projects

4.9 Management of Runoff

Storm water inlets on the Main Base intercept runoff and divert the flow to numerous discharge locations (see Figure 2). Wallops Main Base storm water is discharged through Outfalls numbered 003 through 010, 012 through 014, and NOAA outfalls (see Figure 2). Wallops Island storm water discharges flow to Outfalls 031-039 (see Figure 3). Main Base outfalls are protected with rip-rap to reduce flow velocity and to minimize damage to the receiving waterways. Airfield safety requirements require that no settling ponds are employed at the facility due to the possibility of attracting waterfowl. Wallops Island outfalls are controlled by sluice gates that can be adjusted based upon flow conditions. In addition to the storm water management system, sediment and erosion control measures are implemented to control runoff from construction, demolition, restoration, and site maintenance projects.

5 Comprehensive Site Compliance Evaluation

As described in Section 4.6 of this Plan, the WFF Environmental Office performs regular inspections of the facility and prepares a Comprehensive Site Compliance Evaluation report annually. Corrections are targeted for completion no later than 90 days following an inspection. The SWPPT members review the CSCE Report and recommend and implement any necessary corrective actions. Any necessary revisions to this SWP3 are made within 14 days of the compliance report and implementation of such changes occurs no later than 90 days following the completion of the report. The report shall be signed in accordance of the VPDES permit Signatory Requirements. (Ref. Letter of Delegation of Signatory Authority dated Apr 11, 2012 from William Wrobel, Director of Wallops Flight Facility and email dated February 21, 2012 from Mark Sauer, DEQ).

6 Special Pollution Prevention Requirements

Pursuant to Permit No. VA0024457, Wallops Flight Facility certifies that the EPCRA Section 313 water priority chemicals stored onsite at the Facility; namely lead and lead compounds, are handled and stored onsite only in the form of non-soluble solids. These forms are as follows:

Metallic lead is stored in the form of:

- Sheet lead (Pb) and lead ingots in Buildings F-09 and F-10. The lead is cut using mechanical brake systems and used to balance rocket sections and payloads. Tailings are collected and reused or recycled.
- Tire balancing weights in the Building F-16 Garage. These small weights are clipped to the rims of tires to balance them. They are not altered or machined in any way and are stored in compartmentalized trays on work benches situated at the tire balancing area.

- Various solder compositions in laboratories and shops throughout the facility. Solder beads are collected and disposed of as hazardous waste.

All metallic lead is stored under roof. Lead in batteries receives an article exemption.

Lead compounds are stored as minor constituents in nitrocellulose/nitroglycerine rocket (double base) motors. They are: lead beta resorcylate, lead 2-ethyl hexoate, lead salicylate, and lead stearate. The compounds are situated in an insoluble nitrocellulose matrix, which is then enclosed within the aluminum shell of the rocket. The propellant arrives at WFF already encased within the rocket shell. Handling of the actual propellant is rarely performed at WFF. All trimmings are handled as hazardous waste and stored in closed labeled containers at the SAA. All of the rockets are stored under roof at the following buildings: M-009, M-010, M-011, M-012, M-014, M-015, M-022, and V-067.

When these double base rockets are ignited on the launch pad, they are either static fired or launched. In the case of rocket motors undergoing static firing (i.e., they are prevented from leaving the launch pad), particulate matter and lead are regulated under the Clean Air Act through the Virginia Department of Environmental Quality and emission limits are enforced through State Operating Permit No. 40909 for the Wallops Island Launch Range. Hazardous waste rocket motors which are static fired at the Open Burning Area are regulated by the Resource Conservation and Recovery Act Permit for the Open Burning Treatment of Hazardous Waste VA7800020888.

For rockets in flight, however, these motors are considered “mobile sources” since the emissions are spread out over hundreds of miles while over the ocean and dissipated to negligible levels by atmospheric mixing. Moreover, these rockets are launched under strict meteorological conditions designed to protect the public to the north and west. This will minimize deposition in waters of the State. Best Management Practices to prevent accidental release of lead compounds from rocket motors are included in the GSFC-STD-8009 Range Safety Manual for Goddard Space Flight Center (GSFC) WFF.

Rigorous analysis of our sounding rocket program, conducted under the National Environmental Policy Act, resulted in a Finding of No Significant Impact in the Sounding Rocket Program Supplemental Environmental Impact Statement.

7 Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Glenn D. Lilly 3/28/19

(Signature) (Date)

Glenn D. Lilly, Head, Facilities Management Branch

(Printed Name and Title)

NASA Wallops Flight Facility

Building N-161, Code 228

Wallops Island, VA 23337

(757)-824-1299

(Office Name, Address, and Telephone Number)

APPENDIX A

SAMPLE DISCHARGE MONITORING REPORT (DMR)
VPDES PERMIT No. VA0024457

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

DEPT OF ENVIRONMENTAL QUALITY
(REGIONAL OFFICE)

Tidewater Regional Office
5636 Southern Boulevard

Virginia Beach, VA 23462

PERMITTEE NAME/ADDRESS (INCLUDE FACILTY NAME/LOCATION IF DIFFERENT)

NAME: US NASA - Wallops Flight Facility - Main Base
ADDRESS: Building N-161
Wallops Island, VA 23337

FACILITY LOCATION: 34200 Fulton St
Wallops Island, VA 23337

VA0024457	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2017	08	01	TO	2017	08	31

NOTE READ PERMIT AND GENERAL INSTRUCTIONS BEFORE COMPLETING THIS FORM.

Parameter		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE	LAB CODE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS				
FLOW	REPORTD	0 067	0 214	MGD	*****	*****	*****		0	CONT	REC	
PARAM CODE: 001	REQRMNT	0 3	NL		*****	*****	*****			CONT	REC	
pH	REPORTD	*****	*****		6 9	*****	7 7	SU	0	1/DAY	GRAB	
PARAM CODE: 002	REQRMNT	*****	*****		6 0	*****	9 0			1/DAY	GRAB	
TSS	REPORTD	0 10	0 09	KG/D	*****	0 17	0 37	MG/L	0	3D/W	24HC	
PARAM CODE: 004	REQRMNT	11	17		*****	10	15			3D/W	24HC	
COLIFORM, FECAL	REPORTD	*****	*****		*****	3	*****	N/CML	0	3D/W	GRAB	
PARAM CODE: 006	REQRMNT	*****	*****		*****	200	*****			3D/W	GRAB	
DO	REPORTD	*****	*****		7 5	*****	*****	MG/L	0	1/DAY	GRAB	
PARAM CODE: 007	REQRMNT	*****	*****		5 5	*****	*****			1/DAY	GRAB	
TKN (N-KJEL)	REPORTD	<0 1505	<0 1411	KG/D	*****	<0 50	<0 50	MG/L	0	3D/W	24HC	
PARAM CODE: 068	REQRMNT	3 4	5 1		*****	3 0	4 5			3D/W	24HC	
E COLI	REPORTD	*****	*****		*****	4	*****	N/CML	0	3D/W	GRAB	
PARAM CODE: 120	REQRMNT	*****	*****		*****	126	*****			3D/W	GRAB	

GENERAL PERMIT REQUIREMENTS OR COMMENTS
OUTFALL-SPECIFIC COMMENTS
PARAMETER-SPECIFIC COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)
	0	0	0

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

OPERATOR IN RESPONSIBLE CHARGE			
Vibart A Chandler		VA1965005950	
TYPED OR PRINTED NAME		CERTIFICATE NUMBER	
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE	757-824-1083
		2017-09-07 08:14:52	
TYPED OR PRINTED NAME	SIGNATURE	Date	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

DEPT OF ENVIRONMENTAL QUALITY
(REGIONAL OFFICE)

Tidewater Regional Office
5636 Southern Boulevard

Virginia Beach, VA 23462

PERMITTEE NAME/ADDRESS (INCLUDE FACILTY NAME/LOCATION IF DIFFERENT)

NAME: US NASA - Wallops Flight Facility - Main Base
ADDRESS: Building N-161
Wallops Island, VA 23337

FACILITY LOCATION: 34200 Fulton St
Wallops Island, VA 23337

VA0024457	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2017	08	01	TO	2017	08	31

NOTE READ PERMIT AND GENERAL INSTRUCTIONS BEFORE COMPLETING THIS FORM.

Parameter		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE	LAB CODE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS				
CBOD5	REPORTD	0 08	0 37	KG/D	*****	0 22	1 03	MG/L	0	3D/W	24HC	
PARAM CODE: 159	REQRMNT	11	17		*****	10	15			3D/W	24HC	
COPPER, TOTAL RECOVERABLE	REPORTD	*****	*****		*****	34 5	66 0	UG/L	1	1/M	24HC	
PARAM CODE: 203	REQRMNT	*****	*****		*****	19	19			1/M	24HC	

GENERAL PERMIT REQUIREMENTS OR COMMENTS
OUTFALL-SPECIFIC COMMENTS
PARAMETER-SPECIFIC COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)
	0	0	0

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

OPERATOR IN RESPONSIBLE CHARGE			
Vibart A Chandler		VA1965005950	
TYPED OR PRINTED NAME		CERTIFICATE NUMBER	
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE	757-824-1083
		2017-09-07 08:14:52	
TYPED OR PRINTED NAME	SIGNATURE	Date	

PART I

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from outfall(s): 001.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	Monthly Average		Weekly Average		Minimum	Maximum	Frequency	Sample Type
Flow (MGD) [2]	NL		NA		NA	NL	Continuous	Totalizing, Indicating & Recording Equipment
pH (S.U.)	NA		NA		6.0	9.0	1/Day	Grab
$CBOD_5$ (mg/l; kg/d) [a]	10	11	15	17	NA	NA	3D/Week	24-Hr. Comp
Total Suspended Solids (mg/l; kg/d) [a]	10	11	15	17	NA	NA	3D/Week	24-Hr. Comp
Dissolved Oxygen (mg/l)	NA		NA		5.5	NA	1/Day	Grab
Fecal Coliform (N/CML)	200		NA		NA	NA	3D/Week (Between 10 AM & 4 PM)	Grab
E. coli (N/100ml)	126		NA		NA	NA	3D/Week (At 48 Hr. intervals (between 10am and 4 pm)	Grab
Total Kjeldahl Nitrogen (TKN) (mg/l; kg/d)	3.0	3.4	4.5	5.1	NA	NA	3/D/Week	24-Hr. Comp
Total Copper (ug/l)	19		19		NA	NA	1/Month	24-Hr. Comp

NA = Not Applicable.
NL = No limitation, however, reporting is required.

Upon issuance of the permit, Discharge Monitoring Reports (DMRs) shall be submitted to the regional office at the frequency required by the permit regardless of whether an actual discharge occurs. In the event that there is no discharge for the monitoring period, then "no discharge" shall be reported on the DMR.

[a] See Part I.B.7. for reporting requirements.

2. The design flow of this treatment facility is 0.3 MGD.
3. There shall be no discharge of floating solids or visible foam in other than trace amounts.
4. At least 85% removal for BOD and TSS must be attained for this effluent.

PART I

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from outfall(s): 003 (Stormwater from the airfield areas, fuel tank area, covered satellite accumulation areas, buildings, roadways, parking areas and grassy areas).

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS [a]	
	Minimum	Maximum	Frequency	Sample Type
Flow (MG)	NA	NL	1/3 Months	Estimate[b]
pH (S.U.)	6.0	9.0	1/3 Months	Grab
pH, Precipitation event (S.U.)[e]	NL	NL	1/3 Months	Grab
Total Suspended Solids (mg/l)[c]	NA	NL	1/3 Months	Grab
Total Petroleum Hydrocarbons (mg/l) [c][d]	NA	NL	1/3 Months	Grab

NA = Not Applicable.
NL = No limitation, however, reporting is required.
1/3 Months = In accordance with the following schedule: 1st quarter (January 1 - March 31); 2nd quarter (April 1 - June 30); 3rd quarter (July 1 - September 30); 4th quarter (October 1 - December 31).

Upon issuance of the permit, Discharge Monitoring Reports (DMRs) shall be submitted to the regional office at the frequency required by the permit regardless of whether an actual discharge occurs. In the event that there is no discharge for the monitoring period, then "no discharge" shall be reported on the DMR.

[a] See Part I.C. for additional stormwater sampling and reporting requirements.
[b] Estimate of the total volume of the discharge during the storm event.
[c] See Parts I.B.7. for reporting requirements.
[d] TPH is the sum of individual gasoline range organics and diesel range organics (TPH-GRO and TPH-DRO).
[e] Reporting shall only be required if the effluent pH is less than 6.0 S.U. If not reported, "NR" shall be reported on the DMR. The pH value of the precipitation causing a discharge shall be used for comparison to the effluent pH. Samples taken for this purpose shall be representative of the precipitation, and collected prior to contacting any soils, buildings or other impervious surfaces at the facility. The permittee shall sample and report this rainfall pH with the DMR. See Part I.B.11. for additional instructions regarding pH precipitation monitoring requirements.

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.

PART I

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from outfall(s): 004-010, 012, 013, 014 (storm water runoff from main base airfield, runways, taxiways, and grassy areas)

   Such discharges shall be limited and monitored by the permittee as specified below:

   THIS OUTFALL SHALL CONTAIN ONLY STORM WATER RUNOFF ASSOCIATED WITH A REGULATED INDUSTRIAL ACTIVITY WHERE NO CHEMICAL MONITORING IS REQUIRED. THERE SHALL BE NO DISCHARGE OF PROCESS WASTEWATER FROM THIS OUTFALL. QUARTERLY VISUAL INSPECTIONS IN ACCORDANCE WITH PART I.C. SHALL BE CONDUSCTED AT THESE OUTFALLS.

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.

PART I

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from outfall(s): 021-024, 031-036 (storm water runoff from 021-024: NOAA spacecraft tracking facilities; 031-036: Wallops Island launch facilities, office areas, fuel storage areas, roadways, parking areas and grassy areas; 035: also drains radar and tracking facilities)

   Such discharges shall be limited and monitored by the permittee as specified below:

   THIS OUTFALL SHALL CONTAIN ONLY STORM WATER RUNOFF NOT ASSOCIATED WITH A REGULATED INDUSTRIAL ACTIVITY WHERE NO MONITORING IS REQUIRED. THERE SHALL BE NO DISCHARGE OF PROCESS WASTEWATER FROM THIS OUTFALL.

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.

PART I

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from outfall(s): 037 and 038 (Stormwater associated with industrial activities from Wallops Island orbital launch facilities, fuel storage areas, office areas, liquid fueling facility, launch pad wash waters, deluge system; 039: Stormwater from Northern Wallops Island liquid fueling facility, deluge system).

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS [a]	
	Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NA	NA	NL	1/6 Months	Estimate[b]
pH (S.U.)	NA	NA	6.0	9.0	1/6 Months	Grab
pH, Precipitation Event (S.U.)[e]	NA	NA	NL	NL	1/6 Months	Grab
Total Suspended Solids (mg/l)[c]	NA	NA	NA	NL	1/6 Months	Grab
Total Petroleum Hydrocarbons (mg/l)[c][d]	NA	NA	NA	NL	1/6 Months	Grab
Perchlorate [mg/l]	NA	NA	NA	1.4	1/6 Months	Grab

NA = Not Applicable.
NL = No limitation, however, reporting is required.
1/6 Months = In accordance with the following schedule: 1st half (January 1 - June 30); 2nd half (July 1 - December 31).

Upon issuance of the permit, Discharge Monitoring Reports (DMRs) shall be submitted to the regional office at the frequency required by the permit regardless of whether an actual discharge occurs. In the event that there is no discharge for the monitoring period, then "no discharge" shall be reported on the DMR.

[a] See Part I.C. for additional stormwater sampling and reporting requirements.
[b] Estimate of the total volume of the discharge during the storm event.
[c] See Parts I.B.7. for reporting requirements.
[d] TPH is the sum of individual gasoline range organics and diesel range organics (TPH-GRO and TPH-DRO).
[e] Reporting shall only be required if the effluent pH is less than 6.0 S.U. If not reported, "NR" shall be reported on the DMR. The pH value of the precipitation causing a discharge shall be used for comparison to the effluent pH. Samples taken for this purpose shall be representative of the precipitation, and collected prior to contacting any soils, buildings or other impervious surfaces at the facility. The permittee shall sample and report this rainfall pH with the DMR. See Part I.B.11. for additional instructions regarding pH precipitation monitoring requirements.

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.

APPENDIX B

SAMPLE INSPECTION FORMS

STORM WATER DISCHARGE EVALUATION

Outfall Number and Location _____

Assessor's Name_____ Assessor's Organization_____

Date: _____

Time: _____

Weather conditions: **Clear skies** **Sunny** **Snowing**
Rainy **Foggy** **Drizzling**
Hazy **Cloudy** **Flurrying**

NATURE OF DISCHARGE	
Color	
Odor	
Clarity	
Floating Solids	
Settled Solids	
Suspended Solids	
Foam	
Oil Sheen	
Other indicators of pollution	

Signature:_____ Date:_____

Quarterly High Risk Areas Inspection
Quarter:_____

Area to Inspect	Potential Pollutant Sources	No Finding	Comments
B-30 and 31 - Outdoor storage	Oils, lubricants, gasoline, diesel fuel		
D-1 Apron - mobile equipment storage	Jet Fuels, Diesel fuel, hydraulic oils, Antifreeze		
D-1 Equipment Wash Rack Oil/Water Separator	Diesel fuel, hydraulic oils		
D-1 Hangar (floor drains) beyond doors	Used oil, Jet A, hydraulic oils		
D-54 Sludge Drying Beds **D-53** Sludge Drying Beds	Sludge waste potential overflow		
E Area Mobile tracking pad	Diesel fuel, hydraulic oil, glycols		
F-11 Mobile Generator Storage	Diesel fuel, hydraulic oil, glycols		
F-16 Garage	Gasoline, diesel fuel, hydraulic oil, motor oils, antifreeze, glycols, brake fluids, methanol, battery acids		
F10 toF-20-outdoor storage	Diesel fuel, hydraulic oil		
F-26 - Fuel station	Gasoline, diesel fuel, absorbents		
[illegible] - Salt/sand storage	Salt and sediment		
M-1 - Outdoor storage	Mineral oil (electoral transformers), No. 2 Fuel		
N-159 Hangar (floor drains)	Jet A, Used oil, lubricating oils, hydraulic oils		
Pad O-A	Launch pad and gantry wash water, deluge water, RP-1, diesel fuel		
Pad O-B	Launch pad and gantry wash water, diesel fuel, acids		
V-80 Storage	Diesel fuel, hydraulic oil		
N222 Scrap Yard	Diesel fuel, hydraulic oil, motor oils, batter acids, antifreeze, glycols		
Cropper Center – Navy (oil/water separator)	Diesel fuel, hydraulic oil, cooking oils		

Signature indicates that inspection was performed.

_____ Inspector's Signature

_____ Date of Inspection

_____ Reviewer's Signature

_____ Date

APPENDIX C

OUTFALL LOCATIONS

Outfall Location

For each outfall, the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. Outfall Number	B. Latitude	C. Longitude	D. Receiving Water
001	37 Degrees 56’ 45” N	75 Degrees 28’ 45” W	Little Mosquito Creek
003	37 Degrees 56’ 38”N	75 Degrees 28’ 42”W	Little Mosquito Creek
004	37 Degrees 55’ 38”N	75 Degrees 29’ 0”W	Little Mosquito Creek
005	37 Degrees 56’ 40” N	75 Degrees 28’ 03” W	Little Mosquito Creek
006	37 Degrees 56’ 46”N	75 Degrees 28’ 08”W	Little Mosquito Creek
007	37 Degrees 55’ 46”N	75 Degrees 27’ 57”W	Little Mosquito Creek
008	37 Degrees 56’ 28” N	75 Degrees 27’22” W	Little Mosquito Creek
009	37 Degrees 56’ 04”N	75 Degrees 27’ 16”W	Jenneys Gut
010	37 Degrees 56’ 61”N	75 Degrees 27’ 09”W	Jenneys Gut
012	37 Degrees 56’ 46” N	75 Degrees 27’ 57” W	Little Mosquito Creek
013	37 Degrees 56’ 39”N	75 Degrees 28’ 65”W	Little Mosquito Creek
014	37 Degrees 55’ 16”N	75 Degrees 28’ 65”W	Simoneaston Bay
NOAA 1	37 Degrees 56’ 53.915” N	75 Degrees 27’ 50.048” W	Little Mosquito Creek
NOAA 2	37 Degrees 56’ 53.088” N	75 Degrees 27’ 46.283” W	Little Mosquito Creek
NOAA 3	37 Degrees 56’ 51.291” N	75 Degrees 27’ 39.684” W	Little Mosquito Creek
NOAA 4	37 Degrees 56’ 52.893” N	75 Degrees 27’ 27.171” W	Little Mosquito Creek

Mainland/Island Outfalls

WI-1-031	37 Degrees 51’ 7.27"N	75Degrees 28' 22.62"W	Cat Creek
WI-2-032	37 Degrees 51’ 4.97”N	75 Degrees 28’24.82”W	Cat Creek
WI-3-033	37 Degrees 50’ 36.76”N	75 Degrees 28’53.47”W	Cat Creek
WI-4-034	37 Degrees 50’ 33.68”N	75 Degrees 29’4.09”W	Cat Creek
WI-5-035	37 Degrees 50’ 28.97”N	75 Degrees 29’9.64”W	Cat Creek
WI-6-036	37 Degrees 50’ 12.19”N	75 Degrees 29’15.18”W	Hog Creek
WI-7-037	37 Degrees 51’ 9.1”N	75 Degrees 29’17.12”W	Hog Creek
WI-8-038	37 Degrees 49’ 58.48”N	75 Degrees 29’28.97”W	Hog Creek
WI-9-039	37 Degrees 87’ 16.9”N	75 Degrees 44’76.6”W	Cat Creek

APPENDIX D

REFERENCE LETTERS

Here is the bottom line on the wash rack

Josh Bundick
Environmental Protection Specialist
NASA GSFC WFF
Code 250, Building F-160, Room W160
Wallops Island, VA 23337

Phone: (757) 824-2319
Fax: (757) 824-1819
Mobile: (757) 710-1356
Email: Josh.Bundick@nasa.gov

-----Original Message-----
From: Smith,Raleigh [mailto:rmsmith@deq.state.va.us]
Sent: Wednesday, March 31, 2004 9:59 AM
To: Josh.Bundick@nasa.gov
Cc: Thomas,Stephen; William.D.Phillips@nasa.gov; Wayne.K.Redmond@nasa.gov; James.E.Tracy@nasa.gov; William.B.Bott@nasa.gov; Carlton.N.Ruf.1@gsfc.nasa.gov
Subject: RE: Wash Rack at WFF

Josh,

Steve and I enjoyed NASA's cooperation and hospitality during the recent inspection. Staff has discussed the operation of the wash rack. Pertinent information is listed below.

