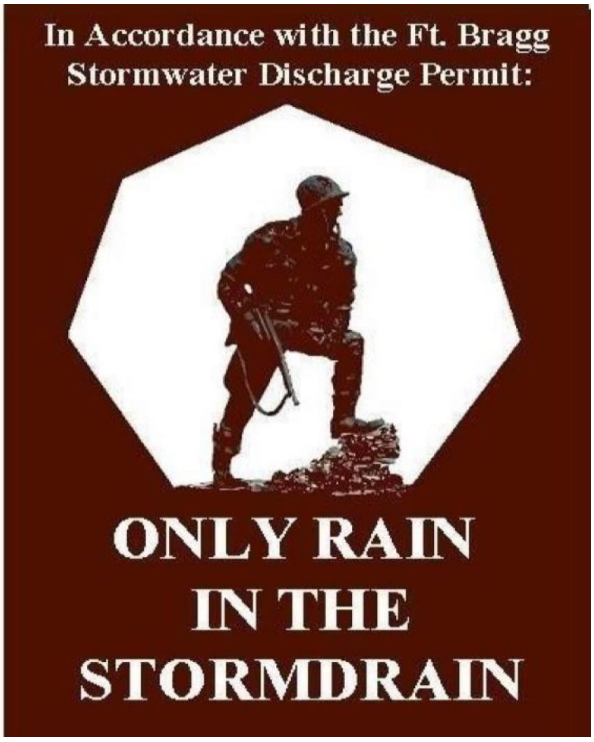
Fort Bragg
ILLICIT DISCHARGE DETECTION AND ELIMINATION PROCEDURE MANUAL



Prepared by
Directorate of Public Works
Environmental Division
Water Management Section
2025 Revision

TABLE OF CONTENTS

Table of Contents

1.0 INTRODUCTION 1
2.0 STORMWATER SYSTEM MAP 2
3.0 ILLICIT DISCHARGE POLICY 3
3.1 Illicit Discharge Definition 3
Figure 3-1. Examples of Illicit Discharges 4
3.2 Fort Bragg Illicit Discharge Prohibition Policy 5
4.0 ILLICIT DISCHARGE DETECTION PROCEDURES 6
4.1 Reporting 6
4.2 Employee Training and Public Education 6
4.3 Dry-Weather Field Screening 7
4.3.1 Responsibility 7
4.3.2 Dry Weather Inspection Schedule 7
4.3.3 Dry Weather Inspections 7
4.3.4 Documentation 8
5.0 ILLICIT DISCHARGE INVESTIGATION 8
5.1 Responsibility 8
6.0 ILLICIT DISCHARGE ELIMINATION 9
6.1 Responsibility 9
6.2 Eliminating Illicit Discharges 9
6.2.1 Structural Issues 9
6.2.2 Operational Deficiencies 9
6.3 Enforcement Actions 10
6.4 Documentation 11
6.5 Manual Review 12
7.0 REFERENCES 13

APPENDICES

Appendix A Stormwater Drainage System Maps
Appendix B Illicit Discharge Detection & Elimination Forms
Appendix C Illicit Discharge Detection & Elimination Field Guide
Appendix D Spill Response and Reporting Procedures
Appendix E Sanitary Sewer Overflow (SSO) SOP

LIST OF FIGURES

Figure 3-1. Examples of Illicit Discharges..... 3-2

LIST OF ABBREVIATIONS AND ACRONYMS

ASUS	American States Utility Services
CFR	Code of Federal Regulations
CO	Contraction Officer
COR	Contracting Officer's Representative
CWA	Clean Water Act
ECB	Environmental Division Compliance Branch
EPA	Environmental Protection Agency
ECA	Environmental Compliance Assistant
ECO	Environmental Compliance Officer
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MS4	Municipal Separate Storm Sewer System
NCDEQ	North Carolina Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POL	Petroleum, Oils, and Lubricants
RCI	Residential Community Initiatives
SDO	Stormwater Discharge Outfall
U.S.	United States
WMS	Water Management Section

1.0 INTRODUCTION

1.1 Background and Purpose

Stormwater runoff from developed land can harm surface water resources by changing natural hydrologic patterns and elevating pollutant concentrations and loadings. Stormwater runoff may contain or mobilize high levels of contaminants, such as sediment, suspended solids, nutrients, heavy metals, and pathogens. To address this problem, the U.S. Environmental Protection Agency (EPA) established stormwater regulations as part of the National Pollutant Discharge Elimination System (NPDES) permits program under the Clean Water Act (CWA), which are implemented through NPDES permits.

The EPA has delegated administration of the NPDES program to the North Carolina Department of Environmental Quality (NCDEQ). Fort Bragg is authorized to discharge stormwater and continue operation of oil water separators not associated with wastewater facilities under NPDES Phase II Permit Number NCS000331 (effective 1 October 2021). This manual has been prepared to support compliance with Part 2.D, Illicit Discharge Detection and Elimination, which requires Fort Bragg to *"develop, implement, and enforcea program to detect and eliminate illicit discharges into to the small MS4"*. To ensure compliance with the Illicit Discharge Detection and Elimination (IDDE) requirements of the MS4 Permit, Fort Bragg will followthe procedures outlined in this manual.

The Fort Bragg MS4 program is managed by the Directorate of Public Works (DPW)/Environmental Division (ED)/Compliance Branch (ECB)/Water Management Section (WMS). For any questions regarding the MS4 program or illicit discharges please contact:

Lee Ward
Chief, Water Management Section
Directorate of Public Works
Fort Bragg, North Carolina
Direct: (910) 908-5286
lee.p.ward.civ@army.mil

or

Bill DeCarmine
Water Management Section
Directorate of Public Works
Fort Bragg, North Carolina
Direct: (910) 907-5320
william.p.decarmine.civ@army.mil

2.0 STORMWATER SYSTEM MAP

Fort Bragg maps its entire stormwater infrastructure using ArcGIS software. This includes MS4 outfalls, storm pipes, culverts, stormwater control measures, and other water features. The water Management Section continuously updates maps and attribute tables. Stormwater infrastructure data is verified through field inspections, surveys, information integrated from CAD files, grading plans, and as-built drawings. After thorough verification, the data is forwarded to the Installation GIS Office for inclusion in the installation's geodatabase. Maintaining an accurate map of the stormwater system allows for easy tracing and locating the source of suspected illicit discharges. Using GIS allows for easily accessed attribute information and layer isolation.

As of May 2023, Fort Bragg has identified 132 Major outfalls: 62 non-industrial and 70 industrial outfalls.

Since 2013 Fort Bragg has been contracting out comprehensive watershed studies to survey stormwater infrastructure locations and conditions. Data collected during these surveys is utilized to update the stormwater system GIS data. Updated storm sewer system maps, including the addition of new or reclassified (e.g., industrial to non-industrial) outfalls, will be included in this manual as they are developed. Surveys are programed/scheduled and subject to funding availability; completion might not take place until 2027/2028.

