



Assessing the Source

Understanding Construction Site Pollutants and How to Control Them

David Montelongo
Compliance Specialist
WGR Southeast, LLC
704.800.6025 | dmontelongo@wgr-se.com

*Presented in connection with NC NPDES Permit NCG010000
and applicable stormwater regulations*

Who We Are

WGR Southeast, LLC

WGR Southeast is an Environmental, Health, and Safety (EHS) company with decades of experience in stormwater compliance, erosion and sediment control, and construction site environmental management.

- Qualified Stormwater Personnel (NCDOT Level II, QSP / QSD)
- Certified Professional in Erosion and Sediment Control (CPESC)
- Certified Erosion, Sediment and Stormwater Inspector (CESSWI)
- Construction Environmental Compliance Services
- SWPPP and E&SC Plan Development
- Inspections, Training, and Monitoring



wgr
Southeast, LLC

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dmontelongo@wgr-se.com

Why This Matters

Construction runoff and water quality in North Carolina

NCG010000

Primary NPDES Construction General Permit

1 Acre+

Threshold for permit coverage in most cases

303(d)

Impaired waters listings partly driven by sediment
& construction pollutants

North Carolina's Construction Stormwater Program requires operators of land-disturbing activities to implement measures that prevent pollutants from leaving the site via stormwater runoff. The permit most commonly applicable to construction in NC is NCG010000, though sites may be subject to additional or overlapping permits depending on project type and location.

Effective compliance starts with understanding what pollutants your site generates, and which trades and activities are producing them.



Every Trade Is a Potential Pollutant Source

A single construction project involves dozens of trades. Each one brings materials, generates waste, and creates activities that can affect stormwater quality.

Heavy Equipment Operators	Electricians	Stucco / Drywall Installers	Welders & Steel Workers
Concrete & Masonry Workers	HVAC Installers	Painters	Demolition Contractors
Carpenters & Framers	Roofers	Flooring Installers	Crane Operators
Plumbers	Glaziers	Landscapers	And more...

Think like an investigator: walk the site, identify every trade, ask what materials they use, what waste they generate, and how those materials and wastes interact with stormwater.

Sediment

The most common and visible construction site pollutant

Pollutant

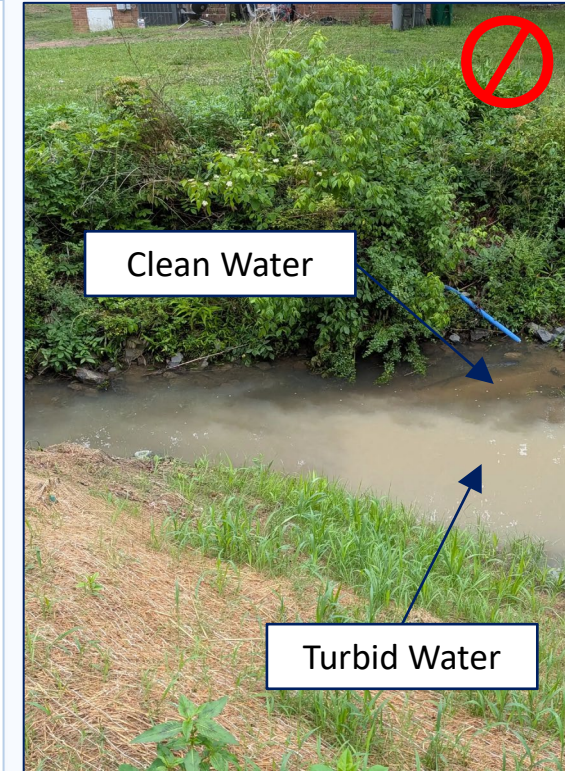
- Soil particles dislodged by rain, wind, or physical disturbance
- Two forms:
 - Settleable** (coarse)
 - Suspended** (fine clays and silts)
- Acts as a carrier for other pollutants — metals, nutrients, and other conventional and toxic pollutants
- Fine particles can remain in suspension for extended periods and travel far from the site

Contributors

- Top contributors: Heavy equipment operations, grading, excavation, site clearing, cut and fill, borrow and spoil area, dust
- General/Specialty trades: vehicular and truck traffic – track out.
- General Contractor: Poor site management; inadequate BMPs.