1. Please send me a letter from Mr. Phillips that states that all discharges from the wash rack will be sent to the FOTW and that you would like to have Outfall 301 removed from the permit during this reissuance. The letter should be clear as to how the diverter valve at the wash rack will be disabled so it cannot discharge to Outfall 003. Additionally, please clarify whether this diversion will effect the discharge from Outfall 302 since they use the same oil/water separator.

2. Attach to the letter, revised application pages that depict flow diagrams to Outfalls 001 and 003 and the description of the stormwater outfalls that you included with the Form 2F (Outfall 301 should be added as a contribution to the FOTW. You will also have to revise page one of the 2F to remove 301. There may be other places where Outfall 301 is mentioned, but I didn't come across them.

3. Most likely you will no longer have a TMP in your permit, since it only tests Outfall 301. Your WET limit on Outfall 001 will remain in tact, and should show any problems that diverting 301 flow to the FOTW might cause. Additionally, the special condition regarding the testing of 301 will probably go away. Any more down stream effects to the permit will become apparent during the process.

Please remember that once you do this, if there is a discharge from the wash rack to Outfall 003 it will be considered a violation of your permit.

If you have any questions, please do not hesitate to contact me.

Raleigh

> -----Original Message-----
> From: Josh Bundick [SMTP:Josh.Bundick@nasa.gov]
> Sent: Thursday, March 25, 2004 11:35 AM
> To: Smith,Raleigh
> Cc: Thomas,Stephen; William.D.Phillips@nasa.gov; Wayne.K.Redmond@nasa.gov; James.E.Tracy@nasa.gov; William.B.Bott@nasa.gov; Carlton.N.Ruf.1@gsfc.nasa.gov
> Subject: Wash Rack at WFF
>
> Raleigh:
>
> We at WFF have decided to lock the wash rack valve in the "open" position to
> divert all waters (wash activity waters as well as stormwater) to the FOTW.
> We feel that this is a much more failsafe method than the current procedure
> of opening and closing the valve before and after each wash event. A
> physical locking mechanism will be placed on the current valve to prevent
> any unintentional misuse.
>
> Do you expect this to change our permit application or any testing
> requirements? Based on last year's precipiation data, it was determined
> that approx. 600,000 gallons of stormwater would have been diverted to the
> FOTW had the valve been locked in the "open" position (this figure does not
> include any wash events). If you have any further questions, please contact
> me.
>
> Josh
>
> _____
> Josh Bundick
> Environmental Protection Specialist
> NASA GSFC WFF
> Code 250, Building F-160, Room W160
> Wallops Island, VA 23337
>
> Phone: (757) 824-2319
> Fax: (757) 824-1819
> Mobile: (757) 710-1356
> Email: Josh.Bundick@nasa.gov
>
>

From: Borowicz, Monica K. (WFF-200.C)[EG&G, Inc. (WICC)]
Sent: Friday, August 26, 2011 9:23 AM
To: 'Thomas,Stephen'
C HOOKS, RICHARD O. (WFF-2500); Turner, Carolyn (WFF-2500)

I[illegible] phone conversation with Steve Thomas, DEQ, on Aug 26 @0843 for Hurricane preparation. Steve Thomas approved D50 Waste Treatment plant to temporarily divert the oil/grease separator directional flow to Outfall 003. This will avoid potential flow surge to the Waste Treatment Plant due to Hurricane Irene.

Monica Borowicz
Air & Water Program Lead
Laboratory Technical Director, QA/QC Officer

URS/EG&G Technical Services, Inc.
Bldg. F160
Wallops Island, VA 23302
Phone: (757) 824-1023 Fax: (757) 824-1819

A NELAP Accredited Laboratory ID: 460031
EPA Laboratory ID: VA01354

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Borowicz, Monica K. (WFF-200.C)[EGG, Inc. (WICC)]

From: Sauer, Mark (DEQ) [Mark.Sauer@deq.virginia.gov]
Sent: Tuesday, February 21, 2012 2:49 PM
To: Borowicz, Monica K. (WFF-200.C)[EG&G, Inc. (WICC)]
Subject: RE: VPDES permit# 0024457

Monica –

That designation letter is fine and acceptable; as long as the title of the position remains the same, a person does not need to be specified by name.

Mark Sauer

> **From:** Borowicz, Monica K. (WFF-200.C)[EG&G, Inc. (WICC)] [mailto:monica.k.borowicz@nasa.gov]
> **Sent:** Tuesday, February 21, 2012 2:45 PM
> **To:** Sauer, Mark (DEQ)
> **Subject:** VPDES permit# 0024457
>
> Hello Mark-
>
> Our facility had an Environmental Functional Review Audit that covers everything we do in our Environmental group which would include the VPDES permit. There was a question about Signatory Requirements under Part II K(2) "the authorization specifies either an individual or a position". Attached is a letter of delegation of Signatory Authority which was written to specify the position of Facility Director, and did not specify a person by name. A different individual holds the position but the position of Facility Director has not changed.
>
> Does a new authorization need to be submitted?
>
> Thanks,
> Monica Borowicz

2. Reports, etc. All reports required by permits, and other information requested by the Board shall be signed by a person described in Part II K 1, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Part II K 1;

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

   c. The written authorization is submitted to the Department.

3. Changes to Authorization. If an authorization under Part II K 2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part II K 2 shall be submitted to the Department prior to or together with any reports, or information to be signed by an authorized representative.

4. Certification. Any person signing a document under Parts II K 1 or 2 shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Duty to Comply.

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the State Water Control Law and the Clean Water Act, except that noncompliance with

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

RECEIVED
APR 11 2012

Reply to Attn of: 250.W

TO: Distribution

FROM: 800/Director of Wallops Flight Facility

SUBJECT: Delegation of Signatory Authority

I hereby designate signatory authority for all permit related documents pursuant to the Clean Water Act and Safe Drinking Water Act to personnel in the Facilities Management Branch (FMB). More specifically, the Head of FMB may sign for the Virginia Department of Health Waterworks Permits and Reports, Virginia Department of Conservation and Recreation (DCR) Storm Water Permits and Reports, Virginia Department of Environmental Quality (DEQ) Groundwater Withdrawal Permits and Reports, and DEQ Virginia Pollution Discharge Elimination System (VPDES) Permits and Reports.

Additionally, the Facilities Management Specialist responsible for the Wallops Flight Facility (WFF) wastewater collection and treatment system is authorized to sign VPDES Discharge Monitoring Reports and the Head of the Construction Management Group is authorized to sign DCR Storm Water Reports.

If you have any questions regarding this delegation of signatory authority, please contact Mr. Richard Owen Hooks of the WFF Environmental Office at (757) 824-1941.

William Wrobel

Distribution:
200/Ms. C. Massey
228/Mr. W. Clayton
228/Mr. G. Lilly
228/Mr. W. Phillips
228/Mr. W. Redmond
250/Mr. E. Connell
250/Ms. C. Turner

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

November 1, 2007

Reply to Attn of: 250.W

TO: Distribution

FROM: 800/Director of Wallops Flight Facility

SUBJECT: Delegation of Signatory Authority

I hereby designate signatory authority for all permit related documents pursuant to the Clean Water Act and Safe Drinking Water Act to personnel in the Facilities Management Branch (FMB). More specifically, the Head of FMB may sign for the Virginia Department of Health Waterworks Permits and Reports, Virginia Department of Conservation and Recreation (DCR) Stormwater Permits and Reports, Virginia Department of Environmental Quality (DEQ) Groundwater Withdrawal Permits and Reports, and DEQ Virginia Pollution Discharge Elimination System (VPDES) Permits and Reports.

Additionally, the Facilities Management Specialist responsible for the Wallops Flight Facility (WFF) wastewater collection and treatment system is authorized to sign VPDES Discharge Monitoring Reports and the Head of the Construction Management Group is authorized to sign DCR Stormwater Reports.

If you have any questions regarding this delegation of signatory authority, please contact Mr. Joshua Bundick of the WFF Environmental Office at (757) 824-2319.

John H. Campbell

Distribution:
200/Ms. C. Massey
228/Mr. G. Lilly
228/Mr. W. Phillips
228/Mr. W. Redmond
228/Mr. J. Wall
250/Mr A. Lopez
250/Ms. C. Turner

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COMMONWEALTH of VIRGINIA

Doug Domenech
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE
5636 Southern Boulevard, Virginia Beach, Virginia 23462
(757) 518-2000 Fax (757) 518-2009
www.deq.virginia.gov

David K. Paylor
Director

Maria R. Nold
Regional Director

January 3, 2014

Mr. Richard Hooks
Air and Water Program Manager
Wallops Flight Facility
Wallops Island, VA 23337-5099

Re: Representative Discharges for Stormwater Outfalls
NASA Wallops Flight Facility (VA0024457)

Dear Mr. Hooks:

Thank you for your letter dated 12/24/13 (received 12/26/13) requesting approval for representative stormwater monitoring at the above referenced facility. Your request to use outfall 006 and 010 as representative outfalls is approved. Please note, however, that all requirements outlined in the permit for the stormwater pollution prevention plan (SWP3) must be followed. Part I.C.2.d outlines the requirements for representative discharges and the information that must be included in the SWP3.
Your letter states that a common drainage pipe will serve as representative for NOAA 1-4 outfalls. These outfalls are not currently recognized in the VPDES permit.
Once the permit is reissued, representative monitoring may need to be reevaluated by the facility if there is a change in permitted outfalls or monitoring requirements.

If you have any questions or comments about this approval letter or representative monitoring, please contact me at the above address or phone (757) 518-2008 or deanna.austin@deq.virginia.gov

Sincerely,

Deanna Dodson Austin
Environmental Specialist Senior II
Water Permitting Technical Coordinator

cc: DEQ/TRO: ECM

Borowicz, Monica K. (WFF-200.C)[EG&G, Inc. (WICC)]

From: Austin, Deanna (DEQ) <Deanna.Austin@deq.virginia.gov>
Sent: Tuesday, January 14, 2014 6:04 AM
To: Borowicz, Monica K. (WFF-200.C)[EG&G, Inc. (WICC)]
Cc: Woodruff, Melinda (DEQ)
Subject: RE: NASA WallopsFlight Facility (VA0024457)

Yes, a new request would need to be submitted once the permit is reissued if there are changes to the sampling requirements for stormwater. Thank you for the clarification for outfalls 021-024.
I am copying Melinda Woodruff on this email. She has been assigned your facility and will be your permit writer. If you have any questions, please keep Melinda in the loop. Thanks.

Deanna Austin
DEQ-TRO Water Permits
5636 Southern Blvd
Virginia Beach, VA 23462
Phone: 757-518-2008
Fax: 757-518-2009

From: Borowicz, Monica K. (WFF-200.C)[EG&G, Inc. (WICC)] [mailto:monica.k.borowicz@nasa.gov]
Sent: Monday, January 13, 2014 4:15 PM
To: Austin, Deanna (DEQ)
Subject: NASA WallopsFlight Facility (VA0024457)

Dear Ms. Austin-

As per your letter dated January 3, 2014 as regards representative discharges for storm water outfalls (please see attachment), the outfalls for NOAA 1-4 are recognized in our permit as Outfall Numbers 021-024. The outfall inspection conducted on Dec 18, 2013 by Steve Thomas (DEQ) made the following recommendation: to sample a common drainage point that be representative for NOAA 1-4 Outfalls. Also, If there is no change to the reissuance of NASA's permit in regards to Outfall sampling and monitoring, would we continue to monitor and sample the representative discharge storm water outfalls according to your approval in the letter that is attached. If not, do we have to submit another request once the new permit is issued?

Regards,
Monica Borowicz

Monica Borowicz
Air & Water Program Lead
Laboratory Technical Director, QA/QC Officer

URS/EG&G Technical Services, Inc.
Bldg. F160
Wallops Island, VA 23302
Phone: (757) 824-1023 Fax: (757) 824-1819

A NELAP Accredited Laboratory ID: 460031
EPA Laboratory ID: VA01354

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January 3, 2014

Mr. Richard Hooks
Air and Water Program Manager
Wallops Flight Facility
Wallops Island, VA 23337-5099

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NASA Wallops Flight Facility (VA0024457)

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If you have any questions or comments about this approval letter or representative monitoring, please contac the above address or phone (757) 518-2008 or deanna.austin@deq.virginia.gov

Sincerely,

Deanna Dodson Austin
Environmental Specialist Senior II
Water Permitting Technical Coordinator

cc: DEQ/TRO: ECM

APPENDIX E

TABLE SUMMARY OF SPILLS AND LEAK

Spill Date	Location	Quantity	Material Spilled	External Report Y/N	Date Cleanup Complete	Date waste removed	Stormwater Follow-up needed Y/N If Yes Enter Spill in SHE-Trak	Other issues to resolve Y/N If Yes Enter spill in She-Trak
01/08/14	D-8	20 gallons	Engine Oil	N	01/08/14	01/13/14	Y	N
02/05/14	E-2	<1 gallon	Engine Oil	N	02/05/14	02/05/14	N	N
04/04/14	V-55	20 ounces	Diluted hydrazine	N	04/04/14	04/04/14	Y	N
04/10/14	F-16	<1 gallon	Jet A fuel	N	04/10/14	04/10/14	Y	N
06/13/14	D-1	<5 gallons	Jet A fuel	N	06/13/14	06/13/14	Y	N
06/13/14	D-1	2 gallons	Jet A fuel	N	06/13/14	06/13/14	Y	N
06/24/14	D-1	3 gallons	JP-5 aviation fuel	N	06/24/14	06/24/14	Y	N
06/24/14	D-1	<5 gallons	JP-5 aviation fuel	N	06/24/14	06/24/14	Y	N
06/25/14	D-1	<5 gallons	JP-5 aviation fuel	N	06/25/14	06/26/14	Y	N
10/08/14	F-7	31 gallons	Elastomeric Roof Coating	Y	10/09/14	10/15/14	Y	N
10/28/14	Pad 0A	21, 096 gal RP-1, 40, 841 gal LOX, 54,950 lbs AP/Al HTPB solid fuel, 120 gal Anhydrous hydrazine, 51 gal MON-3	ORB-3 Failure	Y	1/6/2014 (date represents soil removal from crater which was the last cleanup activity)	As of 6/15/15, one frac tank remains	Y	Y
01/07/15	B-31/ A-7 tank	5 gallons	abandoned UST failure	Y	05/07/15	Tetra Tech	Y	Y
01/23/15	WI causeway	< 5 gallons	Engine Oil	N	01/24/15	03/31/15	Y	N
02/11/15	Runway 04-22	102 gallons	JP-5 aviation fuel/ NAVY E2C	Y	02/11/15	02/13/15	Y	N

Spill Date	Location	Quantity	Material Spilled	External Report Y/N	Date Cleanup Complete	Date waste removed	Stormwater Follow-up needed Y/N If Yes Enter Spill in SHE-Trak	Other issues to resolve Y/N If Yes Enter spill in She-Trak
02/12/15	D-1 Wash Rack	55-60 gallons	JP-5 aviation fuel/ NAVY E2C	Y	02/12/15	02/13/15	Y	Y
04/21/15	F-10	<2 gallons	Flourescein Sodium	N	04/21/15	04/30/15	Y	N
05/31/15	NOAA	10 gallons	Hydraulic Oil	N	05/31/15	05/31/15	N	N
08/14/15	U-1	2 gallons	antifreeze	N	08/14/15	08/14/15	N	N
01/04/16	NE side of D-1	25 gallons	JP-5/ E2D aircraft venting	N	01/04/16	01/09/16	N	N
05/13/16	F34 fuel truck	>1QT	CONDENSATE/WATER	N			N	N
06/01/16	B31	>1G	HYDRAULIC FLUID	N	06/01/16	06/01/16	N	N
06/09/16	N222	>2G	ANTIFREEZE FROM TIRE	N	06/09/16	06/09/16	N	N
07/06/16	A131	<2G	Coolant	N	07/06/16	07/06/16	N	N
07/28/16	U12	5G	FUEL OIL	N	07/29/16		N	N
08/01/16	D1 RAMP	3G	DIESEL	N	08/01/16	08/01/16	N	N
08/01/16	V10	4-6 QT	HYDRAULIC FLUID	N	08/02/16	08/02/16	N	N
08/11/16	A44	7G	HYDRAULIC FLUID	N	08/11/16	08/11/16	Y	N
08/31/16	MLCC	1G	HYDRAULIC FLUID	N	09/01/16	09/01/16	Y	N
10/13/16	N-162	minimal	Power Steering Fluid	N	10/13/16	None	N	N
11/12/16	AIRFIELD	<PT	HYDRAULIC FLUID	N	11/12/16	11/12/16	N	N
12/07/16	OB Area	Consumed in fire	Ejected Propellant	Y	12/07/17	None	N	N
12/19/16	v30	<0.5g	MINERAL OIL	N	12/19/16	12/19/16	Y	N
01/03/17	Pad 0-A	2-3 gal	Diesel	N	01/10/17	01/11/17	N	N
01/19/17	F-10	<5G	Sewage	Y	01/19/14	N/A	N	N
02/09/17	F-26	2 gal	Diesel	N	02/09/17	02/09/17	N	N
03/22/17	Pad 0-A	1/2 quart	Diesel	N	03/22/17		N	N
04/12/17	D-1	2 qts	HYDRAULIC FLUID	N	04/12/17	04/12/17	N	N

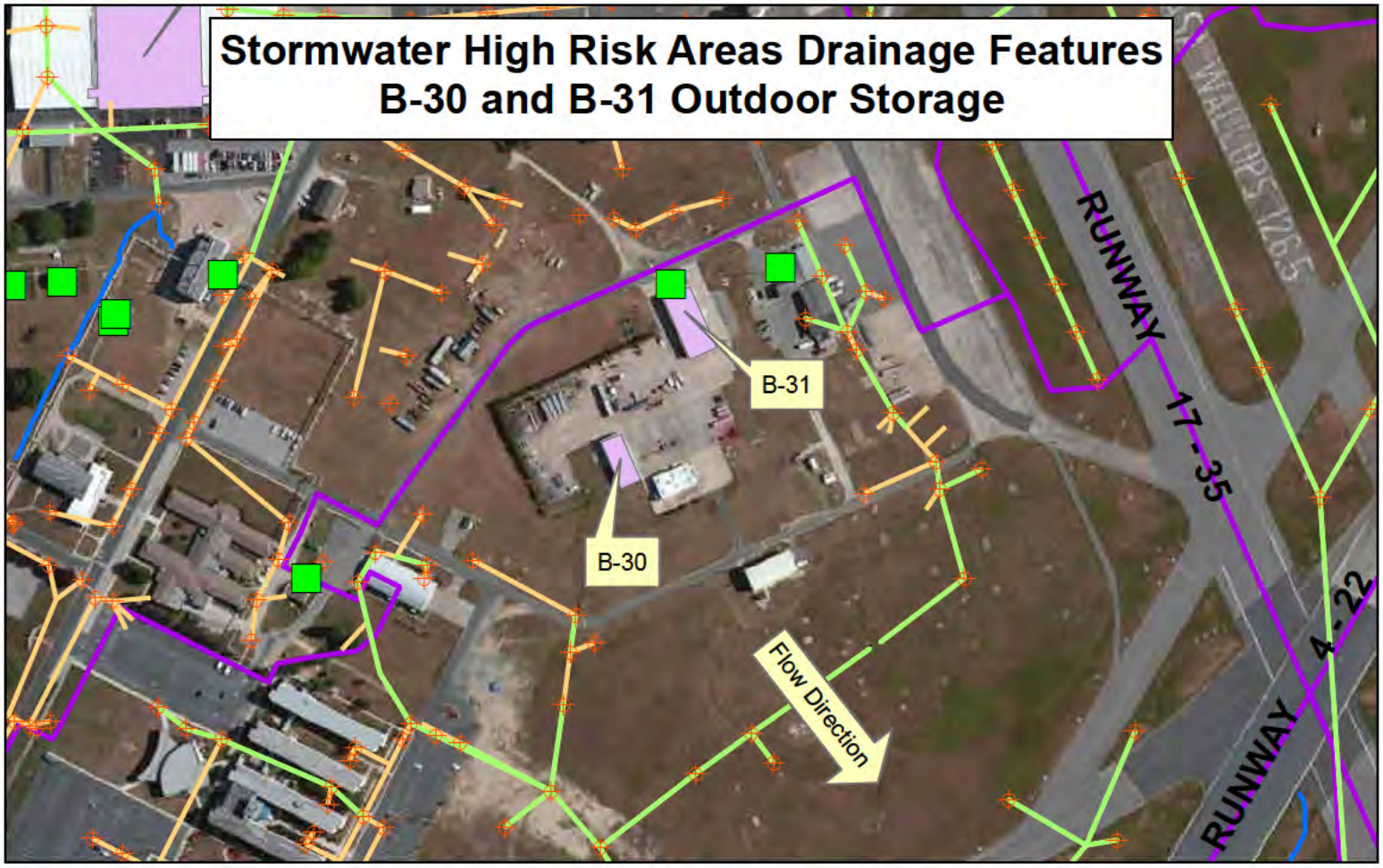
Spill Date	Location	Quantity	Material Spilled	External Report Y/N	Date Cleanup Complete	Date waste removed	Stormwater Follow-up needed Y/N If Yes Enter Spill in SHE-Trak	Other issues to resolve Y/N If Yes Enter spill in She-Trak
04/19/17	D-1	4 G	HYDRAULIC FLUID	N	04/19/17	04/19/17	N	N
05/23/17	R-20A	1-2 qts	Diesel	N	05/23/17	05/23/17	N	N
05/26/17	V-24	0.5 G	Diesel	N	05/26/17	05/26/17	N	N
07/18/17	D-4	5G	Emulsified Asphalt Sealant	N	no cleanup	07/18/17	N	N
07/21/17	B-30	<1 qt	HYDRAULIC FLUID	N	07/21/17	07/21/17	N	N
07/27/17	Pad 0-A	1/2 c	oil mixed with water	N	07/28/17		N	N
08/22/17	D-1 ramp	<5G	JP8	N	08/22/17	08/24/17	N	N
09/21/17	U-40	1.5G	Antifreeze	N	09/21/17	09/30/17	N	N
09/29/17	small M area	<1G	HYDRAULIC FLUID	N	09/29/17	09/29/17	N	N
10/18/17	D-50 Generator (inside)	<1G	Antifreeze on floor	N				
10/19/17	V18 Generator linside)	<1G	Antifreeze on floor	N				
11/03/17	outside Navy guard shack	<1G	AC unit leaking oil	N				
11/03/17	Main Base Runway	<1G	leak found	N				
03/19/18	D-1 Ramp	Unknown	Hydraulic oil	N	03/30/18	03/30/18	Y	Y
05/16/18	D41	10G	JP-5	N	05/16/18	05/16/18	N	N
06/26/18	Pad O-A	1/2 qt	Coolant	N	06/26/18	06/26/18	N	N
07/06/18	W-22	2G	Hydraulic Fluid	N	07/09/18	07/09/18	N	N