Watershed Surveys

Watersheds	Scheduled	Awarded	Complete
Old Post	FY13	FY14	FY15
SAAF	FY13	FY13	FY14
Tank Creek	FY17	FY17	FY19
Beaver Creek	FY18	FY18	FY19
Big Branch	FY18		
Cross Creek	FY19		
McPherson Creek	FY19	FY21	FY22
Young's Creek	FY20		
Patriot Point	FY20		

3.0 ILLICIT DISCHARGE POLICY

3.1 Illicit Discharge Definition

Any discharge to a MS4 that is not composed entirely of stormwater except discharges pursuant to an NPDES permit (other than the NPDES MS4 permit), allowable non-stormwater discharges, and discharges resulting from fire-fighting activities.

Illicit discharges to the Fort Bragg MS4 are typically the result of aging infrastructure; industrial, commercial and/or residential practices spill events. Examples of illicit discharges are illustrated in Figure 3-1 and include (but are not limited to) the following:

- Runoff from improperly stored materials
- Improper disposal of POL's or household chemicals into a storm drain inlet
- Leaking dumpsters flowing into a storm drain inlet.
- Old or damaged sanitary sewer line leaking fluids into a cracked or damaged storm sewer line
- Allowing wash water with soaps or detergents to discharge to a storm drain inlet.
- Washing silt, sediment, concrete, cement or gravel into a storm drain inlet
- POLs from vehicle accidents
- Foam solutions from firefighting testing and training exercises

Examples of authorized non-stormwater discharges that are not significant contributors of pollutants and are not considered illicit discharges at Fort Bragg include the following:

- Water line flushing
- Uncontaminated groundwater infiltration
- Landscape and lawn irrigation
- Air conditioning condensate
- Street wash water
- Groundwater from footing drains and crawl spaces
- Flows from firefighting activities.
- Discharges from potable sources
- Flows from riparian habitats and wetlands.
- Dechlorinated swimming pool discharges

Sewer Pipe Leaking into a Storm Pipe

Oil Dumped at Storm Drain Inlet

Rinsing Dumpster Residue to Storm Drain Inlet

Discharge from a Vehicle Accident

Source: *Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments (CWP, 2004)*

Figure 3-1. Examples of Illicit Discharges

Illicit connections to the stormwater drainage system can also generate illicit discharges. Illicit connections are any manmade conveyance that is connected to the MS4 without a permit, excluding roof drains and other similar connections. Examples of illicit connections include, but are not limited to, the following:

- Sanitary sewer piping that is connected directly from a building to the stormwater drainage system.
- A cross connection between the sanitary sewer and the stormwater drainage system
- A shop floor drain that is connected to the stormwater drainage system.

The frequency of illicit discharges typically occurs within the following three classifications as defined by the EPA (CWP, 2004):

- ***Continuous*** discharges occur most or all the time, are usually easier to detect, and typically produce the greatest pollutant load.
- ***Intermittent*** discharges occur over a shorter period (e.g., a few hours per day or a few days per year). Because they are infrequent, intermittent discharges are hard to detect, but can still represent a serious water quality problem, depending on their flow type.
- ***Transitory*** discharges occur rarely, usually in response to a singular event such as an industrial spill, ruptured tank, sewer break, transport accident or illegal dumping episode. These discharges are extremely hard to detect with routine monitoring, but under the right conditions, can exert severe water quality problems on downstream receiving waters.

Understanding the frequency classifications can help in detecting and eliminating illicit discharges by allowing inspectors to determine if dry weather flows may need additional examination to determine if they should be classified as illicit discharges.

3.2 Fort Bragg Illicit Discharge Prohibition Policy

Fort Bragg is dedicated to detecting and eliminating illicit discharges to the stormwater drainage system. This section defines illicit discharges and outlines the Fort Bragg policy prohibiting illicit discharges.

Ongoing efforts on Fort Bragg have been in place since the inception of NPDES Phase I Permit Program in 1990's. IDDE includes prevention and prohibition, field screening, and investigation procedures.

Deliberate dumping into the stormwater system is illegal under the federal CWA and is therefore enforceable and punishable by Fort Bragg law enforcement officers and outside entities. Additionally, XVIII ABN Corps and Fort Bragg Regulation 200-1 Chapter 12 Wastewater Management calls for Conserving and safeguarding all stormwater collection systems and all bodies of water, whether natural or man-made, including lakes, streams, wells, wetlands, and underground aquifers. Control or eliminate all sources of pollution effecting surface or groundwater quality. Chapter 9 Solid Waste Management Section prohibits littering or illegal dumping of waste. Willful violation of the provisions of XVIII ABN Corps and Fort Bragg Regulation 200-1 will provide the basis for disciplinary action under Article 92, Uniform Code of Military Justice (UCMJ) (Violation of a lawful general regulation for personnel subject to UCMJ) for military personnel, and AR 690-700, Chapter 751, Personnel Regulations and Services (General) (Failure to observe written regulations, orders, rules, or procedures) for civilian employees of the government. All persons, military or civilian, are subject to criminal and civil penalties for violations of these Federal or State statutes.

4.0 ILLICIT DISCHARGE DETECTION PROCEDURES

This section outlines procedures for IDDE incident reporting and dry-weather field screening at the Fort Bragg MS4 outfalls.

4.1 Reporting

All Fort Bragg personnel and residents are encouraged to report illicit discharge and/or illegal dumping activities.

All Illicit discharges/spills, including sewage, are reported to the Fort Bragg Fire and Emergency Services whose personnel are the installation's First Responders, and their telephone number (911) is the primary hotline for reporting illicit discharges/spills. The hotline is manned 24 hours per day, 7 days per week. Fort Bragg personnel can also call Environmental staff (396-2295/396-2141/908-5286). The Integrated Contingency Plan (ICP) incorporates the Spill Prevention, Control, and Counter Measures Plan (SPCCP) which guides theresponse actions. The Spill Response SOP is followed for investigating, clean up, eliminating these illicit discharges, and reported to NCDNER as necessary (See Appendix D). The Sanitary Sewer Overflow (SSO) SOP is followed for investigating, clean up, eliminating SSO illicit discharges, and reported to NCDNER as necessary (See Appendix E)

Copies of spill reports are stored in the ECB shared electronic Hazardous Waste Team folder.

4.2 Employee Training and Public Education

Fort Bragg's employee training for appropriate personnel, who, as part of their normal job responsibilities, may encounter or otherwise observe an illicit discharge or illicit connection to the storm sewersystem is as follows.

- Overview Fort Bragg Stormwater Program and Stormwater Pollution Prevention
- Preventing Stormwater Pollution "What Can We Do" Recognizing and Reporting Illicit Discharges.
- Rain Check Stormwater Pollution Prevention Employee Training for MS4's
- IDDE A Grate Concern Illicit Discharge Detection & Elimination Employee Training for MS4's

Fort Bragg established Environmental Public Education in 1995. Environmental Compliance Officer training for Environmental Compliance Officers (ECOs) and Environmental Compliance Assistants (ECAs) in both military and civilian activities. The ECO class last approximately 20 hours and includes: stormwater, pollution prevention, spill prevention, spill response, Hazardous waste, Solid waste, recycling programs, and the maintenance of oil/water separators.