Solutions

- Scheduling: phasing, avoiding rainy periods for grading, monitoring weather daily
- Soil stabilization
- Silt fence, sediment basins, check dams, and inlet protection at discharge points
- Stabilized construction entrances to intercept track-out
- Temporary seeding, mulching, and erosion control blankets on disturbed slopes
- Inspect and maintain controls before and after each rain event



pH-Altering Materials

Caustic and acidic substances affect aquatic life and downstream water quality

Pollutant

- pH is a measure of acidity or alkalinity on a scale of 0–14; 7 is neutral
- Construction activities frequently cause pH to be outside of the acceptable range for aquatic life
- Extreme pH alters the chemical form of metals in water, making them significantly more toxic
- Concrete washout can reach pH 11–13; lethal to aquatic organisms on direct contact

Cause

- High pH (alkaline): cementitious materials dissolve in water and release hydroxides, rapidly raising pH
- Low pH (acidic): Acid-based cleaners, surface preparation products, and certain concrete additives can lower pH

Contributors

- Concrete and masonry workers: cement, washout, slurry, grout, stucco, mortar, etching, acid washing
- Earthwork contractors: lime for soil stabilization or conditioning
- General trades: cleansers and detergents are alkaline, rust removers and metal cleaners, porta toilets
- Demolition crews: cutting or grinding existing concrete releases alkaline slurry
- Equipment operators: battery acids

Solutions

- Designate concrete washout areas away from drainage paths
- Contain and collect slurry from concrete cutting and grinding
- Use secondary containment for storage and handling
- pH monitoring
- Inspections
- Neutralize highly alkaline washout before disposal
- Good housekeeping

pH-Altering Materials

Caustic and acidic substances affect aquatic life and downstream water quality



pH-Altering Materials

Caustic and acidic substances affect aquatic life and downstream water quality



Oils and Fuels

Present on every site

Pollutant

- Petroleum hydrocarbons (fuels, lubricants, and oil-based products)
- Toxic to aquatic life even at very low concentrations
- Identified visually by an iridescent (rainbow) sheen
- A sheen is a strong indicator of a water quality standard exceedance and warrants immediate investigation and response.

Cause

- Spills and leaks during fueling, maintenance, and equipment operation
- Drips from hydraulic lines, engines, and undercarriage components
- Residual oils mobilized from paved areas or impacted soil during rain events
- Improper storage — uncovered containers or tanks without secondary containment

Contributors

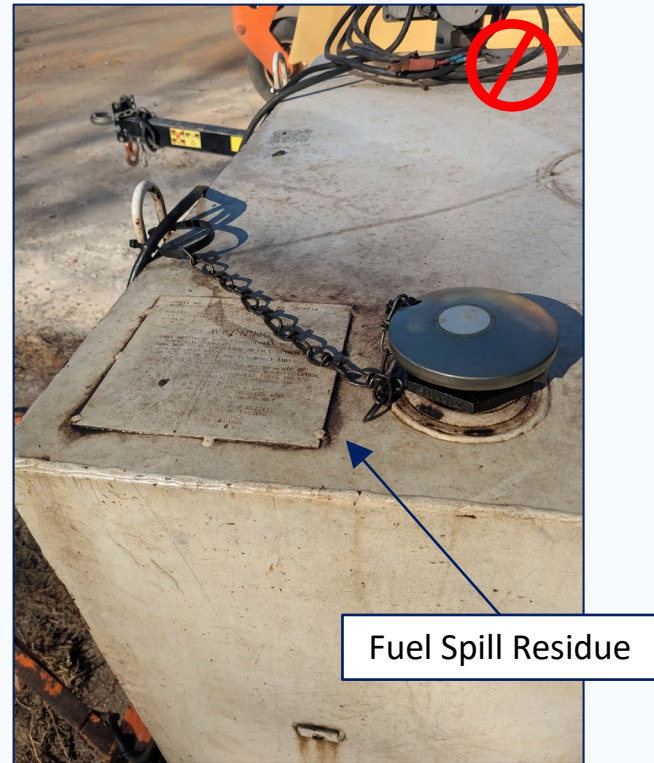
- Equipment operators: fuel tanks, hydraulic systems, engine lubricants
- Paving contractors: asphalt and tack coat materials
- Plumbers and mechanical trades: pipe cutting oils and thread compounds
- Concrete trades: form release oils
- All trades: surface sealers, rust inhibitors, aerosol lubricants