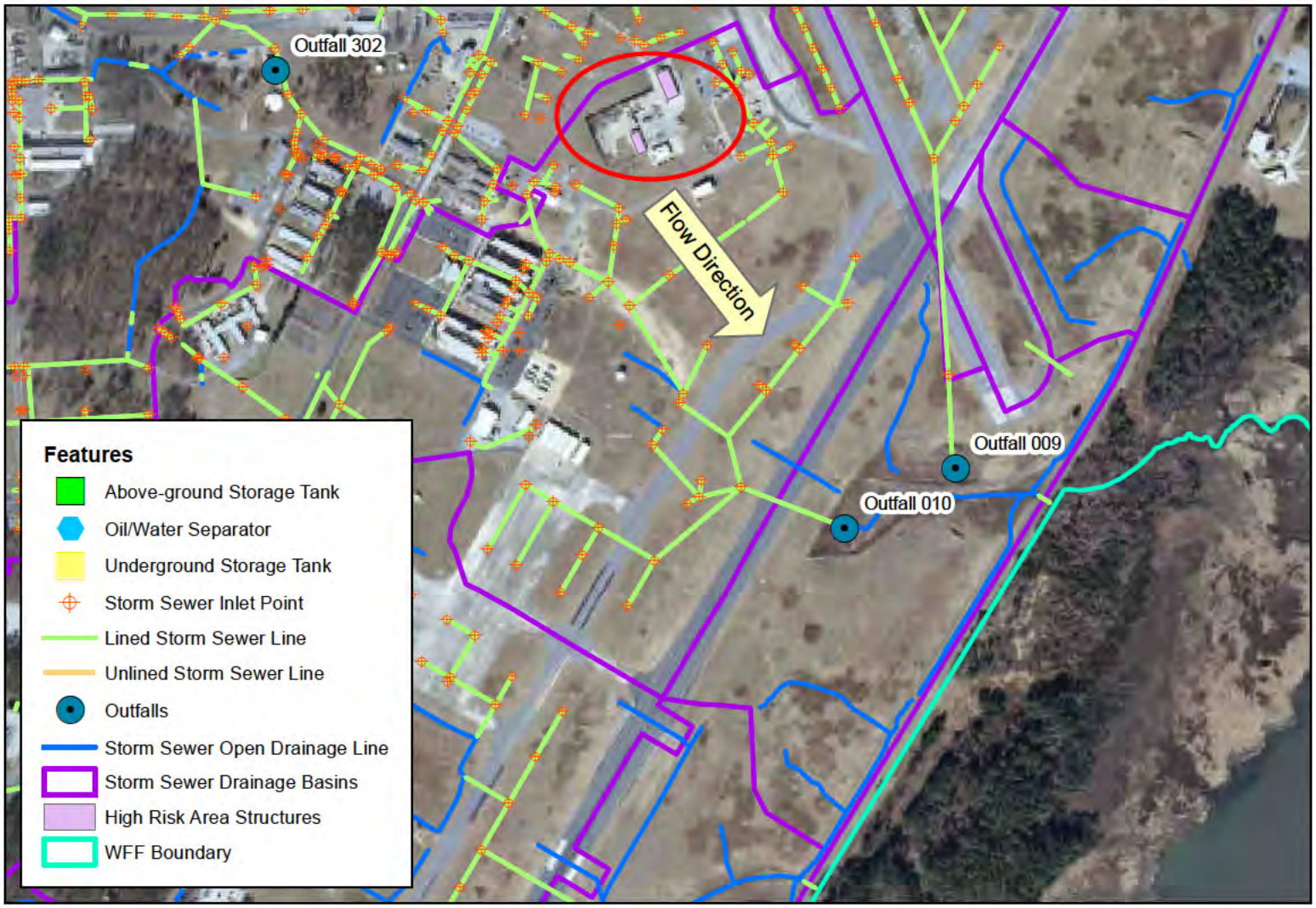
Spill Date	Location	Quantity	Material Spilled	External Report Y/N	Date Cleanup Complete	Date waste removed	Stormwater Follow-up needed Y/N If Yes Enter Spill in SHE-Trak	Other issues to resolve Y/N If Yes Enter spill in She-Trak
07/11/18	Abandon-ed taxiway	5G	Antifreeze	N	07/11/18	07/11/18	N	N
08/21/18	Eastside N159	2-3 gallons	JP-5	N	08/21/18	08/21/18	N	N
08/26/18	D-1	1qt	JP5	N	08/26/18	08/26/18	N	N
08/28/18	F-1 Avery Ave	1 pt	Hydraulic Fluid	N	08/28/18	08/28/18	N	N
09/26/18	D-1 Ramp (vanilla project)	9.5 gallons	Diesel fuel	N	09/26/18	09/26/18	N	N
11/13/18	Pad 0A	<20G	RP-1	N	11/13/18	11/13/18	N	N
12/28/18	N-159	1 pt	Hydraulic Oil	N	12/28/18	12/28/18	N	N

APPENDIX F

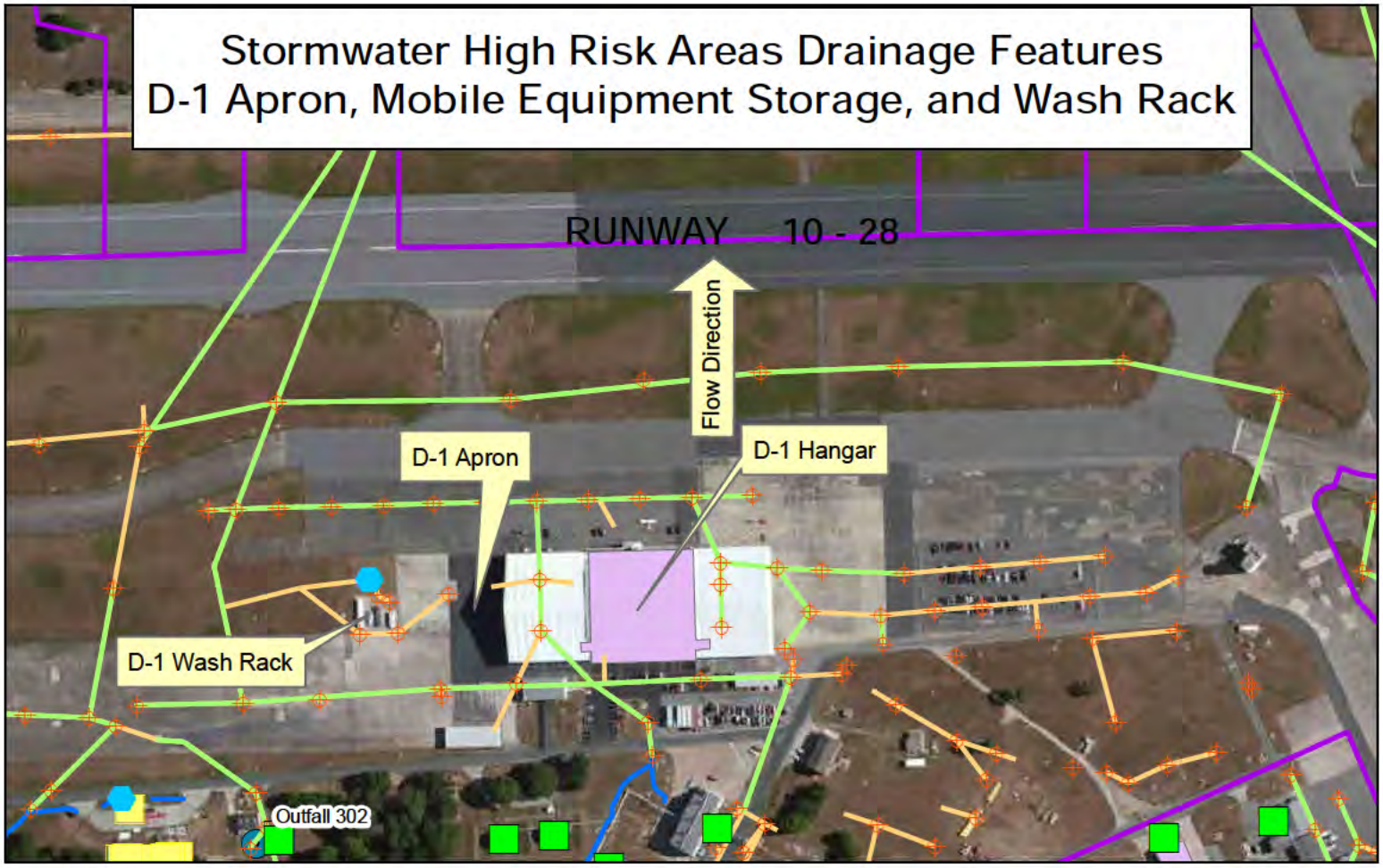
SPILL DIRECTION OF FLOW DRAINAGE TO STORMWATER OUTFALLS

Stormwater High Risk Areas Drainage Features
B-30 and B-31 Outdoor Storage

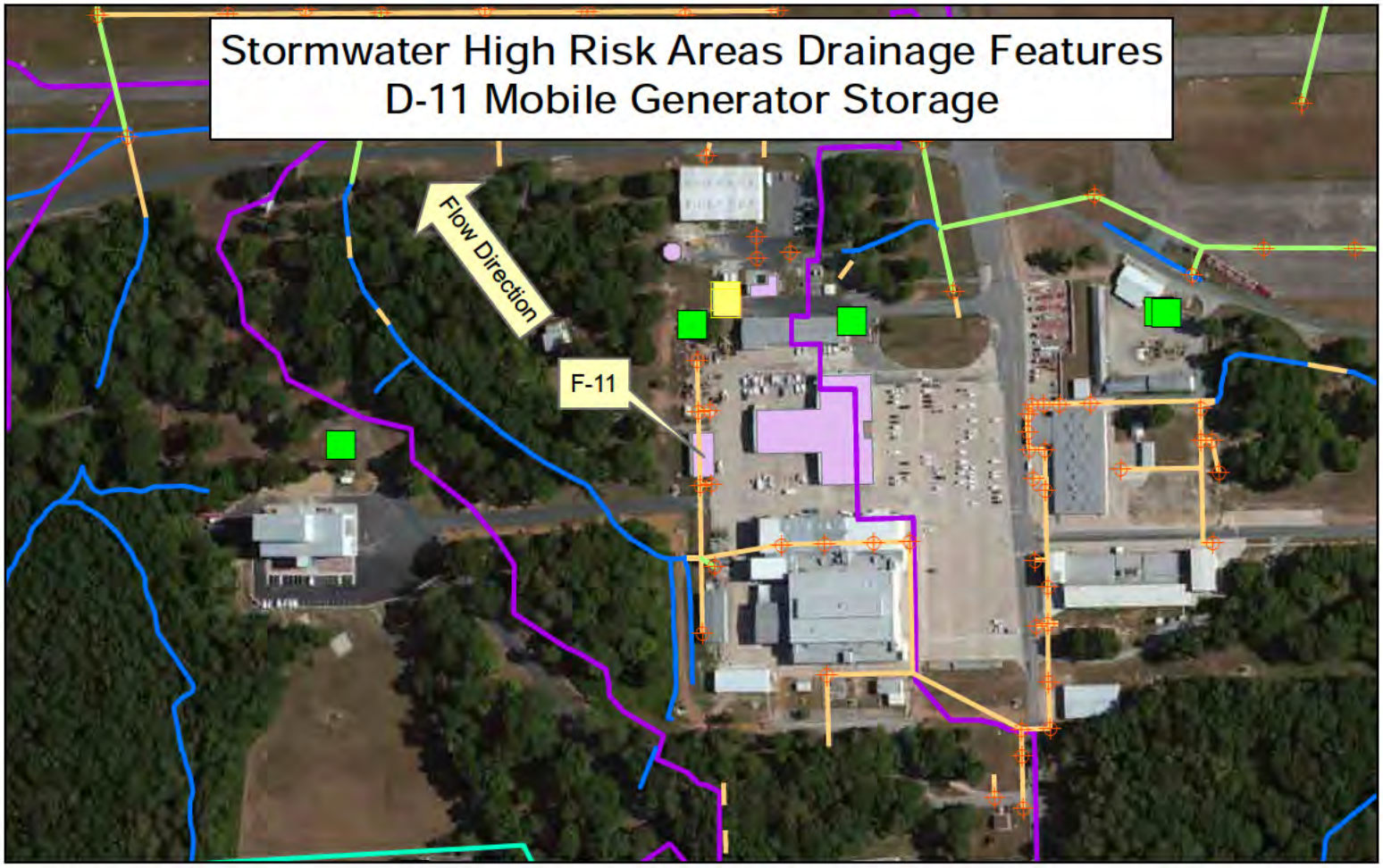


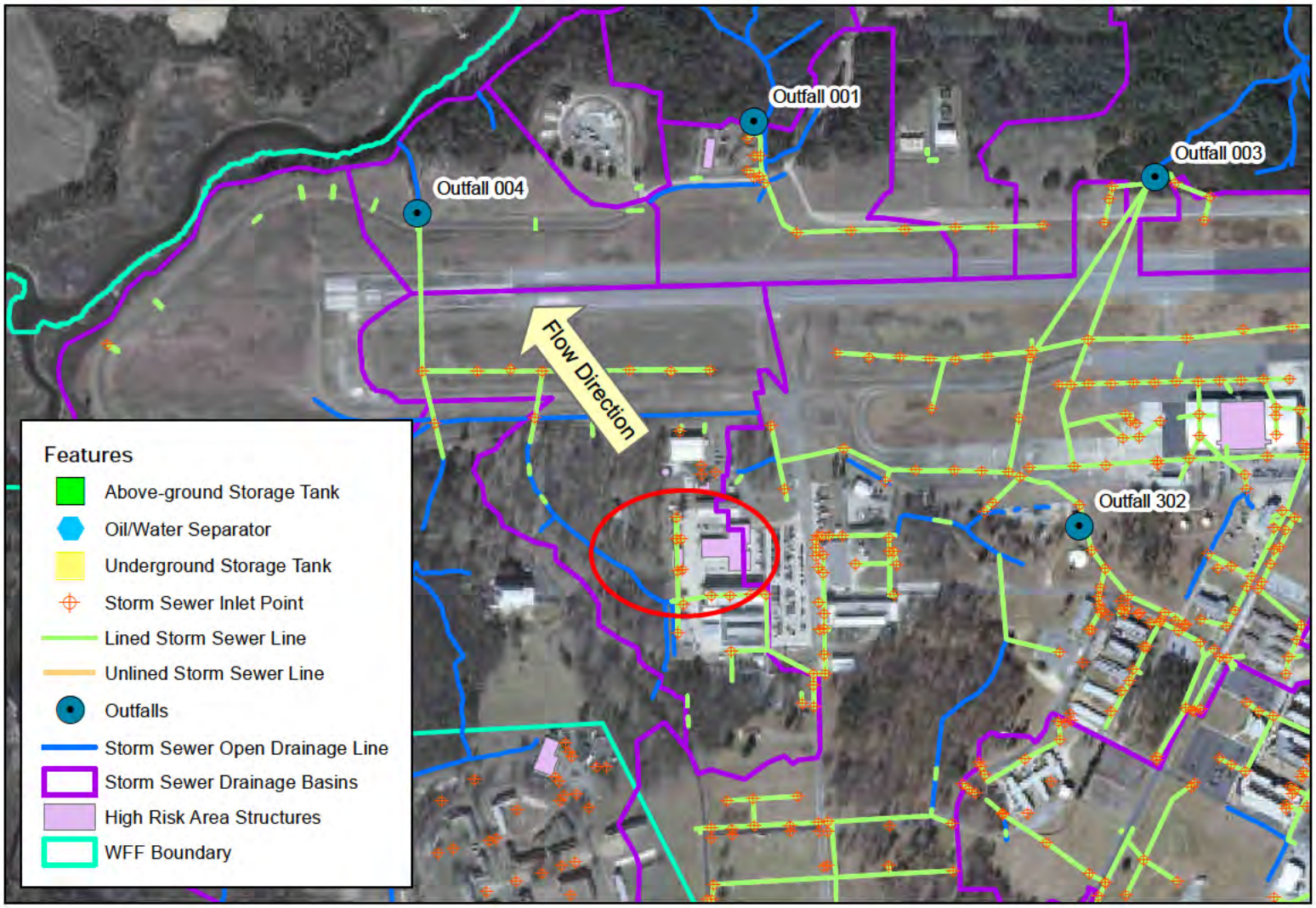


Stormwater High Risk Areas Drainage Features
D-1 Apron, Mobile Equipment Storage, and Wash Rack