DPW and the family housing management company (Corvias) have periodically distributed information about the IDDE program and how to report via newsletter articles.

4.3 Dry-Weather Field Screening

The Water Management Section conducts dry weather inspections at all stormwater outfalls to identify any potential illicit discharges. These inspections are documented on an inspection form (see Appendix B) kept in the WMS office and stored in the Fort Bragg Stormwater Management Database. The results of these inspections are discussed and summarized in the annual report submitted to NCDEQ.

4.3.1 Responsibility

Outfall dry weather inspections are the responsibility of DPW WMS. Contractors hired by the installation perform outfall dry weather inspections.

4.3.2 Dry Weather Inspection Schedule

As required by Section 2.D.3c of the MS4 Permit, dry weather inspections are conducted at all major outfalls. The EPA suggests MS4 communities inspect at least 20% of their outfalls per year. Fort Bragg schedules around 10% of their total MS4 major outfalls each month. Weather permitting; the goal is to inspect all MS4 major outfalls at least once per year.

4.3.3 Dry Weather Inspections

Outfall dry weather inspections field crews will visually inspect each major outfall and complete a Dry-Weather Outfall Inspection Form provided in Appendix B. Special attention is paid to outfalls that are flowing whenno rain has occurred within the last 72 hours and/or outfalls where foul odors or discolored water is noted. When the screening of an outfall indicates a potential illicit discharge, the Fort Bragg Stormwater Program Manager will be notified so an investigation, as described in Section 5.0, can be performed. Any identified spills or conditions that represent a serious threat to personnel safety or equipment damage will be immediately reported to Fort Bragg Fire and Emergency Services.

4.3.4 Documentation

All field reports will be reviewed and maintained by DPW WMS staff in the Fort Bragg Stormwater Management Database.

A service order request will be submitted via e-mail or phone to the DPW Operation & Maintenance Division (OMD)/Customer Service Order Desk to address any maintenance issues identified during the outfall screenings. OMD will determine whether the issue can be addressed with a service order or whether an FB Form 4283, Engineering Facilities Work Request, will be required. A blank FB Form 4283 is provided in Appendix B.

5.0 ILLICIT DISCHARGE INVESTIGATION

Potential illicit discharges can be detected through community reporting or outfall inspections as described in Section 4.0. Once a potential illicit discharge has been detected, it becomes necessary to investigate to identify and eliminate the source of the discharge. The investigation may result in the source being easily identified or it may require a more in-depth inspection as outlined in this section.

5.1 Responsibility

In 2012 the Water Management Section developed an Illicit Discharge Detection & Elimination Field Investigation Guide (see Appendix C). The guide lays out procedures for detecting, tracing, and removing sources of illicit discharges. Trained Qualified personnel physically inspect the drainages looking for illicit discharge pipes, seeps, or other suspect flows. Tools to help personnel identify potentially illicit discharges include field test kits to determine chemical characteristics, and the storm sewer map, which shows base infrastructure in addition to other items required by the permit. Field personnel utilize maps to help identify the source of the discharge.

6.0 ILLICIT DISCHARGE ELIMINATION

Fort Bragg is committed to eliminating illicit discharges to the stormwater drainage system. This section outlines mechanisms for eliminating confirmed illicit discharges and enforcement actions that may be enacted to achieve compliance.

6.1 Responsibility

Initiating and verifying the elimination of an illicit discharge is the responsibility of DPW ECB. DPW ECB staff will provide educational materials and advocate for funding when needed to eliminate illicit discharges. Depending on the location and type of discharges, specific elimination actions may be conducted by other organizations including Unit Commanders, ECO's, Housing Management staff (Corvias), the installations Utility Service providers, Electrical - Sandhills Utility Services (SUS), Water/Wastewater - American States Utility Services (ASUS), and Natural Gas – Piedmont Natural Gas (PNG), or other outside contractors hired by the installation.

6.2 Eliminating Illicit Discharges

Illicit discharges are generally the result of either structural issues or operational deficiencies. The mechanism for eliminating a discharge will depend on the discharge type.

6.2.1 Structural Issues

Examples of structural issues that may result in illicit discharges include:

- Illicit connections with the sanitary sewer
- Oil/water separators (OWS) pretreating industrial wastewater discharging to the stormwater drainage system.
- Leaking concrete containment berms and/or valves
- High level bypass pipes at sanitary sewer lift stations

Structural issues will generally require a construction action to eliminate the illicit discharge. Repair projects for structural issues will be initiated through completion of a service order request to the Operation & Maintenance Division (OMD) Service Order Desk. OMD will determine whether the issue can be addressed with a service order or whether an FB Form 4283, *Facilities Engineering Work Request*, will be required. A blank FB Form 4283 is provided in Appendix B. Funding for the repair will be determined once the work request has been submitted and reviewed by DPW Business Operations and Engineering Divisions.

6.2.2 Operational Deficiencies

Examples of operational deficiencies that may result in illicit discharges include:

- Washing activities in areas that discharge to a storm drain inlet.
- Runoff from improperly stored material
- Illegal dumping
- Dumpster leachate
- Improperly managed secondary containment valves

Elimination of operational deficiencies can be achieved through BMP's such as education, modification of processes, and/or relocation of the discharge generating activities. DPW ECB staff will work with facility occupants as needed to promote compliance.

6.3 Enforcement Actions

As discussed in Section 3.2 of this manual, illicit discharges to the stormwater system are prohibited by Federal Regulations. Prohibition is also addressed through contract language with contractors performing work on base. Corrective actions focus first on education to promote voluntary compliance and escalate to increasingly severe enforcement actions if voluntary compliance is not obtained. The Fort Bragg community is comprised of military and civilian personnel and residents and enforcement actions associated with illicit discharges will depend on the organization of the responsible party or parties. Fort Bragg will generally follow a three-step enforcement action policy for confirmed illicit discharges; however, more serious violations or continued, egregious non-compliance may warrant a more aggressive approach. Actions conducted under each enforcement step include the following:

- **Step 1: Initial Actions** – DPW ECB will provide documentation (e-mail, Spill Report, Photos) describing the location and nature of the illicit discharge and the required elimination action. If the source of the illicit discharge is due to a structural issue, the documentation will also include a reference to the Service Order Number, or a copy of the FB Form 4283 initiated to correct theissue. For military organizations and tenants, the documentation will be sent to the ECO or ECA. For contractor organizations, the documentation will be sent to the Contracting Officer's Representative (COR) overseeing the responsible party. Documentation for illicit discharges occurring in housing areas will be sent to the Residential Community Initiatives (RCI). ***Step 1 is not meant to be punitive. It is an opportunity to inform and educate the responsible parties and to encourage voluntary compliance.***

- **Step 2: Intermediate Actions** – If the illicit discharge has not been eliminated or if the illicit discharge is detected a second time at the facility under the responsibility of the same organization, ECB will send a notification regarding the unresolved issues. For military organizations and tenants, the notification will be sent to the unit Commander or equivalent. For contractor organizations, the notification will be sent to the Contracting Officer (CO) overseeing the responsible party. Notification for illicit discharges occurring in housing areas will be sent to the RCI Housing Authority. ***To the extent possible, Step 2 is meant to bring about an immediate stop to activities generating the illicit discharge until such time that procedures are put in place to prevent future discharges. For contractor activities, Step 2 may result in a stop work order from the CO.***
- **Step 3: Final Actions** – If the illicit discharge has not been eliminated or if the illicit discharge reoccurs at the facility a third time under the responsibility of the same organization, ECB will send a notification to the Garrison Commander regarding the unresolved issues. ***Step 3 may result in disciplinary action for military organizations and tenants; loss of contract and/or removal from base for contractors; and loss of housing lease for residents in base housing.***

6.4 Documentation

Digital copies of all correspondence between all parties regarding the resolution of the illicit discharge will be saved on the ECB shared server.

6.5 Manual Review

Review of the IDDE Procedures Manual is important in order Fort Bragg to have an up-to-date standard to use for assessing the overall effectiveness of the IDDE Program for compliance with NPDES Phase II Permit Number NCS000331. The Fort Bragg MS4 Program Plan outlines the procedures for the IDDE program evaluation and assessment. Refer to the MS4 Program Plan for guidance for performing the annual evaluation.

7.0 REFERENCES

Center for Watershed Protection (CWP). 2004. *Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments*. Ellicott City, MD: CWP.

Fort Bragg. NPDES Phase II Permit Number NCS000331

North Carolina Department of Environmental Quality (NCDEQ). 2008. *Stormwater Discharge Outfall (SDO) Qualitative Monitoring Report Supplement SWU-242A: Guidance for Rating Stormwater Discharge.* Unknown.

U.S. EPA. 2013. 40 CFR 122, EPA Administered Permit Programs: The National Pollutant Discharge Elimination System. Washington, DC: U.S. Government Printing Office.

Fort Bragg Spill Prevention, Control, and Countermeasure (SPCC) Plan

APPENDIX A
STORMWATER DRAINAGE SYSTREM MAPS

The Stormwater Drainage System maps are too large to place in this document. The maps can be viewed in pdf or in GIS.

APPENDIX B

ILLICIT DISCHARGE DETECTION AND ELIMINATION FORMS:

- Dry-Weather Outfall Inspection Form
- Fort Bragg Spill Report Form
- Facility Engineering Work Request FB Form 4283

Dry Weather Outfall Inspection

Inspector Name:

Inspection Date:

Last Precipitation Date:

Precipitation:

Outfall ID:

Pipe Diameter:

Outfall Type:

Is apron present? J-

[O Yes O No

Apron comments:

If yes: 0 Concrete D Metal 0 Trash Guard O No Trash Guard 0 Other

is rip-rap present ?

0 Yes O No

Rip-rap condition:

Industrial activities in immediate vicinity of outfall:

Does the outflow allow the free flow of water?

0 Yes O No

If not, what is obstructing the flow?

O Garbage O Sediment O Vegitation O Animal Dens

Indicate any evidence of environmental impacts:

D Scouring
D Sediment build-up
D Garbage entrapment
D Entrapment of decaying vegitation
D Illicit discharges

Is drainage occuring?

[0 Yes O No

Drainage Source:

a. Color:

c. Odor:

b. Clarity:

d. Staining:

Identify maintanence needs:

D Obstruction removal or cleaning
D Erosion stabilization
D Apron not intact
D Visible joints not intact
D Pitting/rusting/holes present
D Concrete spalling present
D Road distress above pipe present
D Other:

Rate each outfall's need for repair, replacement or maintanence:

Comments:

FORT BRAGG SPILL REPORT FORM

Directorate of Public Works
Environmental Compliance Branch
Fort Bragg, North Carolina 28310-5000

Spill Response Incident Number: **9223-2**

This Spill report Form (Form SP-1) should be used to evaluate and document the status of each Ft. Bragg spill. Form SP-1 is used in conjunction with the Spill Response Plan (SRP). The SRP contains general procedures to be follow ed in the early stages of a spill. Installation Spill Response Team (ISRT) personnel should transition to the Installation Spill Contingency Plan (ISPC), Facility Response Plan (FRP) and Spill Prevention Control and Countermeasures Plan (SPCCP) after appropriate notifications and response actions are underway.

1a. DATE OF SPILL (ex., 01-Jan-08)		1b. TIM E OF SPILL (HH:M M)	
2a. BUILDING LOCATION	2b. BUILDING NUM BER	2c. BUILDING COORDINATE	
3a. PRODUCT SPILLED		3b. AMOUNT / VOLUMESPILLED and UNIT OF MEASURE	
4a. PERSON REPORTING SPILL		4b. TELEPHONE NUM BER	
4c. UNIT OR ACTIVITY		4d. UNIT OR ACTIVITY TELEPHONE NUM BER	
5a. SPILL RESPONDERS			
5b. SPILL RESPONSE EQUIPM EN			
6. CAUSE OF SPILL			
7a. DESCRIPTION OF SPILL			
7b. M ETHOD OF CLEAN UP			
8. CORRECTIVE ACTIONS TAKEN			
9. SPILL REPORT DOCUM ENTED BY			
10. DPW-ENVIRONM ENTAL COM PLIANCE BRANCH REPRESENTATIVE			
11a. FORWARDED TO	NC, DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (Send copy by e-mail to: james.brown@ncmail.net (FACSIMILE (910) 486-0707))		N
11b. FORWARDED TO	ENVIRONMENTAL SUSTAINMENT DIVISION (ESD) / DPW-ECB		Y
11c. FORWARDED TO	NATIONAL RESPONSE CENTER (800.424.8802)		N
11d. FORWARDED TO			
12a. DATE REPORT(S) E-M AILED (DD-M M -YY)		12b. TIM E REPORT(S) E-M AILED (HH:M M)	
13 ADDITIONAL INFORM ATION			

FACILITIES ENGINEERING WORK REQUEST
For use of this form, see DA Pam 420-6: the proponent agency is OACSIM

PART A (See Requestor Instructions)	CUSTOMER ID	DOCUMENT SERIAL NUMBER	FY	TYPE	SUMMARY OF WORK FOR TITLE	DATE DA	MO	YR

INSTALLATION ABBREVIATION OF FACILITIES		BUILDING/ FACILITY NUMBERS 1	2	3	4	5	6	7	8	9
1										
2										
3										

REMARKS:
This project will comply with Title 10, USC Section 2461, for maintenance, repair and construction contracts for real property using Operations & Maintenance funds.