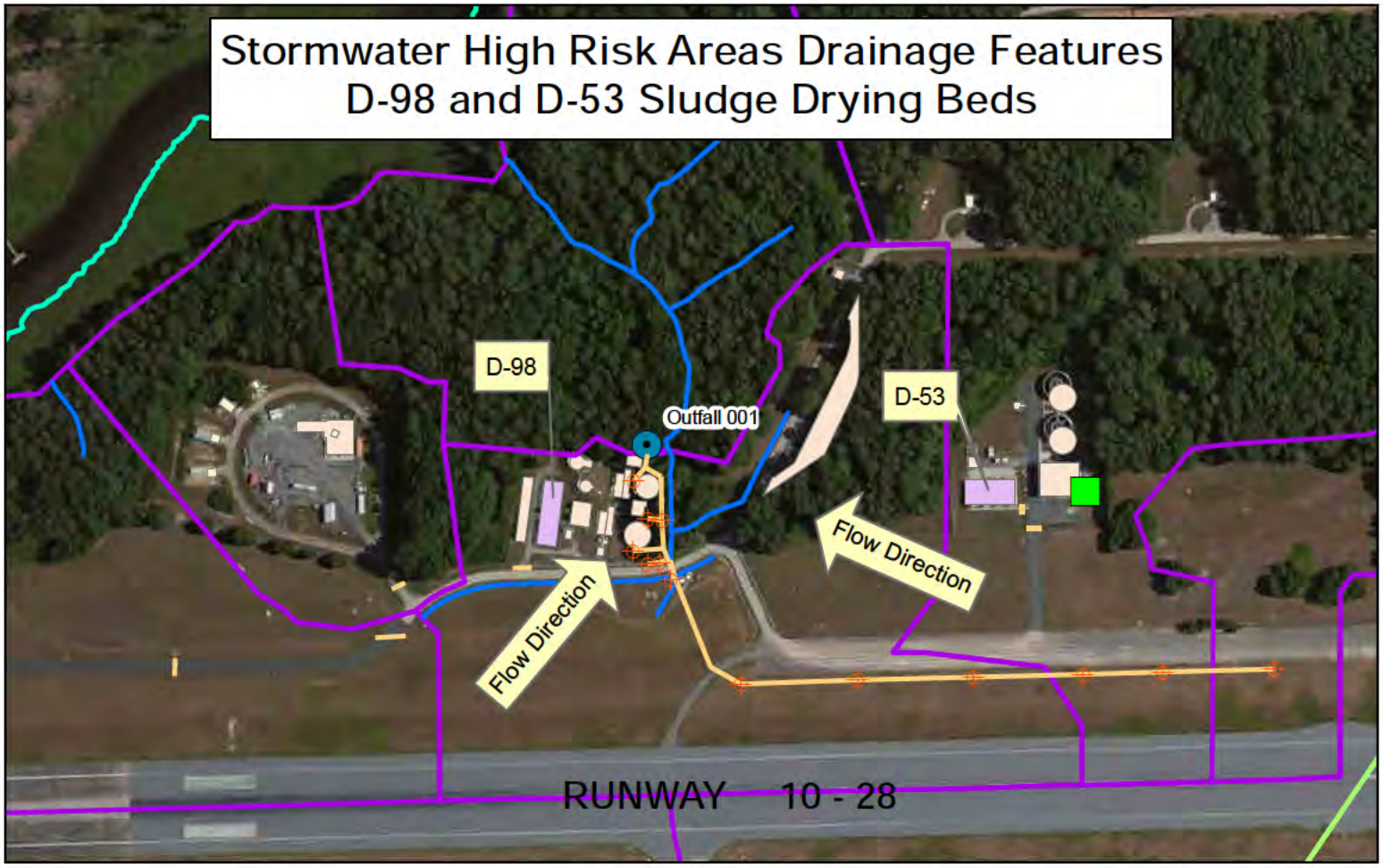


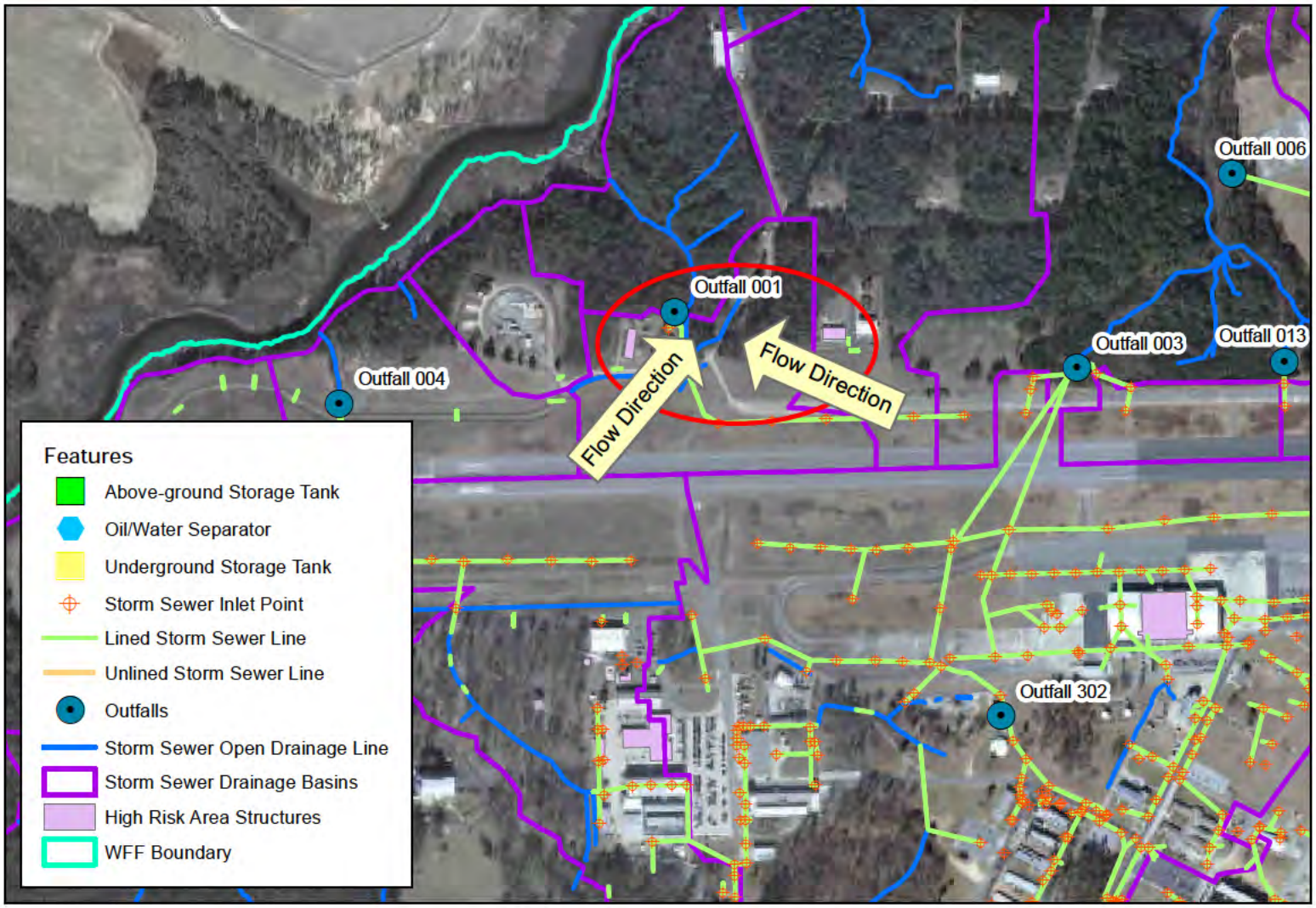
Stormwater High Risk Areas Drainage Features
D-11 Mobile Generator Storage



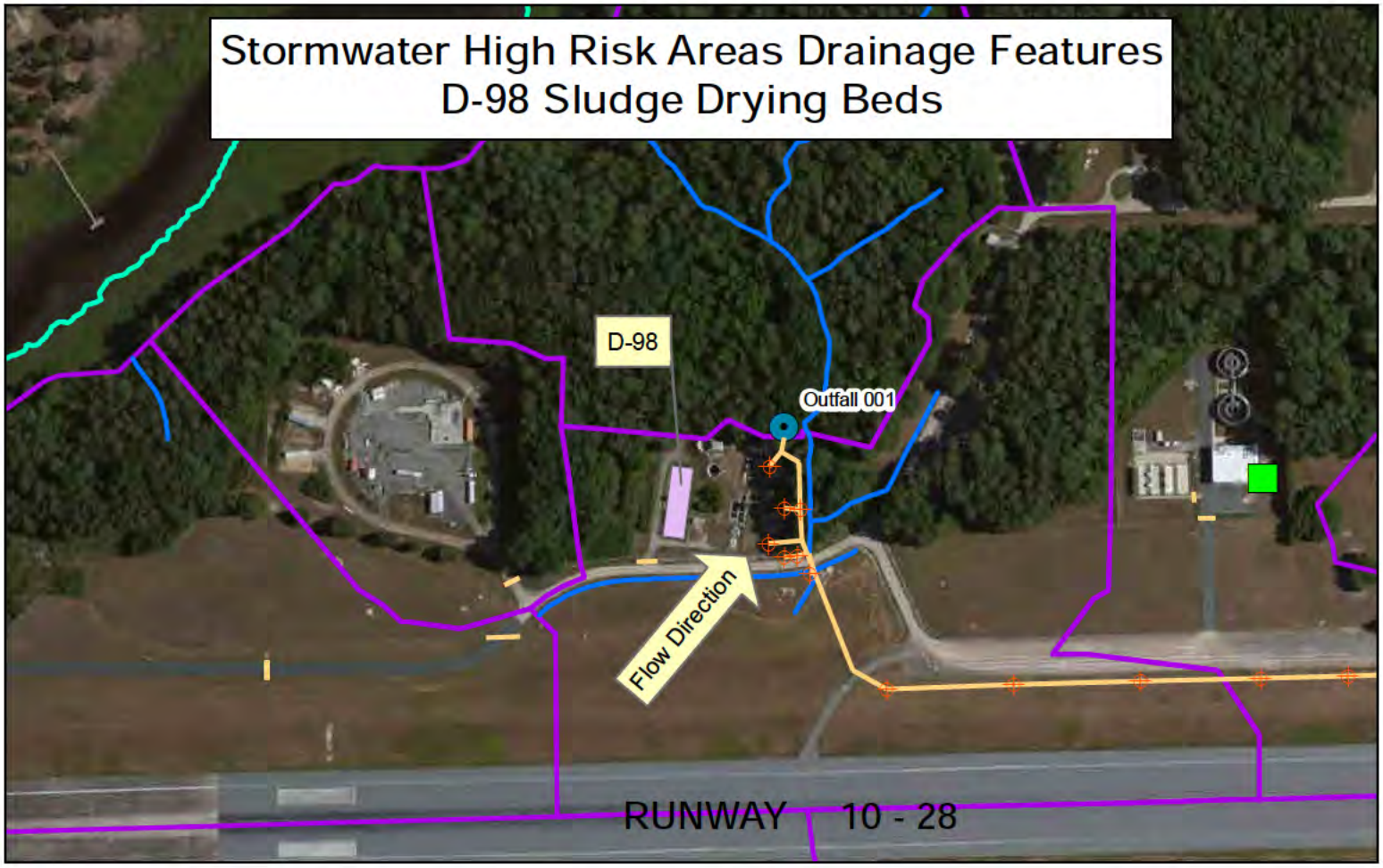


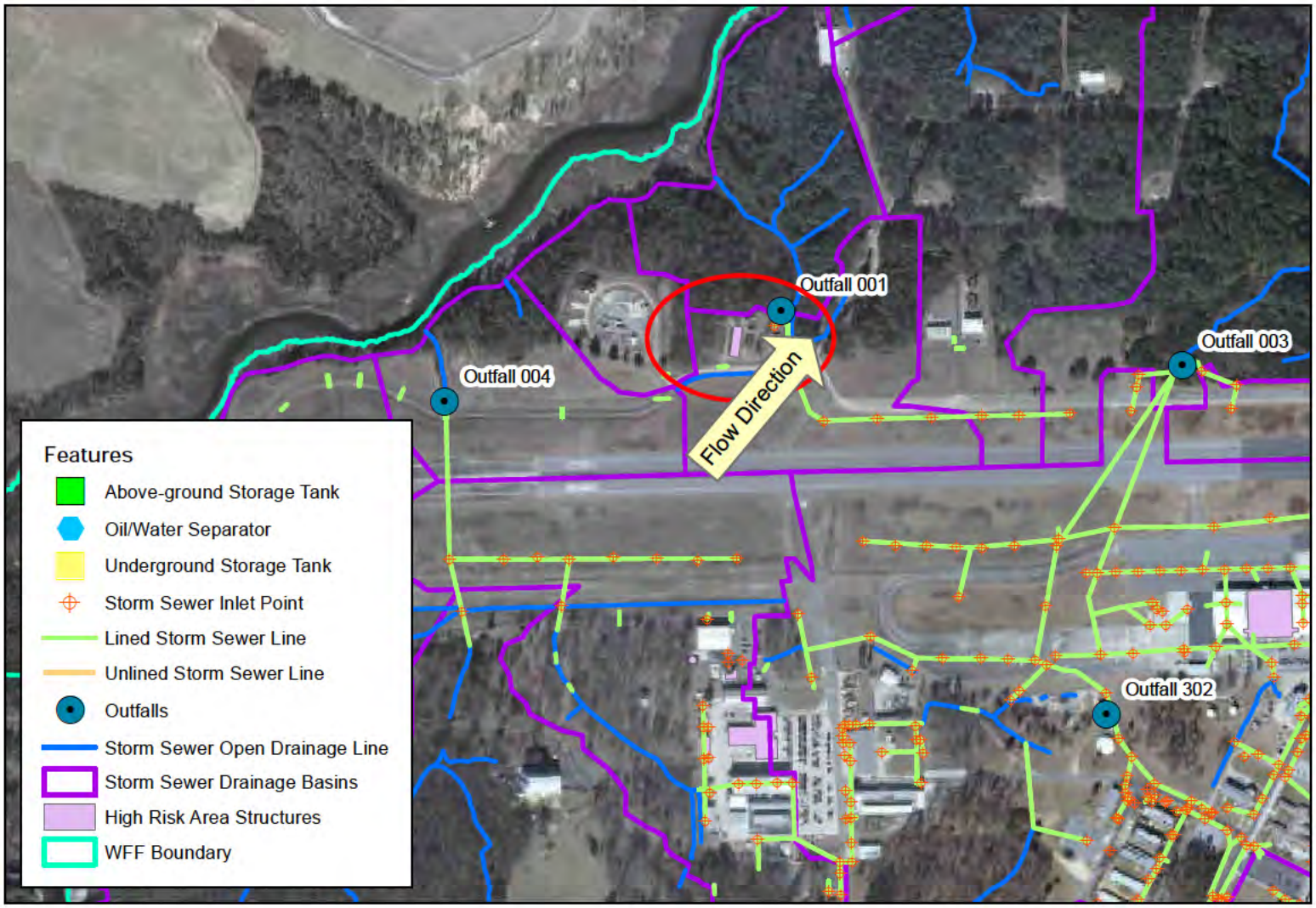
Stormwater High Risk Areas Drainage Features
D-98 and D-53 Sludge Drying Beds



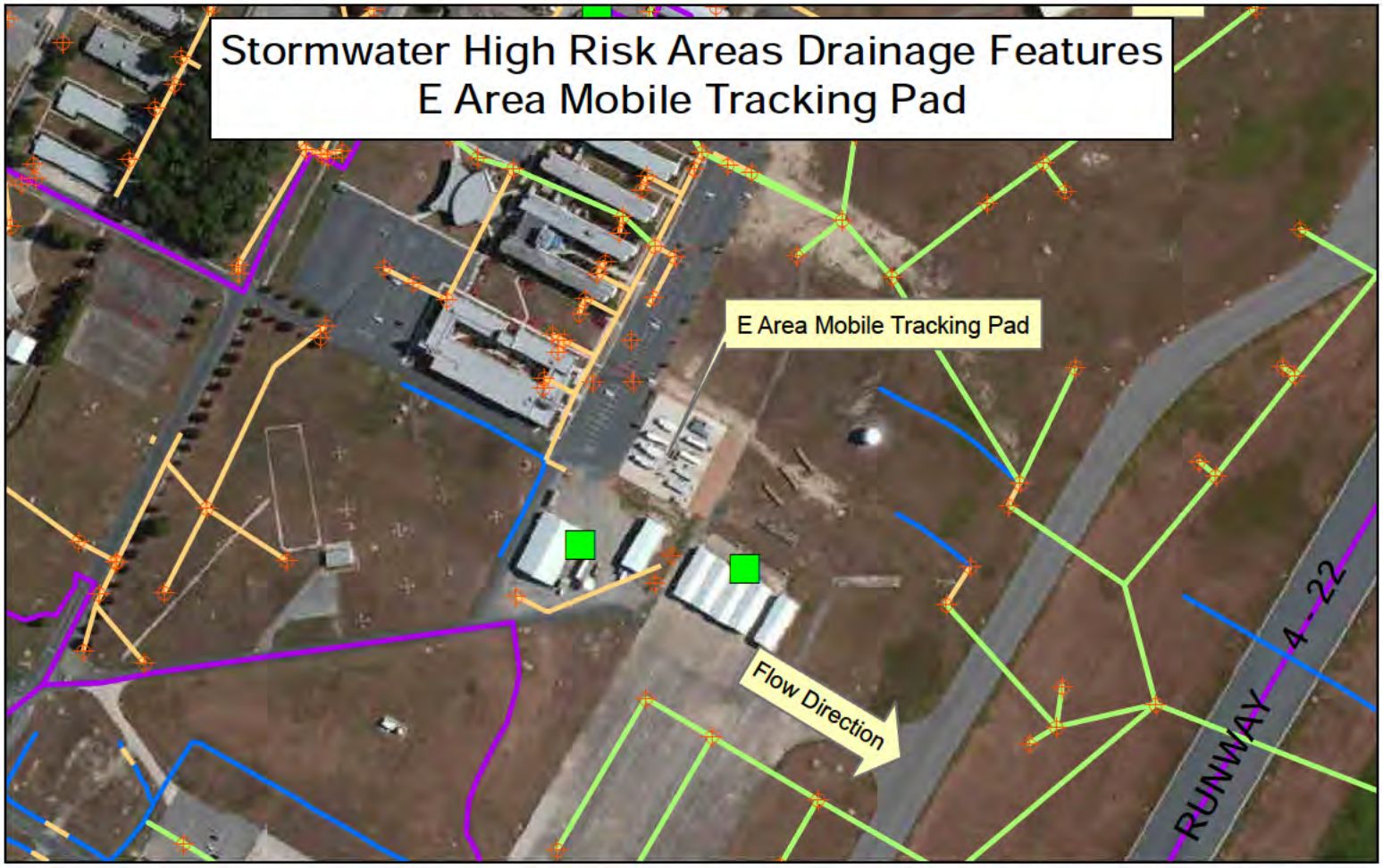


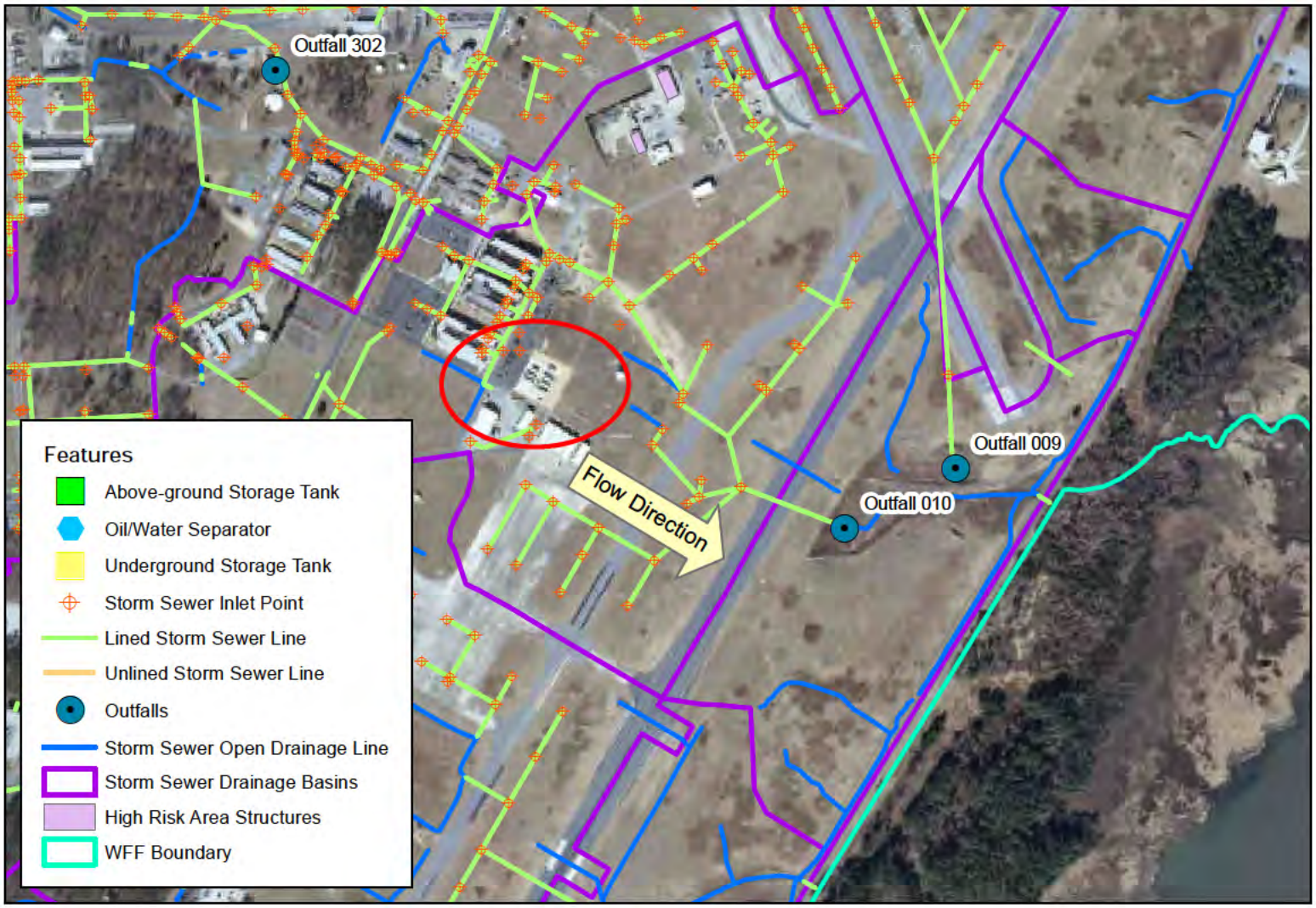
Stormwater High Risk Areas Drainage Features
D-98 Sludge Drying Beds