ORGANIZATION BENEFITING FROM WORK	SENIOR ENGINEERNG REP. NAME	SENIOR ENGINEERNG REP. EMAIL ADDRESS	SENIOR ENG REP PHONE #

WORK DESCRIPTION *(Description and justification of work requested)*

WORK REQUEST POINT OF CONTACT *(NAME, PHONE, EMAIL)*	WORK REQUEST ALTERNATE POINT OF CONTACT (NAME, PHONE, EMAIL)

PART B *(APPROVING OFFICIAL ONLY)*				DATE DAY	MO	YR
	CHAMPION PROGRAM:		FUNDING PLAN DOCUMENT:			
	FUNDING SOURCE:					
	PPSID:		MDEP:			
	ISR#:		WBS ELEMENT (for main work effort):			

NEPA DOCUMENTATION REQ'D			WORK TO BE PERFORMED		WORK CLASS	BUDGET TERMS	APPROVAL AMOUNTS FUNDED	UNFUNDED	REIMBURSABLE SOURCE OF FUNDS	
YES	NO			IN-HOUSE DESIGN						
☐	☐	RECORD OF ENV CONSIDERATION	☐	SELF-HELP	Repair	Sustain	$	$	☐	GFEBS
					Repair	Restore	$	$	☐	MIPR
☐	☐	EA INITIATED			New	Modern	$	$	☐	CHECK with SERVICE AGREEMENT
			☐	CONTRACT	BOS	M / J acct	$	$	**WORK BREAKDOWN STRUCTURE**	
☐	☐	EA COMPLETED				TOTAL			DESIGN:	
			☐	TROOP					PREAWARD:	

DESIGN APPROVAL *(Please type or print name)*	DATE DA	MON	YR	**APPROVAL AUTHORITY** *(Please type or print name)*	**APPROVAL ACTION**	DATE DA	MO	YR
					☐ APPROVED			
DESIGN APPROVAL SIGNATURE				**APPROVAL AUTHORITY SIGNATURE**	☐ DISAPPROVED			

FB FORM 4283, SEP 2014 | DA FORM 4283, AUG 1978, IS OBSOLETE | APD V1.00

APPENDIX CILLICIT DISCHARGE DECTECTION & ELIMINATION FIELD INVESTIATIONGUIDE

Fort Bragg
Illicit Discharge Detection & Elimination(IDDE) Field Investigation Guide

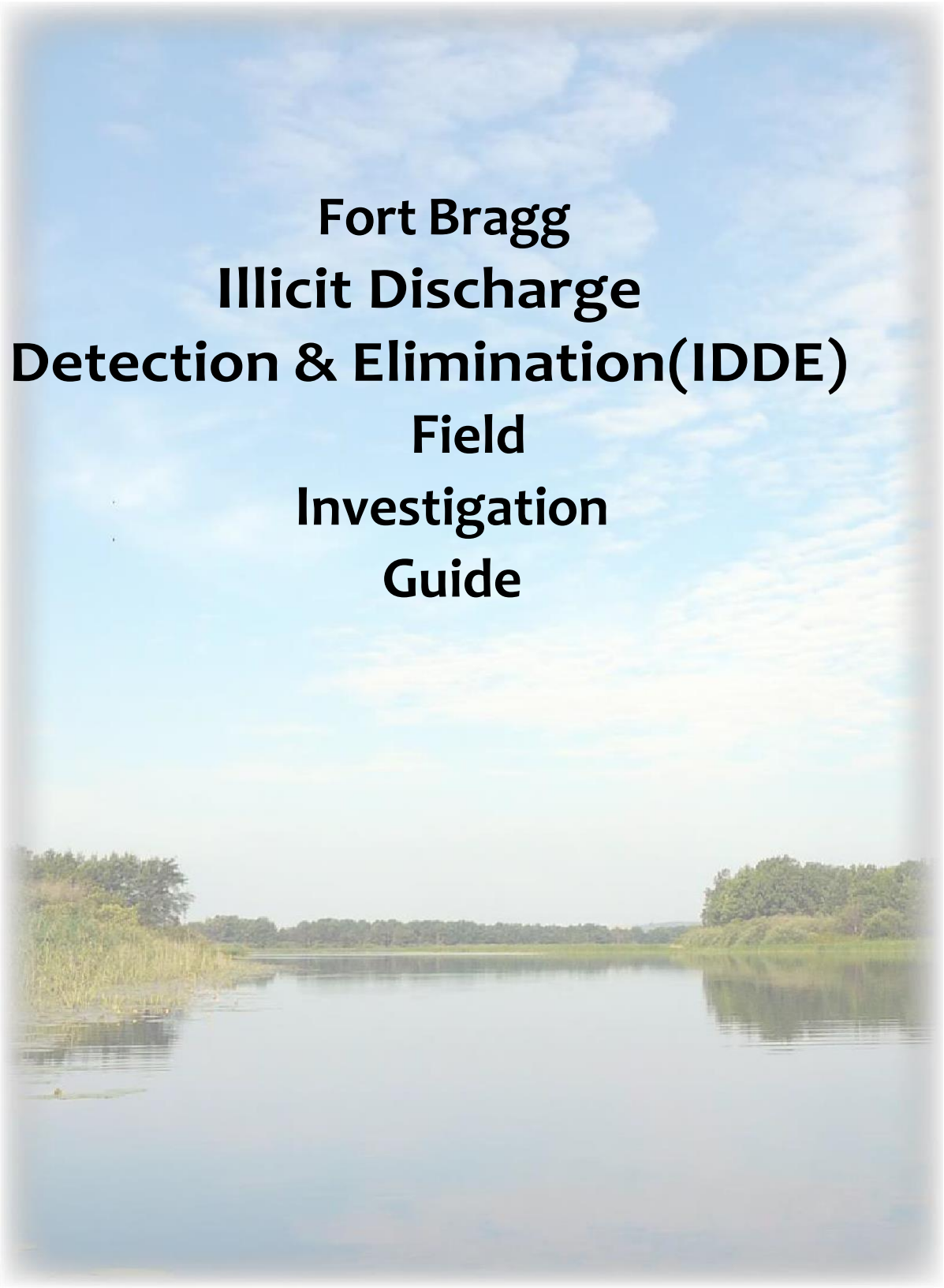


TABLE OF CONTENTS

Preparing for a Field Inspection

Field Inspection Checklist	1
Illicit Flow Detection Process	2
Land Use Examples	3

Physical Indicators

Flow	4
Color	4
Odor	6
Turbidity	7
Sewage, Sheens & Scum	7
Outfall Condition	10
Outfall Classifications	11

Biological Indicators

Vegetation	12
Algae	12
Bacteria	12
Fish Kills	12
Aquatic Life	12

Tracing Illicit Discharges

Storm Drain Network Investigations	13
Intermittent Discharges	15
On-Site Investigations	16

Plants & Snakes to Avoid

Poison Ivy	17
Poison Oak & Poison Sumac	18
Venomous Snakes	19
Venomous Spiders	21