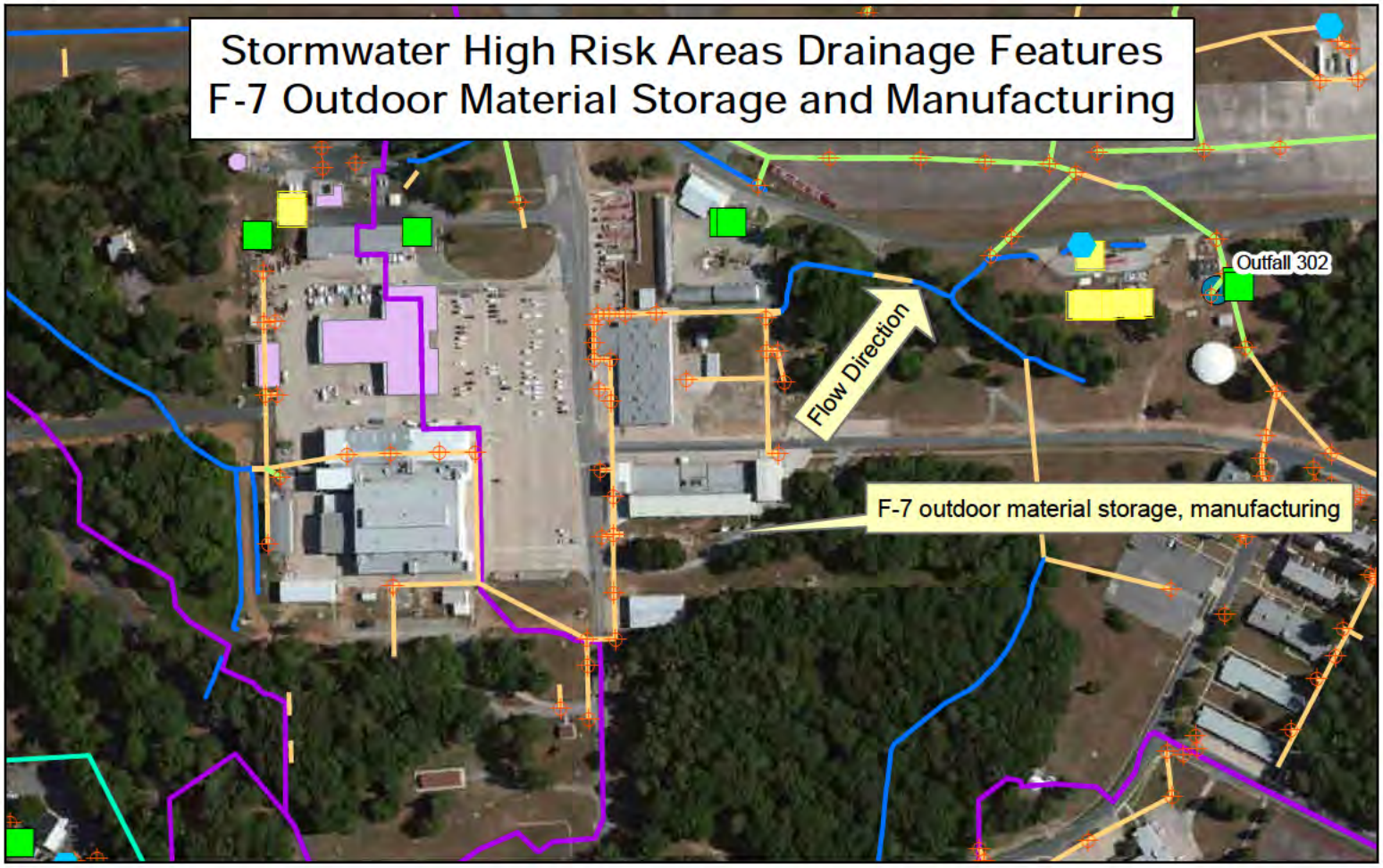


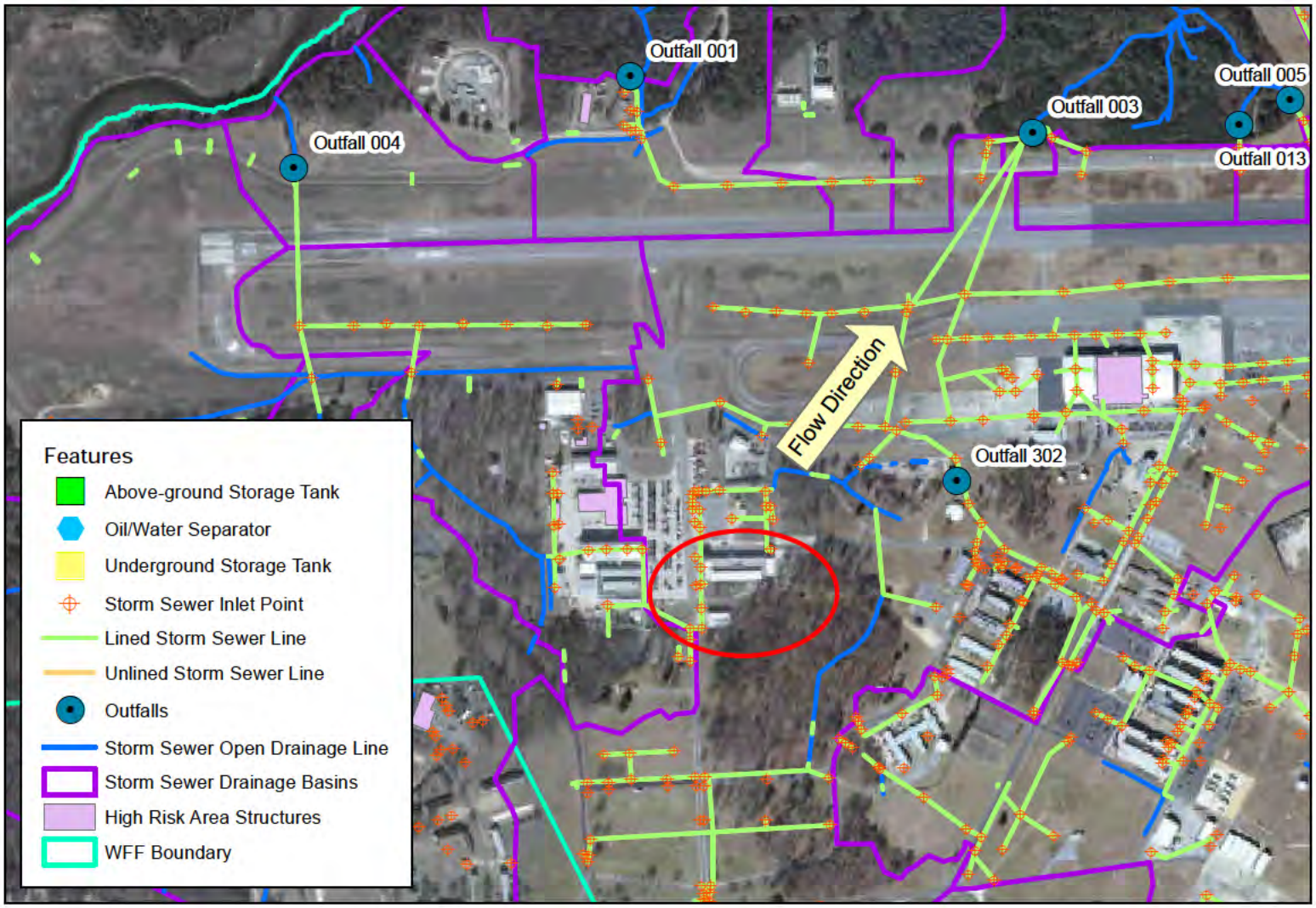
Stormwater High Risk Areas Drainage Features
E Area Mobile Tracking Pad



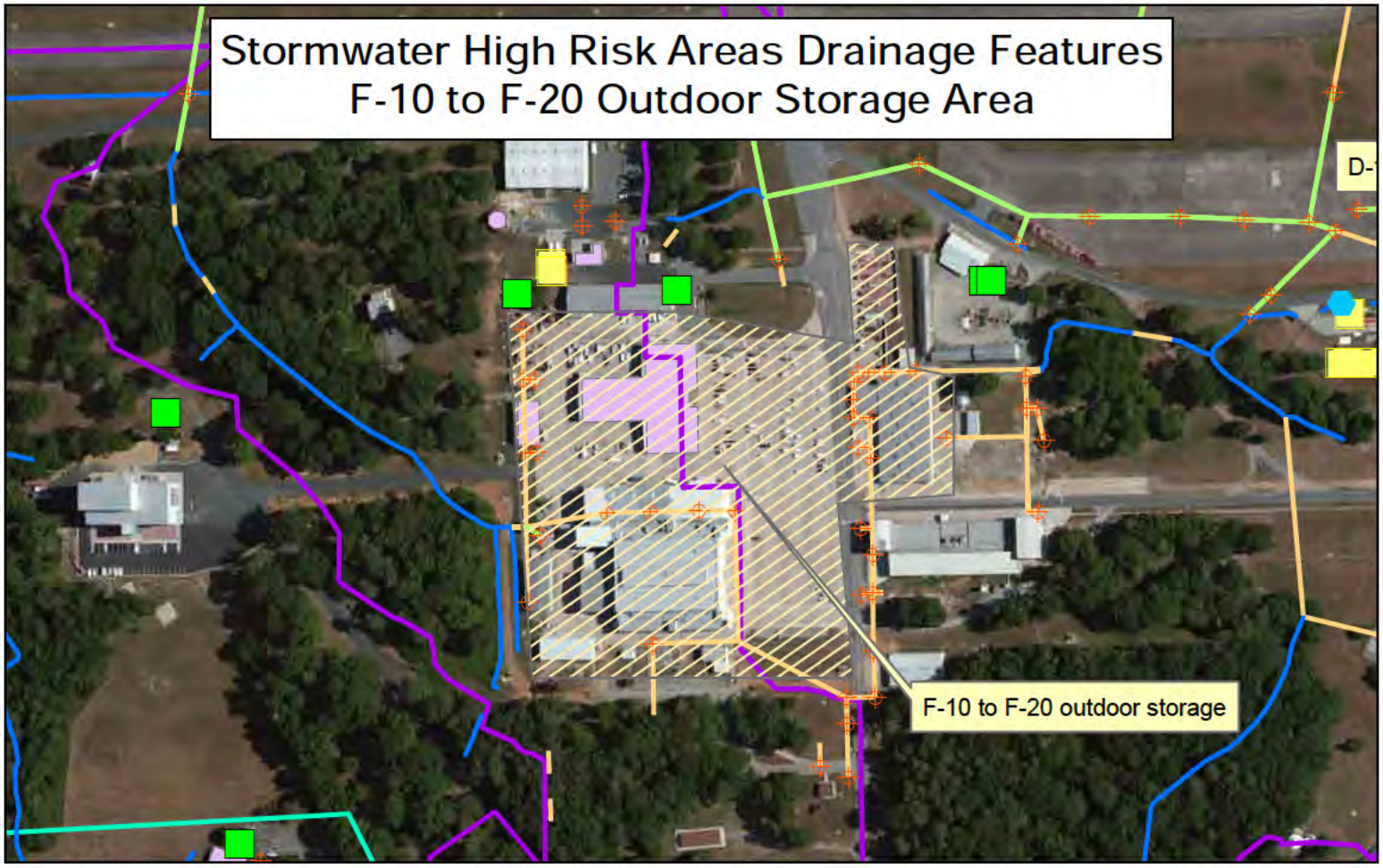


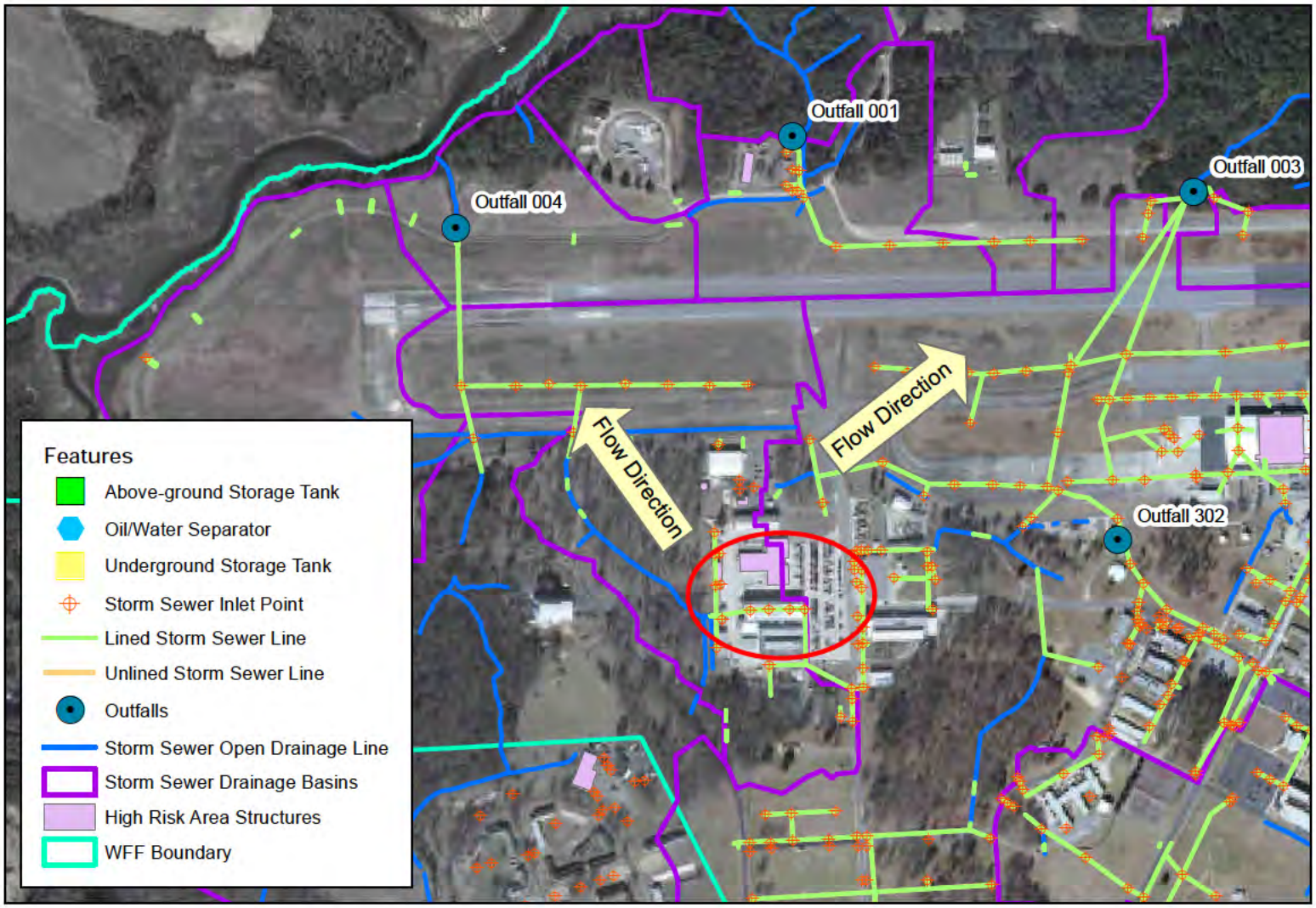
Stormwater High Risk Areas Drainage Features
F-7 Outdoor Material Storage and Manufacturing



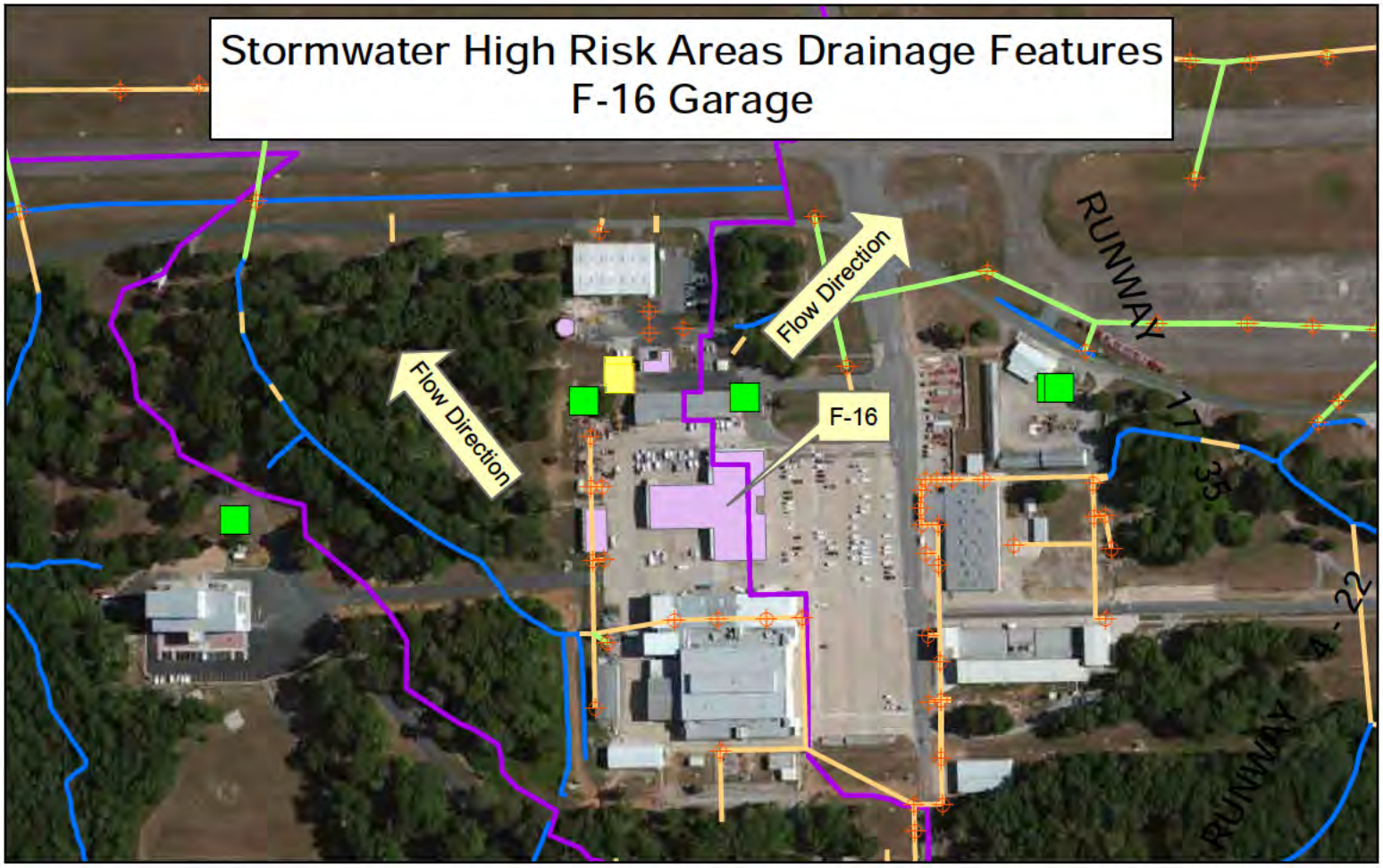


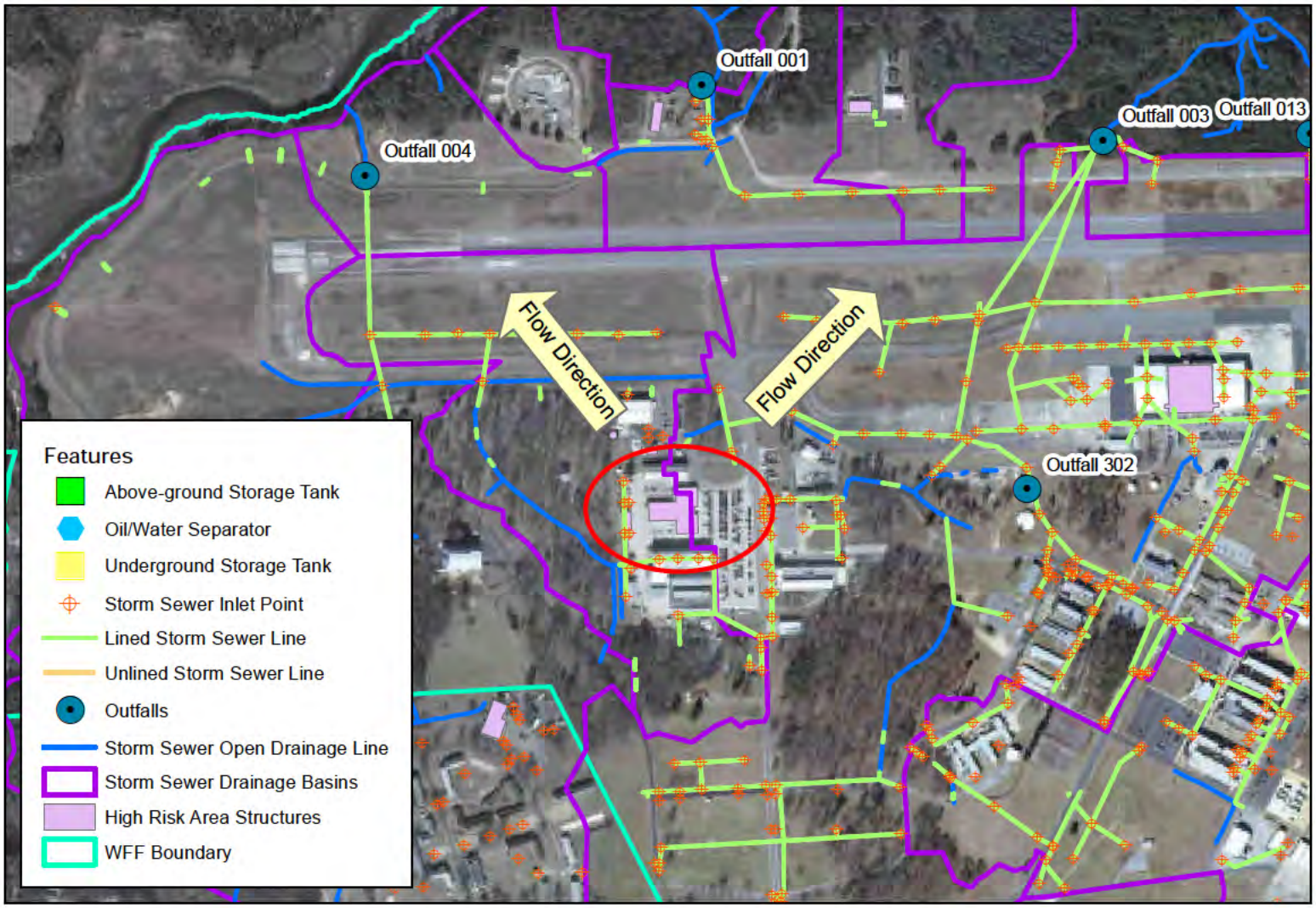
Stormwater High Risk Areas Drainage Features
F-10 to F-20 Outdoor Storage Area