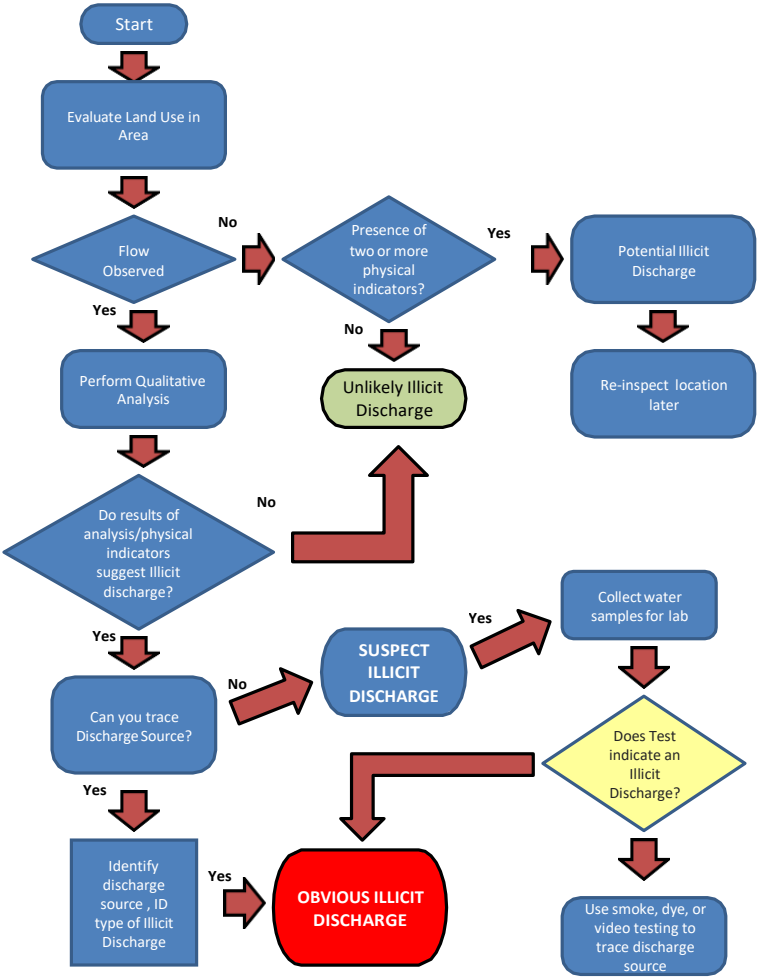
Important Contacts 22

Preparing for a Field Inspection

Field Inspection Checklist

- Monitoring test kits
- Test meters (pH, turbidity)
- Protective gloves
- Safety goggles, hard hat, closed-toed shoes and/or rubber boots and all required PPE.
- Bottle of deionized or distilled water for rinsing equipment after sampling
- Extendable pole with attached sampling cup
- Paper towels or rags
- Field sheets/forms
- Storm drain, stream, and street maps
- Tape measure or ruler
- Camera, clipboard, flashlight
- Cell phone
- Handheld GPS unit
- Contact information of police and emergency response personnel in case of spills or active illicit discharges

Illicit Flow Detection Process



Land Use by Sector	Generating Sites	Discharge-Producing Activities
Residential (on post housing)	• Apartments • Multi-family • Single family • Temporary Billeting	• Car washing • Driveway cleaning • Dumping/spills • Equipment washdowns • Lawn/landscape watering • Sanitary sewer system • Swimming pool discharges
Commercial	• Campgrounds/RV parks • Car rentals • Car washes • Commercial laundry/dry cleaning • Gas stations/auto repair • Nurseries and garden centers • Oil change shops • Restaurants • Swimming pools	• Building/parking lot maintenance (power washing) • Dumping/spills • Landscaping/grounds care • Outdoor material storage • Vehicle fueling/washing • Vehicle maintenance/repair • Grease trap/equipment cleaning
Industrial	• Recyclers/scrap yards • Construction vehicle washouts • Distribution centers • Dining facility • Garbage truck washouts • Metal plating operations • Forestry operations • Petroleum storage • Printing	Oil Water separator Maint. • Industrial process water or rinse water • Loading and unloading area washdowns • Outdoor material storage • Vehicle fueling/washing • Vehicle maintenance/repair • Grease trap/equipment cleaning
Institutional	• Cemeteries • Churches • Office buildings • Training facilities • Hospitals • Schools	• Building/parking lot maintenance (power washing) • Dumping/spills • Landscaping/grounds care •

Municipal	• Airfields • Animal shelters • Landfills • Maintenance depots • Municipal fleet storage areas • Public works yards • Streets and highways • Borough Pit	• Building/parking lot maintenance (power washing) • Dumping/spills • Landscaping/grounds care • Outdoor materials storage • Road maintenance • Spill prevention/response • Vehicle fueling/washing • Vehicle maintenance/repair

Physical Indicators

Physical indicators are those that can be observed or sensed during dry weather field screenings and routine inspections. They can include the presence of unusual flow, color, odor, turbidity, and floatable liquids and solids.

Flow

Record whether there is a presence or absence of flow at the site.

Note: to measure flow, mark off a fixed flow length (about five feet) and drop a floatable object (i.e., stick, ping-pong ball, or cork) into the flow. Record the time it takes the object to travel the fixed length then calculate velocity (feet per second or ft/s).

Color

Collect a sample of the discharge in a clear sampling bottle.

Note: do not try to assess water color by looking directly into the waterway. Water depth, substrate composition, aquatic plants, and sky conditions can all influence your perception of the water color.

Field Investigation Example

Concrete wash Illicit discharge

	Color	Possible Sources
1	Tan to light brown	• Suspended sediments common after rainfall • Runoff from construction, roads, agricultural/range land • Soil erosion caused by vegetation removal
2	Pea green, bright green, yellow, brown, brown-green, brown-yellow, blue-green	• Algae or plankton bloom - color depends on type of algae or plankton • Sewage, fertilizer runoff, vehicle wash water
3	Tea/coffee	• Dissolved or decaying organic matter from soil or leaves. Commonly associated with tree overhangs, woodlands, or swampy areas
4	Milky white	• Paint, lime, milk, grease, concrete, swimming pool filter backwash
5	Milky or dirty dishwater gray	• Gray water or wastewater, musty odor present
6	Milky gray-black	• Raw sewage discharge or other oxygen-demanding waste (rotten egg or hydrogen sulfide odor may be present)
7	Clear black	• Caused from turnover of oxygen-depleted waters or sulfuric acid spill
8	Dark red, purple, blue, black	• Fabric dyes, inks from paper and cardboard manufacturers
9	Orange-red	• Leachate from iron deposits • Deposits on stream beds often associated with oil well operations (check for petroleum odor)
10	White crusty deposits	• Common in dry/arid areas or during periods of low rainfall where evaporation of water leaves behind salt deposits

11	Other (describe)	

Odor

Fill sample bottle at least halfway with sample water and hold about six inches away from your nose. Use your free hand to fan the scent to your nose.

Note: never inhale the air directly off the top of a sample as many potential contaminants are harmful to nasal membranes and lung tissue. Make sure that the origin of the odor is at the outfall. Sometimes shrubs, trash, or even spray paint used to mark the outfalls can confuse the nose.

	Odor	General Causes
1	Rotten eggs/hydrogen sulfide (septic)	• Raw sewage, decomposing organic matter, lack of oxygen
2	Chlorine	• Wastewater treatment plant discharges, swimming pool overflow, industrial discharges
3	Sharp, pungent odor	• Chemicals or pesticides
4	Musty odor	• Presence of raw or partially treated sewage, livestock waste
5	Gasoline, petroleum	• Industrial discharge, illegal dumping of wastes, waste water
6	Sweet, fruity	• Commercial wash water, wastewater
7	Other (describe)	

Field Investigation Example

Suspicious colored water and yard waste flowing into storm drain

Turbidity

Causes of High Turbidity

- Soil erosion
- Runoff from a rain event
- Algae blooms
- Bottom sediment disturbances by aquatic life
- Construction or dredging

If highly turbid (cloudy) water is observed, make sure to look upstream and downstream to see if anything around the site has changed since the last field inspection. An illicit discharge may be present if a highly turbid flow exists.

Field Investigation Example

Highly Turbid Construction Runoff

Surface Scum	General Causes
Tan foam	Usually associated with high flow or wave action; wind action plus flow churns water containing organic materials causing harmless foam; produces small patches to very large clumps.
White foam	Sometimes patchy or covering wide area around wastewater outfall, thin and billowy, mostly due to soap.
Yellow, brown, black film	Pine, cedar, and oak pollens form film on surface, especially in ponds, backwater areas, or slow moving water in streams.
Rainbow film	If a swirling pattern, then likely oil or other fuel type. Check for petroleum odor. If sheet-like and cracks if disturbed, then it is natural.

Examples

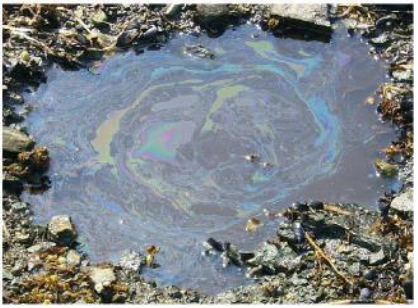
Sewage Discharge

Sewage fungus

Bacteria growth in outfall

Natural Sheen vs. Synthetic Sheen

Natural sheen



Synthetic sheen

Foam and Suds

Low severity, naturally occurring suds

High severity suds

Sewage fungus photo courtesy of Wayne County Illicit Discharge Elimination Program, natural sheen image courtesy of NOAA's National Ocean Service, synthetic sheen photo courtesy of Jane Thomas, IAN Image Library (ian.umces.edu/imagelibrary/), all others courtesy of the Center for Watershed Protection.

Outfall Condition

The physical condition of an outfall can provide strong clues about the history of discharges passing through it.

Over time, intermittent discharges can cause outfall damage or leave behind remnants in the form of deposits or stains which can help an inspector determine what type of discharge traveled through the area.

Field inspectors should document that a deposit or stain is present even if there is no dry weather discharge observed.

Condition	Things to Consider
Structural Damage	• Cracked, deteriorated concrete or peeling surface paint at an outfall usually indicates the presence of contaminated discharges • Contaminants causing this type of damage are usually very acidic or basic (alkaline) and originate from industrial processes
Deposits and Stains (Residues)	• Staining may be any color but is characteristically different from the outfall • Residues can contain fragments of floatable substances • Gray-white deposits can be from illegal dumping of concrete truck washouts • Crystalline powder can indicate the discharge of fertilizer wastes

Potential outfall issue with presence of at least one physical indicator – paint stains

Outfall Classifications

Water Management Branch has adopted four outfall classifications categorizing outfalls based on their characteristics and likelihood to pose a problem. Use these classifications to record the state of the outfall at the time of inspection.

	Classification	Description
1	Obvious/Duh?	Flowing outfall where there is an illicit discharge that does not require sample collection for confirmation; exhibits physical indicators and field-measured chemical indicators
2	Potential	Flowing outfall with high severity on one or more physical indicators
3	Likely	Flowing or non-flowing outfall with presence of two or more physical indicators
4	Unlikely	Non-flowing outfall with no physical indicators of an illicit discharge

Field Investigation Example

Oil discharge found at outfall traced back to leaking Oil Drums

Biological Indicators

Biological indicators include things that live and grow. The biological indicators that should be investigated during a field inspection are: the condition of the surrounding vegetation, algae growth, amount and types of bacteria, fish kills, and the presence or absence of certain aquatic organisms.

Biological Indicators	Things to Consider
Vegetation	Seasonal and recent weather conditions should be considered to accurately determine if the vegetation near an outfall is normal or abnormal. Increased or inhibited plant growth, as well as dead and decaying plants, near stormwater outfalls is often a sign of pollution.
Algae	An overabundance of nutrients can cause elevated plant growth or algae blooms. During an algae bloom, the water body typically becomes a pea-green color; however, the color depends on the dominant species of algae present.
Bacteria	The amount and types of bacteria present can be extremely significant. Bacteria can be associated with inadequately treated sewage, sanitary sewer overflows, improperly managed waste from livestock, failing septic systems, and pets and wildlife (e.g., birds nesting under a bridge). Although some types of bacteria are visible to the naked eye – such as sewage fungus or natural sheen, counts for indicators like *E. coli* are done in the laboratory.
Fish Kills	Fish kills can be caused by a wide variety of factors including a decrease in dissolved oxygen, infectious disease, a rise in water temperature, toxic algae blooms, parasites, and bacterial or viral infections. The loss of a single fish is typically a natural occurrence and is not usually a cause for concern.
Presence or Absence of Aquatic Life	The presence or absence of aquatic life in and around a water body can be an indicator of the health of the water body. Field inspectors should document whether or not they observe aquatic life at the time of inspection.

Tracing the Source of an Illicit Discharge

Once an illicit discharge has been found, the next step is to trace and remove the source of the discharge.

Storm Drain Network Investigations

This technique involves:

- Inspecting manholes in a storm drain system by using chemical and physical indicators to isolate discharges to specific segments of the network.
- Identifying where to inspect the network and what indicators to use to determine if a manhole is clean or contaminated.
- Developing a strategic plan for inspecting the pipe network.

Option 1: Move up the trunk	Option 2: Split the storm drain network
• Work progressively up the trunk from the outfall and test manholes along the way. • Start with the manhole closest to the outfall • Goal is to isolate discharge between two storm drain manholes	• Split trunk into equal segments and test manholes at strategic junction in the storm drain system • Particularly suited to larger, more complex drainage areas since it can limit total number of manholes to inspect

Photo demonstrating manhole safety

Note: manholes and confined spaces should only be entered by properly trained and equipped personnel. Check with your supervisor for the proper safety procedures.

On-Site Investigations

There are three basic approaches to on-site investigations that will help determine the actual source of an illicit discharge: dye, video, and smoke testing. Note: these techniques should be used when conducting a follow-up investigation once an illicit discharge has been found. Refer to the DPW/WMB IDDE SOP for more detailed information on how to use these techniques.

Techniques	Best Applications	Limitations
Dye testing	• Discharge limited to very small drainage area • Commercial or industrial land uses	• May be difficult to gain access to some facilities • May require prior notice
Video testing	• Continuous discharge • Discharge limited to a single pipe segment • Entities with their own equipment for other investigations (water supply or sewer pipes)	• Relatively expensive equipment • Cannot capture non-flowing discharges • Often cannot capture discharges from submerged pipes
Smoke testing	• Cross-connection with the sanitary sewer • Identifying other underground sources caused by damage to the storm drain	• Poor notification to public can cause alarm • Cannot detect all illicit discharges

.