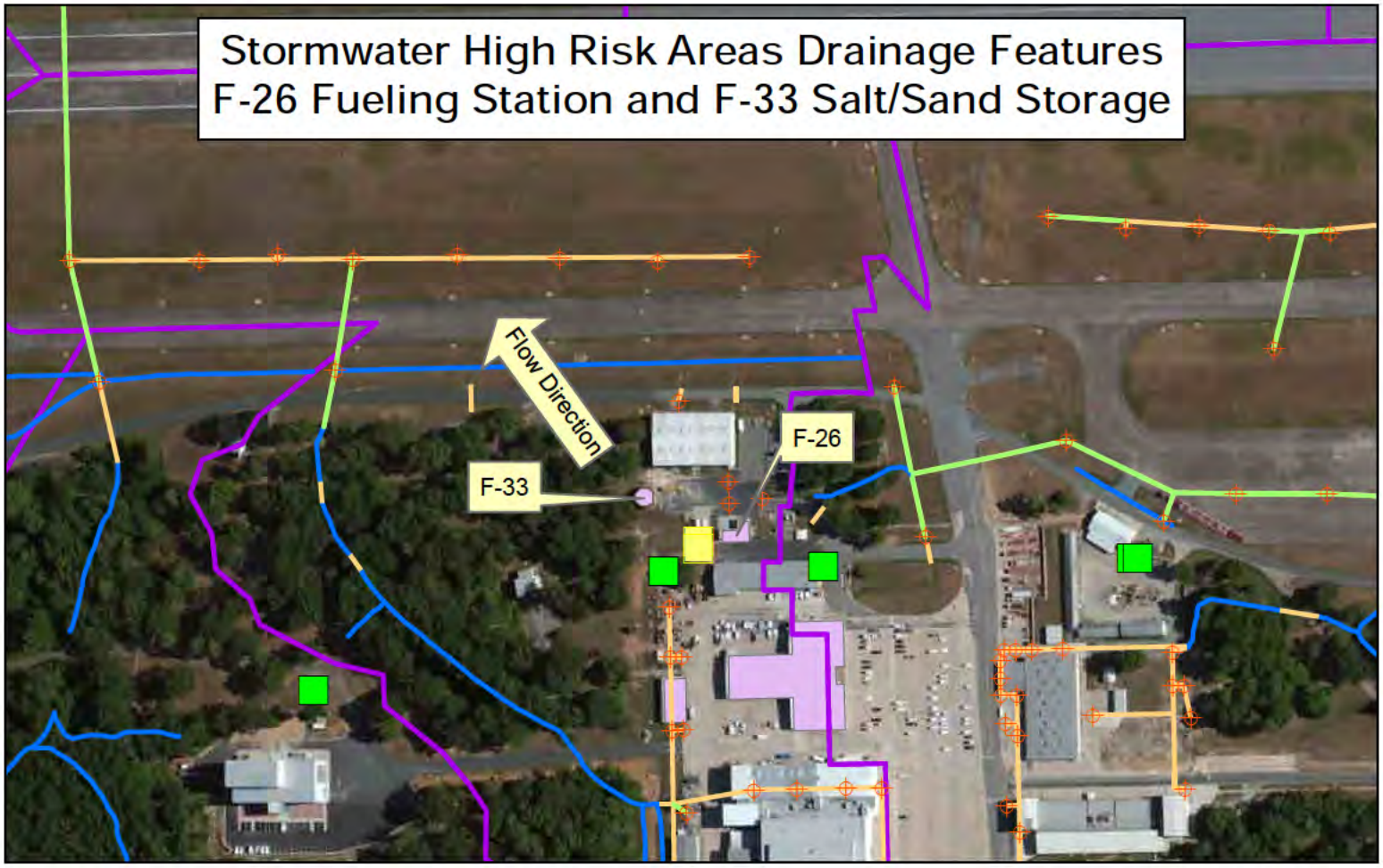


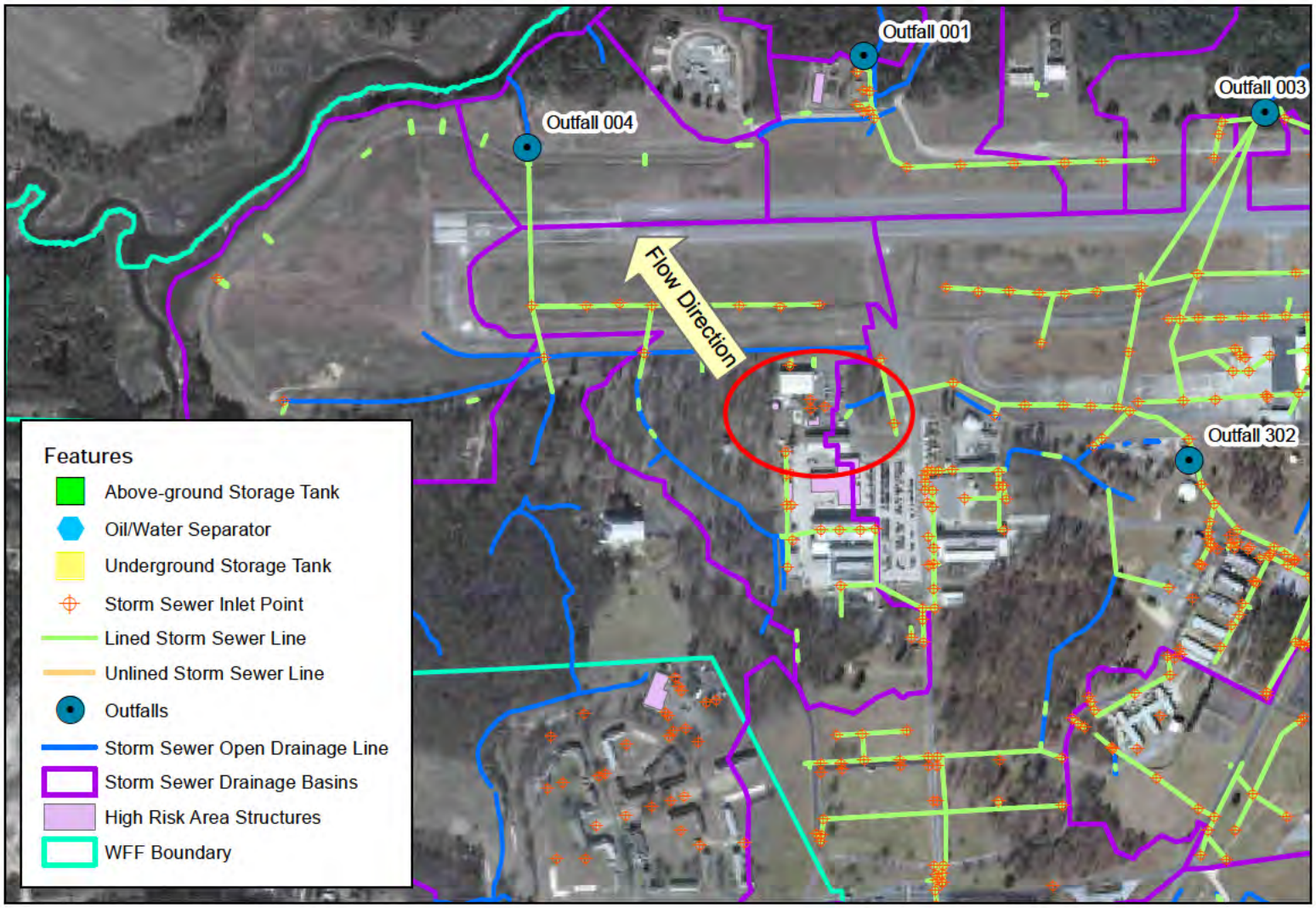
Stormwater High Risk Areas Drainage Features
F-16 Garage



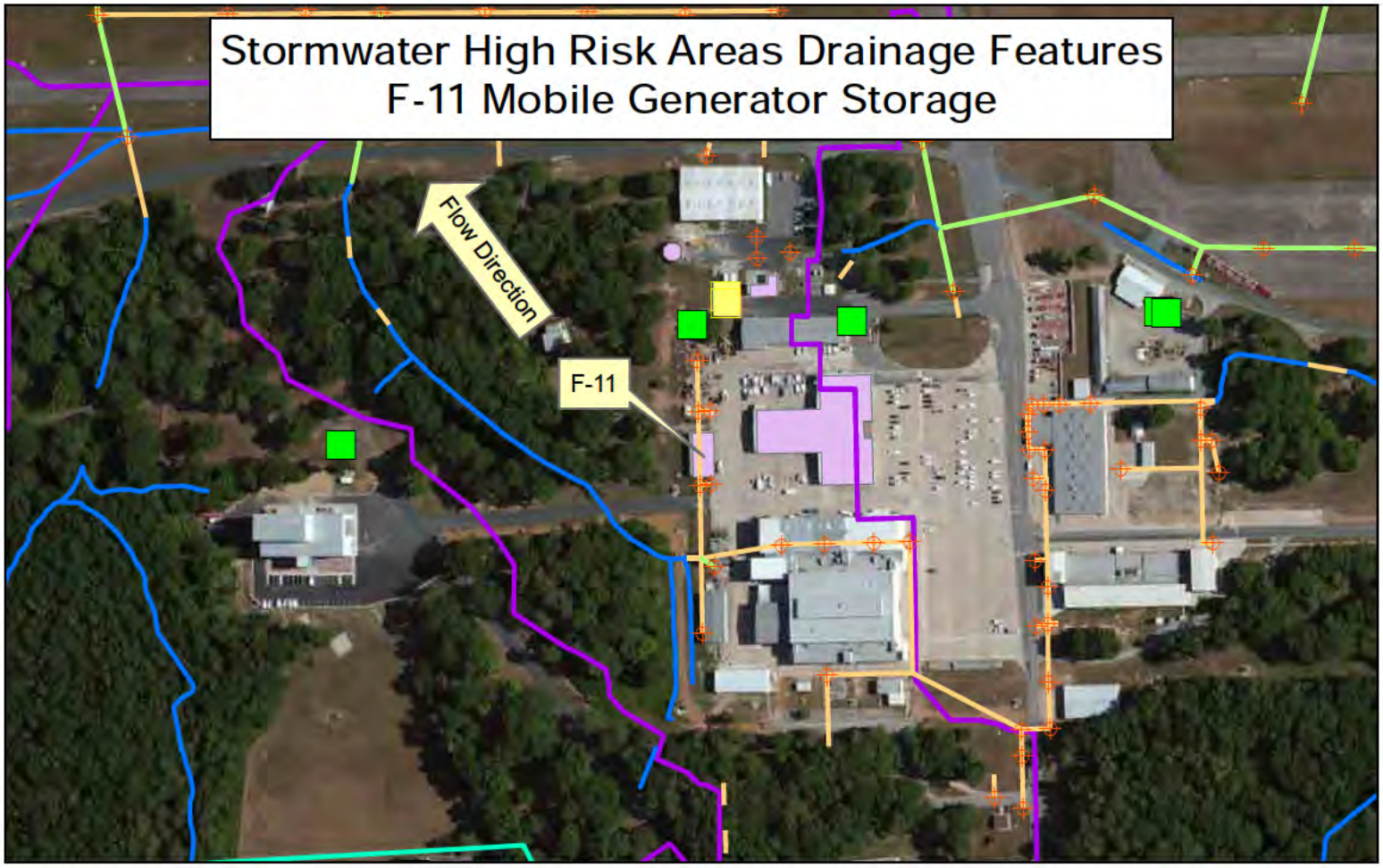


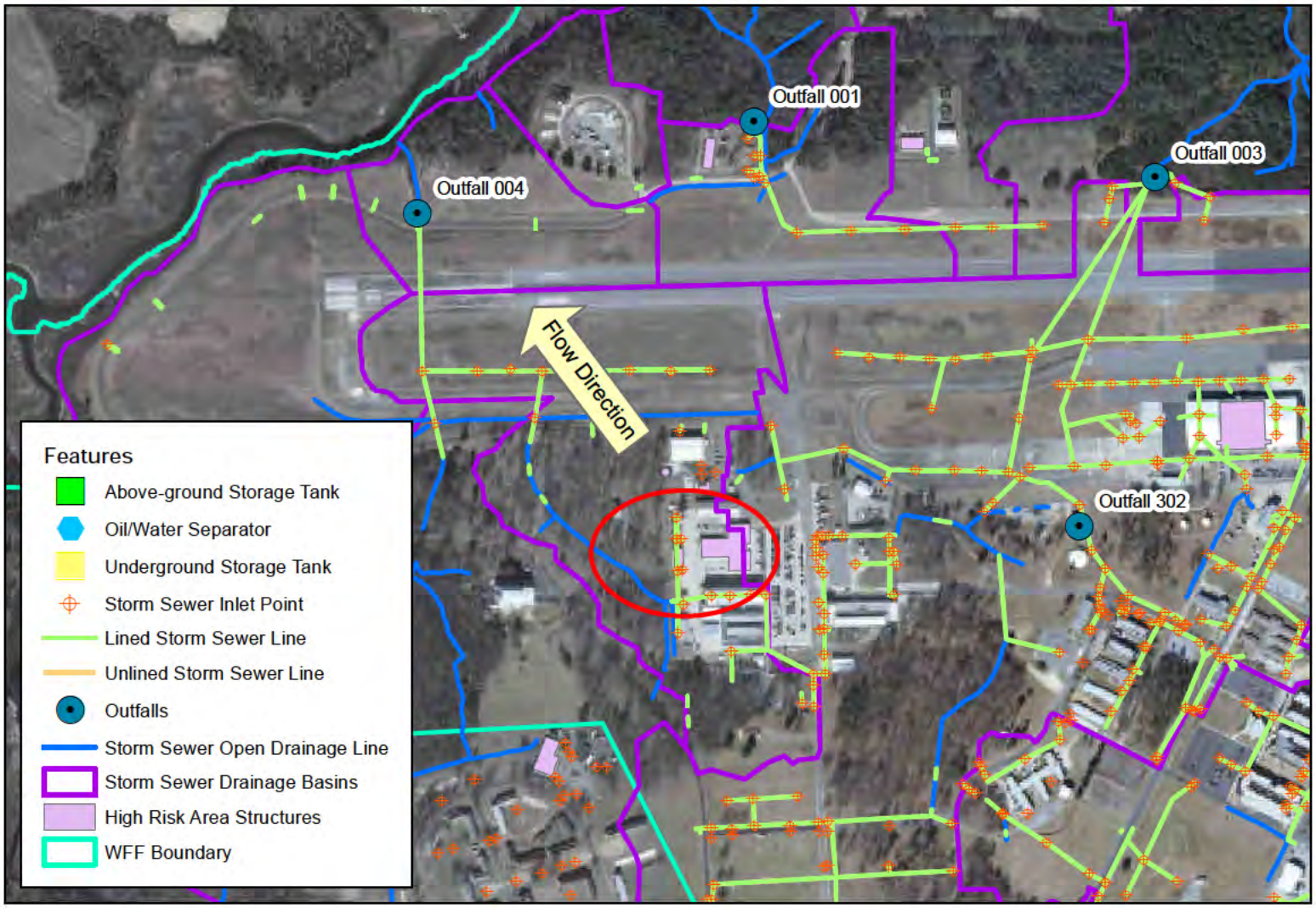
Stormwater High Risk Areas Drainage Features
F-26 Fueling Station and F-33 Salt/Sand Storage



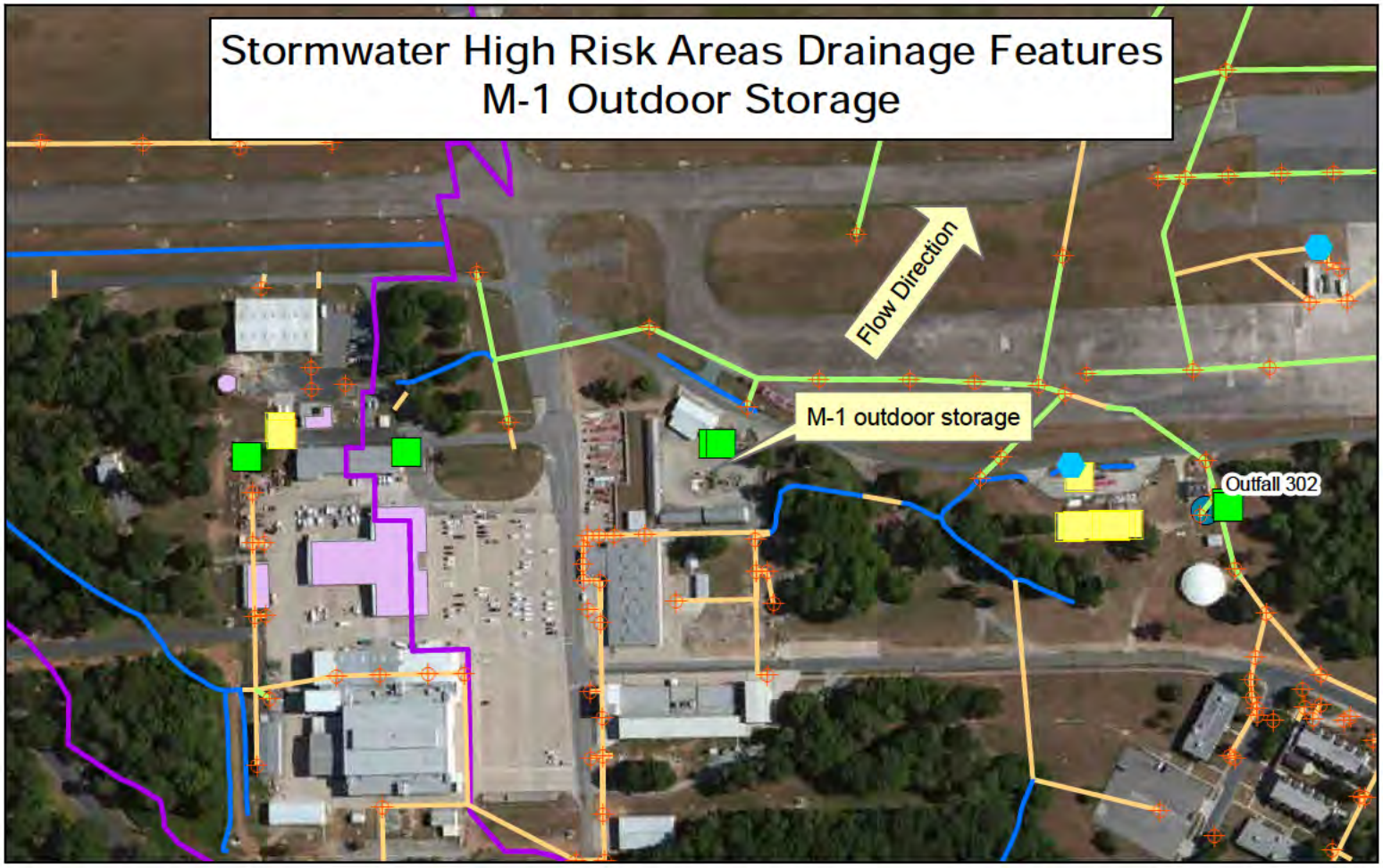


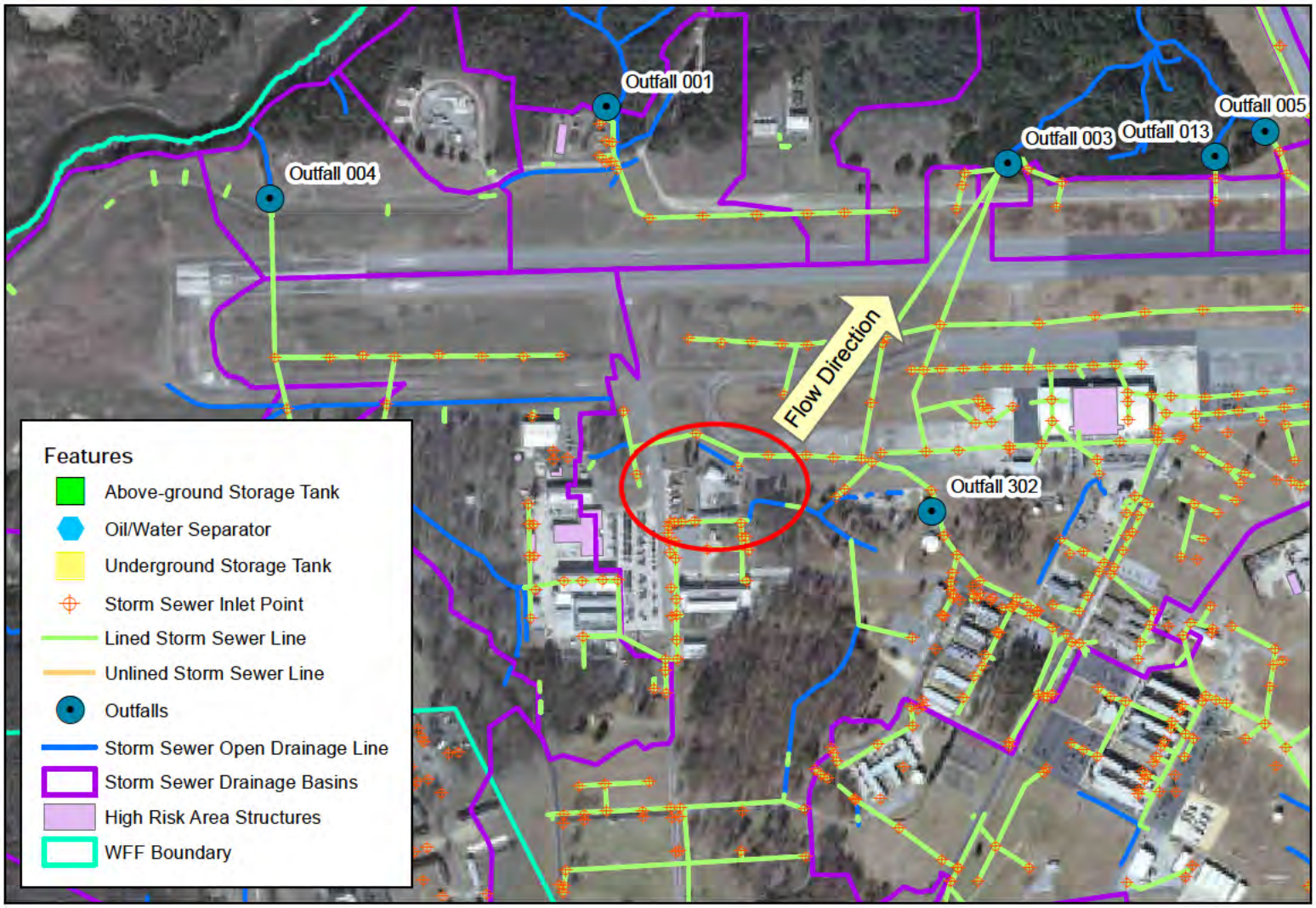
Stormwater High Risk Areas Drainage Features
F-11 Mobile Generator Storage



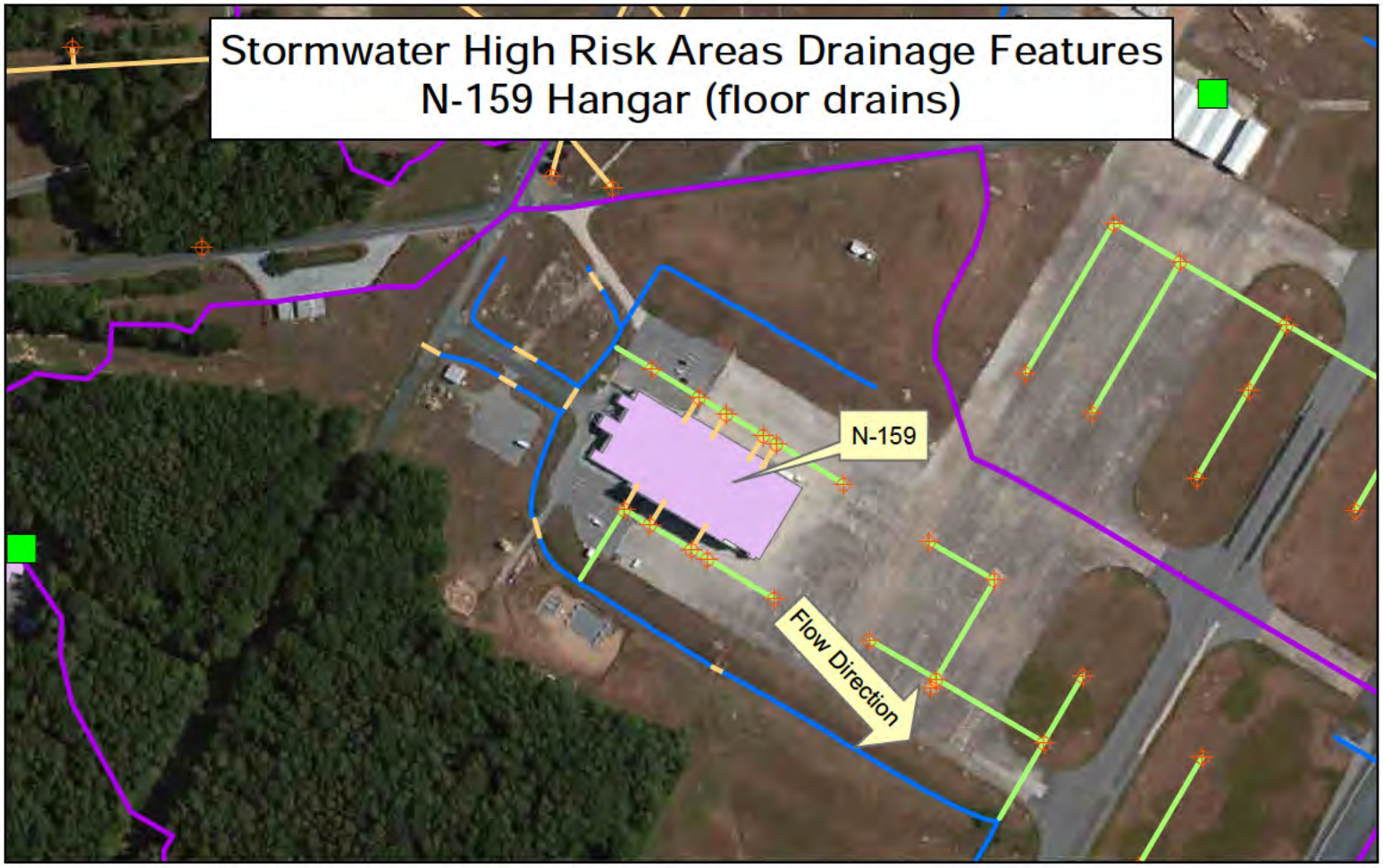


Stormwater High Risk Areas Drainage Features
M-1 Outdoor Storage

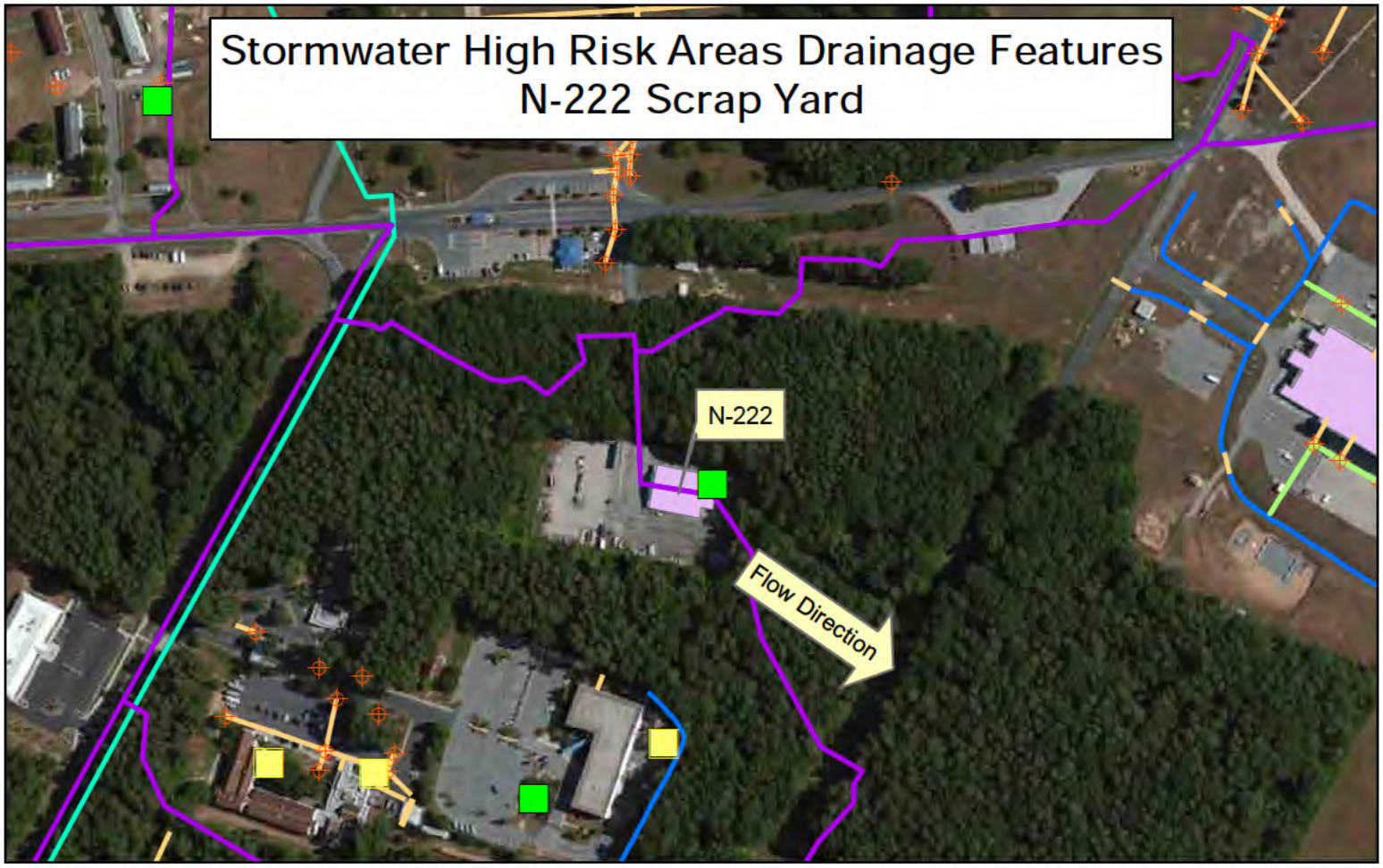


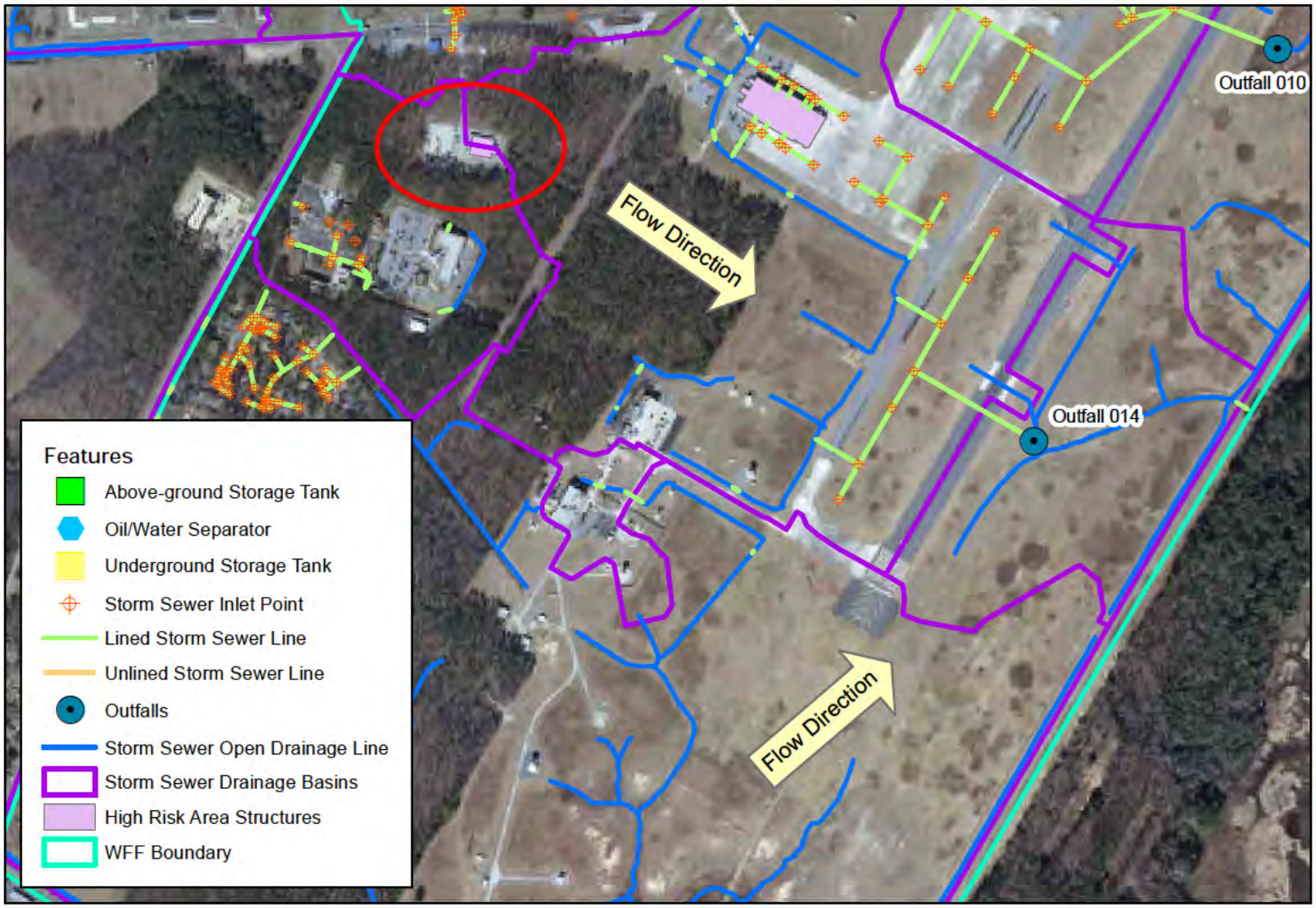


Stormwater High Risk Areas Drainage Features
N-159 Hangar (floor drains)



Stormwater High Risk Areas Drainage Features
N-222 Scrap Yard

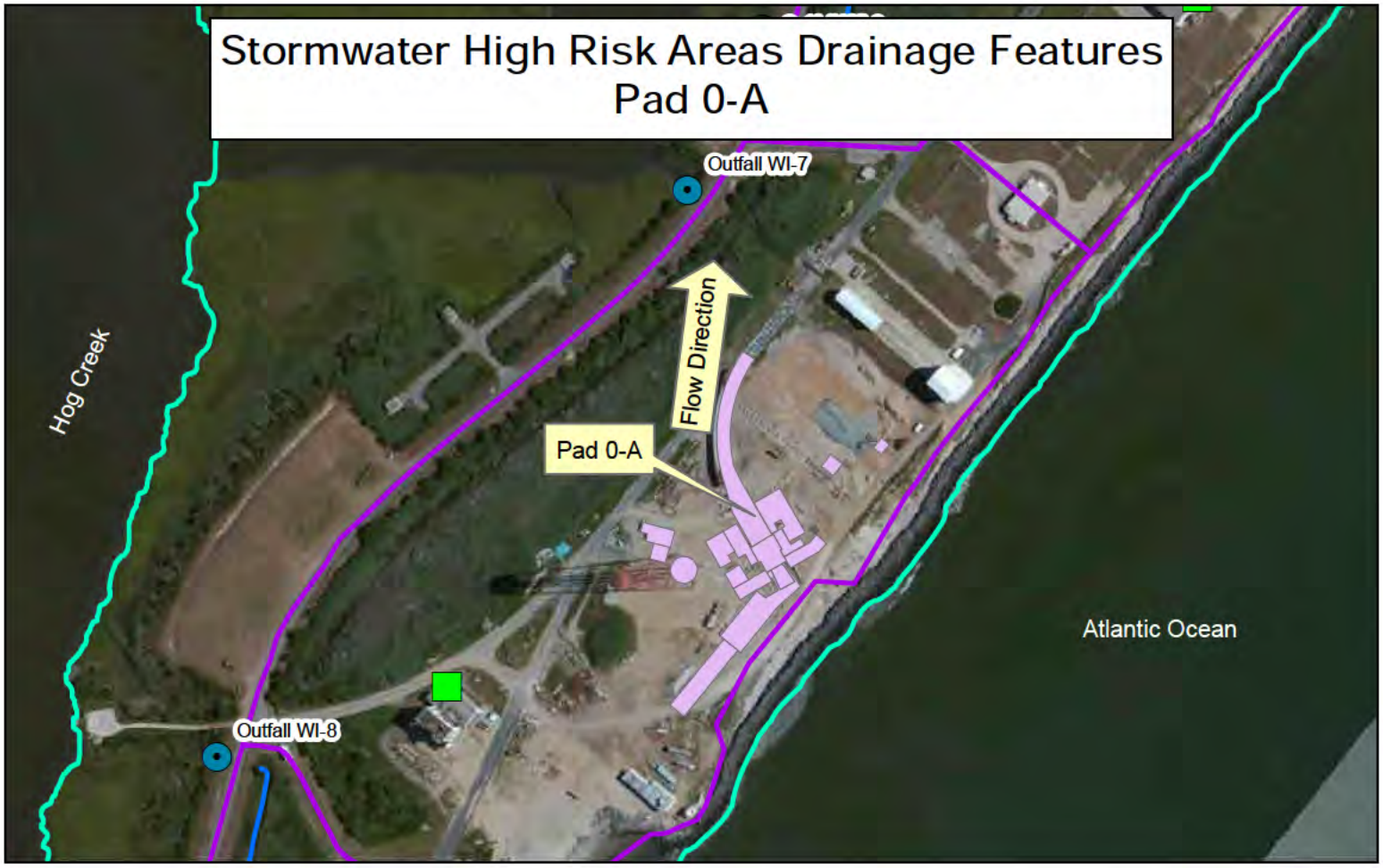




Pad 0-A and Pad 0-B Complexes at WFF
Outfall 036 (WI-6)
Outfall 037 (WI-7)
Hog Creek
Retention Pond 1
Retention Pond 2
Retention Pond 3
Retention Pond 4
Flow Direction
Pad 0-A
Deluge Basin
Outfall 038 (WI-8)
Flow Direction
Flow Direction
Pad 0-B
Atlantic Ocean
Legend
Outfalls
Stormwater Drainage Basins
WFF Boundary
0
250
500
1,000
Feet