Dye testing example on the left, video on the right. Both photos courtesy of the Center for Watershed Protection

PLANTS TO AVOID

Poison Ivy

- Common in North Carolina and Ft Bragg region
- Leaves can be smooth, toothed, or deeply notched
- New leaves are red in spring and green in summer
- Fall leaves are yellow, orange, and red
- Produces small, greenish-white clusters of flowers in spring and white, waxy berry-like fruits in fall
- Can be a climbing vine, a shrub, or even a small tree

Poison Ivy - Fall

Poison Ivy - Spring

Poison Ivy - Summer

Photos courtesy of www.poison-ivy.org

Poison Sumac

- Common in North Carolina, found in wet, wooded areas
- Leaves are smooth and arranged in pairs of three to six with a single leaf at the terminal end of the stem
- Hanging fruits are whitish-green; non-poisonous varieties have red, upright fruits and jagged leaves

Poison Oak

- Oak-like leaves usually in clusters of three
- Can have yellow berries
- Grows as a low shrub in sandy soils or as a climbing vine
- Sprouting poison oak leaves can look very much like poison ivy

Venomous Snakes

EASTERN CORAL SNAKE

A moderately slender, medium-sized, brightly colored snake with a body pattern of red, yellow, and black rings.
Red rings include conspicuous black patches and the tail
displays wide black rings separated by narrow yellow rings. Total length 18–36 inches. The rhyme "red on yellow, kill a fellow; red on black,
venom lack" is a useful reminder that red and yellow bands touch each other on the Eastern Coral Snake. Red
and black bands are in contact on the Scarlet

COPPERHEAD

DESCRIPTION
A large, moderately stout-bodied snake with brown or chestnut hourglass-shaped markings on a brown, tan, or pinkish background. The belly is light brown, yellowish, or pinkish and may be stippled or mottled with gray or black. The top of the head has large symmetrical plates.
Juveniles differ from adults by having a greenish-yellow tail tip, and from young Cottonmouths by not having a conspicuous dark bar extending from eye to angle of the jaw.

Total length 24–46 inches.

PIGMY RATTLESNAKE

A small, moderately slender-bodied, grayish, brownish, or reddish rattlesnake with narrow, light-margined, dark brown blotches. Often a narrow, reddish middorsal stripe is present. A pair of wavy brown bands run from the top of the head to the neck. On the side of the head, a dark brown or red-brown stripe bordered below by a narrow light line extends from the eye to the angle of the jaw. There are large symmetrical plates on top of the head. The belly is whitish or reddish with dark spots. There is a tiny rattle on the tip of the tail. Unlike the adult, the juvenile is lighter, has a yellow tail tip, and possesses a small inconspicuous "button" instead of a tiny rattle.

Venomous snakes

TIMBER RATTLESNAKE

A large, heavy-bodied, pinkish to blackish rattlesnake with dark, light-centered blotches and crossbands. The tail of the adult is black. The belly is yellowish, pinkish, or cream with gray or black stippling. There is a prominent rattle or enlarged "button" on the tip of the tail. Total length 36–68 inches. Timber Rattlesnakes in the Coastal Plain and most of
the Piedmont generally are larger and more vividly pat terned than those from the Mountains. Some authorities consider these eastern populations to represent a sub-species known as the "canebrake" rattlesnake.

COTTONMOUTH

A large, heavy-bodied, olive, brown, or blackish semi-aquatic snake with wide, dark-margined, light-centered crossbands. The pattern can be faint in adults and is virtu-ally absent from some large specimens. The head has a dark bar extending from the eye to the angle of the jaw. The belly is light and mottled with gray or black. The adult tail is black. Large symmetrical plates cover the top of the head. More colorful than the adult, the juvenile is tan with a conspicuous banded pattern. The tail tip of a juvenile is greenish-yellow.

Venomous Spiders

Black Widow Spider

The black widow spider, *Lactrodectus mactans*, is probably the most widely r spiders found in North Carolina. Most people are familiar with the large, shiny black body and red " the abdomen (see picture), but it is important to note that the coloration and markings are only found c lers are tan-to-gray in color and have orange and white stripes on their abdomens. These marks may rem dy length of about 1/2", with a total length (including legs) of about 1 1/2". The male spider is smaller than ed and white markings on the back of its abdomen. Black widow spiders are found in protected places, suc dense plant growth. They frequently nest in electrical, water and telephone equipment boxes outdoo

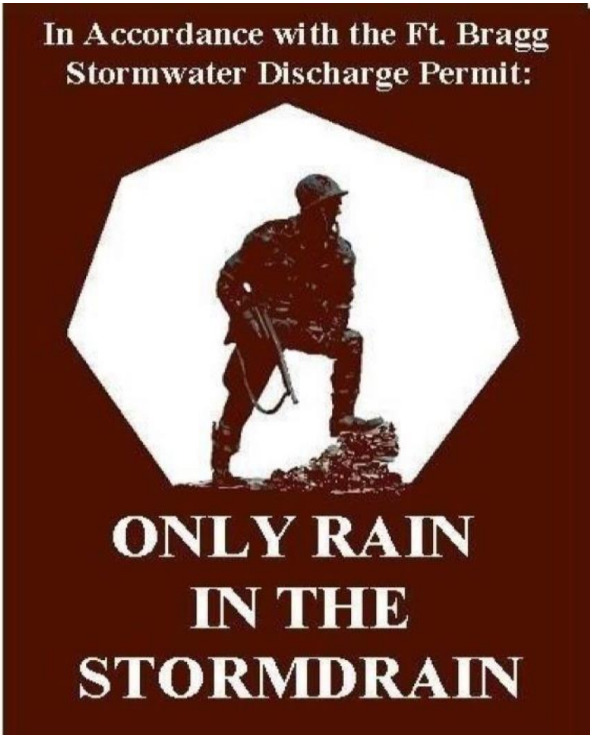
Brown Recluse Spider

Brown Recluse adults are about 1/4-1/2 inch in length. The familiar dark viol e cephalothorax (see picture). The "neck" of the fiddle points toward the rear of the body. Outdoors, they wood piles, etc. Indoors, common hiding places are bathrooms, attics, cellars and storage areas.

FORT BRAGG Fort Bragg ORGANIZATIONS	PHONE NUMBER
Fire Department	911 or 396-3015
Environmental Compliance Branch	907-8441 x 7146/7441
Hazardous Waste Office	396-2141
Water Management Section	908-5286/907-5320
PAO Representative	396-5600
Emergency Operations Center	396-3300/5713
Wildlife Branch (Fish Kills)	396-7506

This guidance manual was developed by DPW Water Management Section. It was adapted from a compilation of several local, state, and national resources and is intended to serve as guidance for Ft. Bragg personnel seeking to identify and eliminate illicit discharges and connections to the municipal separate storm sewer systems (MS4).

For more information on Illicit Discharge Detection and Elimination, contact the Directorate of Public works Water Management Section 907-5320 or (910) 908-5286.


In Accordance with the Ft. Bragg
Stormwater Discharge Permit:
ONLY RAIN
IN THE
STORMDRAIN

APPENDIX D

SPILL RESPONSE AND REPORTING PROCEDURES

APPENDIX E

SANITARY SEWER OVERFLOW (SSO) SOP