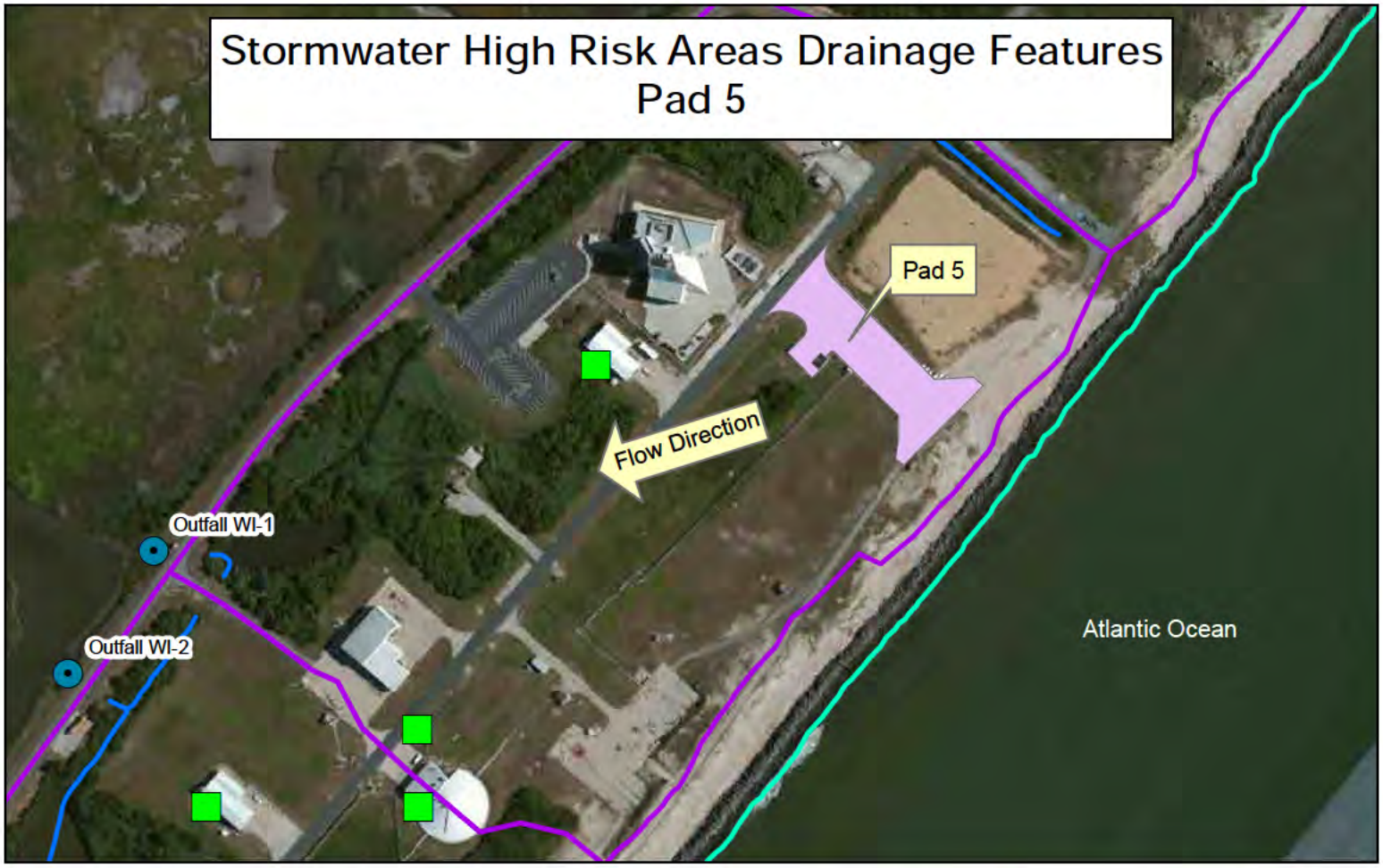
Enclosure 2

Stormwater High Risk Areas Drainage Features
Pad 0-A

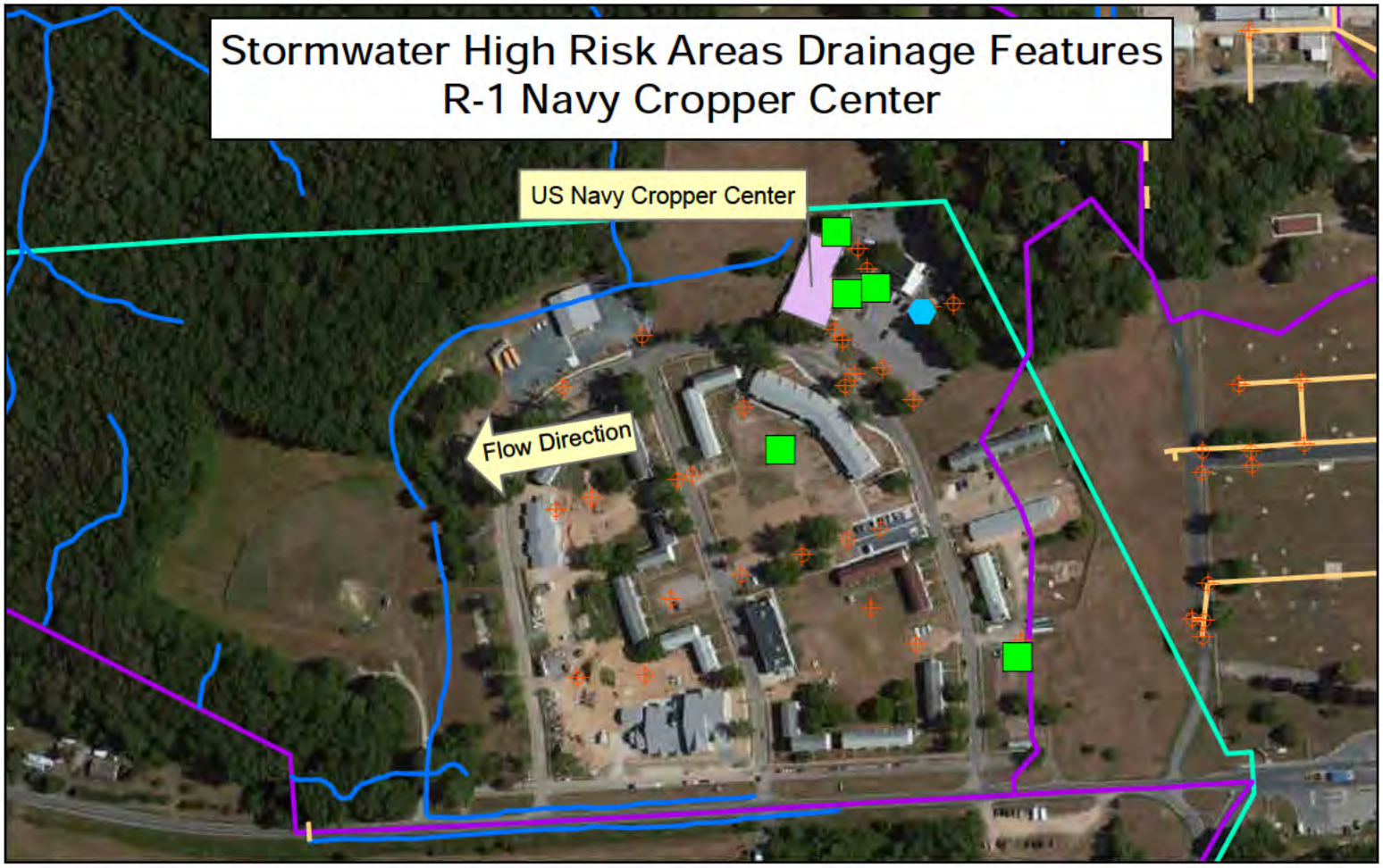


Stormwater High Risk Areas Drainage Features
Pad 0-B

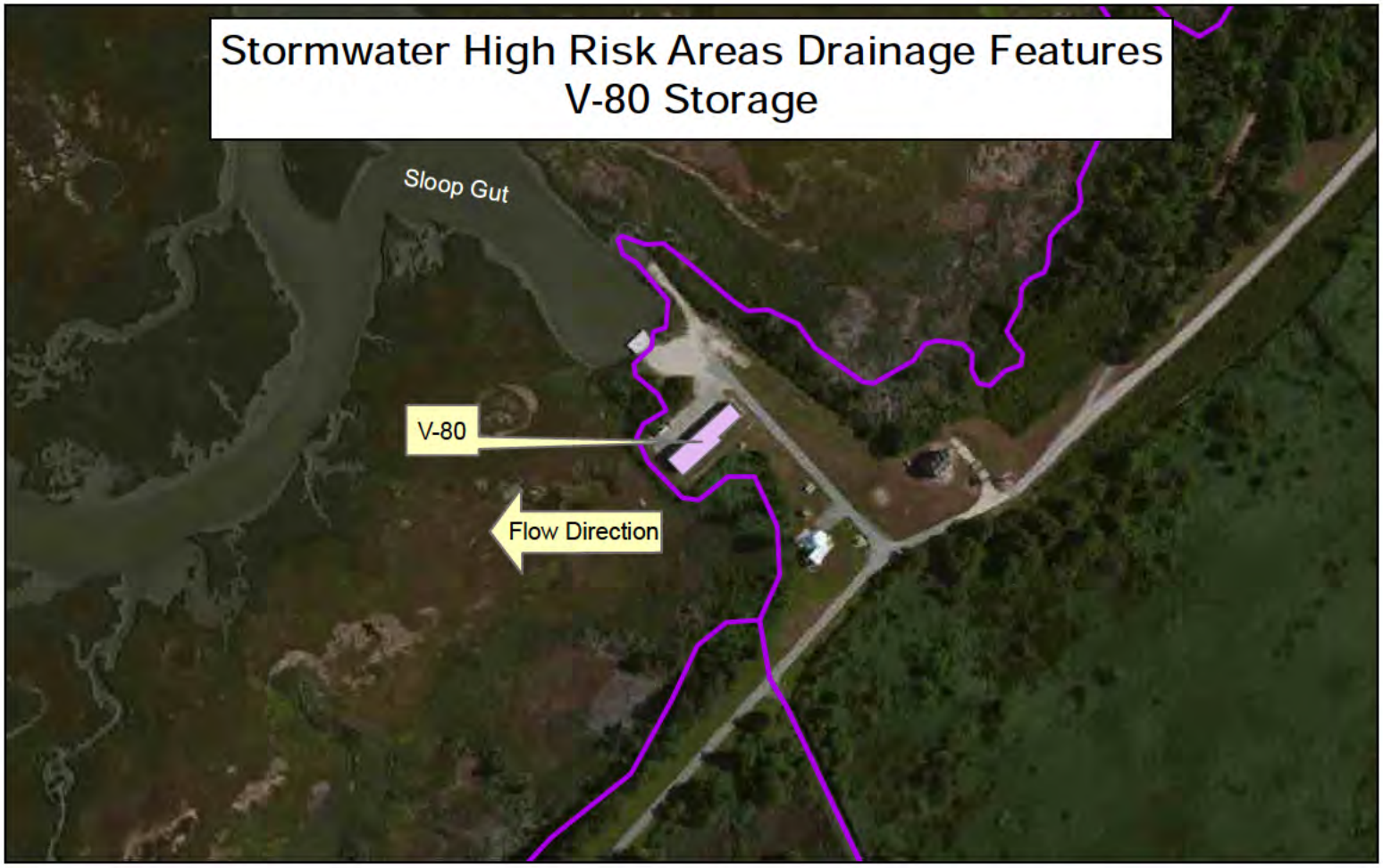
Stormwater High Risk Areas Drainage Features
Pad 5



Stormwater High Risk Areas Drainage Features
R-1 Navy Cropper Center



Stormwater High Risk Areas Drainage Features
V-80 Storage



REVISION HISTORY LOG

Revision	Effective Date	Description of Changes
04/07/09	04/07/09	Island construction for proposed Liquid Fueling Facilities with Deluge Systems and New Spacecraft Integration Facility. Outfall locations coordinates and area of imperious surfaces and total surface area drained to outfalls.
03/14/12	03/30/12	Revised plan to reflect current VPDES permit and changes to the NASA Wallops Flight Facility.
03/14/13	03/14/13	Restoration Revisions
	07/03/13	Industrial Outfalls (Outfalls WI-06(037), WI-07(038), and WI-08(039) on the Island commenced in Feb 2013 and reportable every 6 months specified by the VPDES permit.
	7/17/13	Section 313 Water Priority Chemical Addendum, added Potential Pollutant from Construction Activities, added Reference Letters, Appendix D, added
2/10/2014	2/10/2014	Revised plan to reflect current changes to the NASA Wallops Facility.
	08/07/2014	Updated Table 8. Building D-098 sludge beds have been closed with demolition of old WWTP, July 2014.
	9/15/2014	Updated formatting, alignment, and pagination.
2/24/2015	2/24/2015	Updated maps, restoration and construction projects, and pagination.
06/17/2015	06/17/2015	Reclassification of Island outfalls to correspond to VADEQ labeling. Updated formatting, alignment, and pagination.
03/15/2017	03/15/2017	Revised plan to reflect current changes to the NASA Wallops Facility section 3.5 and 3.7.3.
Rev 8	03/12/2018	Revised plan to reflect current changes to the NASA Wallops Facility section 3.5 and 3.7.3.
Rev 9	03/20/19	Revised plan to reflect current changes to the NASA Wallops Facility Section 3.5 and 3.7.3. Updated Figure 2.

APPENDIX Q

WFF #2 Diesel Fuel Delivery Guidance

Standard Operating Procedure

WFF #2 Diesel Fuel Delivery Guidance

ITS-SOP-001 Version Date: 20190515
Effective Date: Date of last signature
Expiration Date: Five years from last signature
Responsible Office: Code 250, Medical and Environmental Management Division

Document Change and Review History

Version Number	Summary of Changes	Changes Made/Reviewed By	Date
1	Baseline document		08/28/2015
2	Updated baseline draft: Section 1.3: Policies, Section 2: Fuel delivery process, Appendix B	Thera Lombardi, Mark Culver	05/15/2019

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1. Introduction

This guidance will assist Operations and Maintenance Branch (O&M) personnel (Code 227) with receiving #2 diesel fuel supplied to the National Aeronautics and Space Administration (NASA, "the Agency") Goddard Space Flight Center's Wallops Flight Facility (WFF). This document complies with federally-mandated executive decisions, regulations and directives. The procedures and processes contained herein are designed to minimize disruption to facility and mission operations and ensure that the Agency's operations and services comply with the WFF Main Base and Mainland/Island State Operating Permits for its Air Program, with the provisions of the Virginia Regulations for the Control and Abatement of Air Pollution, and with the spill prevention and control requirements of the WFF Integrated Contingency Plan (ICP).

1.1 Purpose

The purpose of this guidance is to provide O&M personnel with a systematic process for receiving #2 diesel fuel at the WFF, to ensure the Agency consistently meets the documentation requirements of the WFF Main Base and Mainland/Island State Operating Permits, and the onsite contractor escort requirements of the WFF Integrated Contingency Plan (ICP). In an emergency, refer to the WFF ICP. This Standard Operating Procedure (SOP) is not intended to provide spill response guidance or procedures.

1.2 Applicable Documents

This guidance was developed in accordance with the following regulatory mandates, directives, and federal publications:

- Federal Clean Air Act (CAA)of 1963, and revisions
- Federal Clean Water Act (CWA) of 1977, and revisions
- Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution
- WFF Main Base State Operating Air Permit No. 40217, December 6, 2011
- WFF Space Flight Test Facility (Mainland/Island) State Operating Air Permit No. 40909, February 10, 2014
- American Society for Testing and Materials (ASTM) specifications
- WFF Integrated Contingency Plan, May 2014

1.3 Policies

In accordance with the CAA and the Virginia Regulations for the Control and Abatement of Air Pollution, as referenced in the WFF Main Base and Mainland/Island state operating air permits, the Agency is required to obtain certification with the following information from the #2 diesel fuel supplier for each shipment of fuel oil delivered to the installation:

- The name of the #2 diesel fuel supplier;
- The date on which the fuel shipment was delivered;
- The volume of fuel delivered to WFF in each shipment;
- A statement that the #2 diesel fuel delivered complies with the ASTM D396; and
- A statement confirming that the sulfur content of the fuel delivered is less than 0.0015%.
- A statement of confirming compliance of minimum cetane index or maximum aromatic content, in accordance with 40 CFR 80.510 (required by 40 CFR 80.511.b.2)

In accordance with the spill response and control requirements of the CWA, as referenced in the ICP, all fuel deliveries shall be met at the WFF Main Base or Mainland front gate by an O&M representative, and the delivery truck shall be escorted to each tank scheduled to be filled during the facility site visit or shipment delivery. This requirement allows the Agency to maintain fuel accountability, site security, and air emissions controls, and to ensure quick and complete spill response and clean-up as needed.

1.4 Roles and Responsibilities

This section focuses on roles and responsibilities for individuals and organizations with respect to this SOP.

1.4.1 Operations and Maintenance Branch (Code 227)

The O&M Branch is responsible for managing #2 diesel fuel operations in support of NASA missions and facility maintenance, to include fuel supply, receipt, storage, usage, and documentation. Accordingly, O&M Branch tracks fuel usage and procures additional fuel as needed, maintains the fuel storage tanks, equipment, and the spill response supplies, and is responsible for maintaining key control access to diesel fuel tanks used for heating and power generation at both the WFF Main Base and Mainland/Island installations.

1.4.2 Medical and Environmental Management Division (Code 250)

The Medical and Environmental Management Division (MEMD) is responsible for WFF environmental compliance, monthly and annual air emissions reporting, and maintaining this SOP.

2. Fuel Delivery Process

2.1 O&M orders #2 diesel fuel usage to support mission operations and facility requirements.

2.2 O&M contacts the fuel supplier and schedules a delivery when additional fuel is needed.

2.3 O&M meets each fuel truck at the Main Base and/or Mainland front gate upon arrival to review delivery certification documentation, per the checklist included in Appendix B, and ensure the following information is included:

a. Vendor name
b. Date of delivery
c. Delivery location – must indicate building and/or tank
d. Volume delivered – must be indicated for each building/tank (gallons)
e. Type of fuel – must be ultra-low sulfur diesel or 15 ppm sulfur diesel
f. Sulfur content – must be 15 ppm sulfur or less
g. Sulfur content test method – must be ASTM D396 or equivalent
h. Minimum cetane index or maximum aromatic content – must comply with 40 CFR 80.510 (required by 40 CFR 80.511.b.2)
i. Signatures – must include signatures by the vendor manager, driver, and O&M customer representative

2.4 If all of the above information is not included in the shipment documentation, the fuel shipment will be refused and the supply company must be *immediately* contacted to fax the proper documentation to O&M before the driver will be allowed to fill any fuel

tanks and complete the delivery.

2.5 Once all of the required documentation is provided, O&M will escort the fuel delivery truck to each tank that is to be filled during the site visit.

2.6 O&M will unlock each fuel tank to be filled, and relock the fuel tank after the filling operations are complete, maintaining key control throughout the filling process.

2.7 The fuel delivery truck driver will complete, date, and sign the attached fuel certificate, attesting to the volume of fuel delivered to each tank and noting the corresponding fuel delivery ticket number. Fuel tickets must include:

- Type of fuel – must be dyed ultra-low sulfur diesel ("ULSD") or 15 ppm sulfur diesel
- Sulfur content – must be 15 ppm sulfur or less
- Delivery location – must indicate building and/or tank
- Volume delivered – must be indicated for each building/tank (gallons)
- Date of delivery
- Signatures – must include signatures by the driver and O&M customer representative

2.8 O&M will sign the attached fuel certificate, confirming receipt of the fuel delivered.

2.9 O&M will provide an electronic copy of the fuel tickets and fuel certification to Code 250.

3. SOP Maintenance

This SOP must be maintained by MEMD in a ready state that accurately reflects regulatory requirements, facility operational procedures, organizational structure, and policies. This SOP should be reviewed and updated annually as part of the organization's change management process to ensure that new information is documented and contingency measures and operational procedures revised, if required. The SOP reviews should focus on the following elements:

- Regulatory requirements
- Operational requirements
- Security requirements
- Technical procedures
- Equipment and/or fuel changes
- Alternate and offsite facility operational or procedural changes
- Record-keeping and documentation requirements

MEMD should work closely with associated internal and external organizations to ensure that impacts caused by changes within interconnected organizations will be adequately addressed and reflected in the SOP.

4. Approval

X

TJ Meyer
EMD Associate Chief

6/19/2019

X Jeffery A. Hall

Jeffery Hall
Assistant Branch Head, Code 227
Signed by: cards

4. Approval

X 11/19/2019

TJ Meyer
EMD Associate Chief

X

Jeffery Hall
Assistant Branch Head, Code 227

Appendix A: Acronyms

ASTM	American Society for Testing and Materials
CAA	Clean Air Act
CWA	Clean Water Act
ICP	Integrated Contingency Plan
MEMD	Medical and Environmental Management Division
NASA	National Aeronautics and Space Administration
O&M	Operations and Maintenance
SOP	Standard Operating Procedure
WFF	Wallops Flight Facility

Appendix B: Checklist

Diesel Fuel Delivery Checklist

Delivery Date: Year													
Month/Day													
Fuel Certificates If any of the following are marked NO, explain problem and corrective action on back or attachment.													
1. Type of fuel listed as "ultra-low sulfur" or "15 ppm" sulfur diesel?													
2. Sulfur content less than 15 ppm?													
3. Sulfur content tested by ASTM D396 (or equivalent)?													
4. Mininum cetane or maximum aromatic content complies with 40 CFR 80.510?													
5. Volume delivered for each ticket/location?													
6. Dated signatures from vendor manager, driver, and NASA representative?													
Fuel Tickets If any of the following are marked NO, explain problem and corrective action on back or attachment.													
7. Type of fuel listed as "ultra-low sulfur" or "15 ppm" sulfur diesel?													
8. Sulfur content listed as 15 ppm or less?													
9. Tank or building delivery location?													
10. Volume delivered consistent with certificate?													

APPENDIX R

Spill Summary

2016 SPILL SUMMARY				
Spill Date	**Location**	**Quantity**	**Material Spilled**	**External Report Y/N**
01/04/16	NE side of D-1	25 gallons	JP-5/ E2D Aircraft Venting	N
05/13/16	F34 fuel truck	>1QT	Condensate/Water	N
06/01/16	B31	>1G	Hydraulic Fluid	N
06/09/16	N222	>2G	Antifreeze From Tire	N
07/06/16	A131	<2G	Coolant	N
07/28/16	U12	5G	Fuel Oil	N
08/01/16	D1 RAMP	3G	Diesel	N
08/01/16	V10	4-6 QT	Hydraulic Fluid	N
08/11/16	A44	7G	Hydraulic Fluid	N
08/31/16	MLCC	1G	Hydraulic Fluid	N
10/13/16	N-162	minimal	Power Steering Fluid	N
11/12/16	AIRFIELD	<PT	Hydraulic Fluid	N
12/07/16	OB Area	Consumed in fire	Ejected Propellant	Y
12/19/16	v30	<0.5g	Mineral Oil	N

2017 SPILL SUMMARY				
Spill Date	**Location**	**Quantity**	**Material Spilled**	**External Report Y/N**
01/03/17	Pad 0-A	2-3 gal	Diesel	N
01/19/17	F-10	<5G	Sewage	Y
02/09/17	F-26	2 gal	Diesel	N
03/22/17	Pad 0-A	1/2 quart	Diesel	N
04/12/17	D-1	2 qts	Hydraulic Fluid	N
04/19/17	D-1	4 G	Hydraulic Fluid	N
05/23/17	R-20A	1-2 qts	Diesel	N
05/26/17	V-24	0.5 G	Diesel	N
07/18/17	D-4	5G	Emulsified Asphalt Sealant	N
07/21/17	B-30	<1 qt	Hydraulic Fluid	N
07/27/17	Pad 0-A	1/2 c	Oil Mixed With Water	N
08/22/17	D-1 ramp	<5G	JP8	N
09/21/17	U-40	1.5G	Antifreeze	N
09/28/17	X-57 (inside)	1 qt	Transformer Oil Inside Transformer	N
09/29/17	small M area	<1G	Hydraulic Fluid	N

2017 SPILL SUMMARY				
Spill Date	**Location**	**Quantity**	**Material Spilled**	**External Report Y/N**
10/18/17	D-50 Generator (inside)		Antifreeze On Floor	N
10/19/17	V18 Generator Iinside)		Antifreeze On Floor	N
11/03/17	outside Navy guard shack		AC Unit Leaking Oil	N
11/03/17	Main Base Runway		Leak Found	N
11/29/17	F10 T&E lab(inside)	6 gal	Hydraulic Fluid	N

2018 SPILL SUMMARY				
Spill Date	**Location**	**Quantity**	**Material Spilled**	**External Report Y/N**
3/19/2018	D-1 Ramp		Hydraulic Fluid	N
5/16/2018	D-1 Tank to Fuel Truck	10 Gallons	JP-5 Fuel	N
7/6/2018	W-22 Northside	2 Gallons	Hydraulic Fluid	N
7/11/2018	Abandoned taxiway		Antifreeze	N
8/28/2018	Avery Avenue Near Building F-1	1 Pint	Hydraulic Fluid	N
9/26/2018	Runway 04-22, East of Building E-10	9.5 Gallons	Diesel	N
11/13/2018	Pad 0A Launch Mount	Less than 20 Gallons	RP-1	N