Solutions

- Secondary containment for all above-ground fuel storage
- Material storage should be lined and bermed.
- Drip pans or buckets
- Spill kits staged at fueling and maintenance areas
- Prohibit unnecessary outdoor storage of oil-containing products
- Maintain spill response procedures in the E&SC plan
- Inspect equipment for leaks as part of routine site inspections

Oils and Fuels

Present on every site



Metals

Present in both dissolved and particulate form — sediment control is your primary lever

Pollutant

- More than twenty metals can be present in construction runoff
- Metal pollutants occur in dissolved and particulate phases; particulate is far more abundant and easier to control
- Toxic to aquatic organisms at elevated concentrations; some metals bioaccumulate up the food chain

Cause

- Mechanical abrasion and thermal processes (cutting, grinding, welding)
- Rain mobilizes metal-bearing dust and particles from surfaces and disturbed soils
- Leaks, drips and particulates from equipment use, maintenance, and leaks and spills
- Pre-construction soils may contain naturally elevated metal concentrations

Contributors

- Welders and steel workers: grinding, cutting, and welding of metal structures
- Heavy equipment: tire and brake dust, fuels and oils, track out
- Carpenters: cutting and sanding of pressure-treated wood that may contain copper and arsenic
- Demolition crews: sandblasting of metal surfaces
- All trades: new and used lubricants, surface coatings, roofing materials, cementitious materials

Solutions

- Prioritize sediment controls. Particulate metals are carried with suspended sediment
- Contain grinding, welding, and sandblasting operations with barriers or enclosures
- Segregate and properly dispose of treated wood waste
- Maintain equipment to minimize lubricant and hydraulic fluid leaks
- Store coatings, admixtures, and metal-bearing materials under cover

Metals

Present in both dissolved and particulate form — sediment control is your primary lever



Trash and Solid Waste

Every trade produces it — and it is both a pollutant and a pollutant source

Pollutant

- Solid waste functions as both a direct pollutant and a vehicle for other pollutants
- Paper and organic debris decompose when in contact with runoff, raising BOD and depleting dissolved oxygen
- Plastic waste degrades into microplastics that persist in aquatic environments and threaten wildlife
- Packaging and containers retain residues of whatever they held

Cause

- Waste exposed to precipitation contacts stormwater directly on the ground or in uncovered containers
- Rain and wind disperse waste across the site and into drainage features
- Residues on packaging are mobilized by even light rain contact
- Accumulation over time increases both the volume of waste and the duration of exposure

Contributors

- Every trade on site. Waste generation is universal
- Wrapping, bags, and packaging from delivered materials
- Empty product containers (concrete, adhesives, coatings, chemicals)
- Demolition contractors: debris and broken materials.
- All site workers: food waste and personal trash

Solutions

- Covered, secured waste receptacles distributed throughout active work areas and/or regular cleanups of work areas
- Regular pickup schedule. Do not allow waste to accumulate between hauls, overflowing
- Designate a covered waste staging area located away from drainage paths
- Include solid waste management orientation and/or signage

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Oxygen Consumers and Nutrients

Indirect but significant threats to aquatic water quality

Pollutant

- Substances that deplete dissolved oxygen (DO) in receiving waters, directly or indirectly
- BOD (Biochemical Oxygen Demand): organic material consumes oxygen as it decomposes
- COD (Chemical Oxygen Demand): oxidizing chemicals react with oxygen in the water
- Nutrients (nitrogen, phosphorus) fuel algae blooms that deplete DO as algae decomposes

Cause

- Organic material entering runoff decomposes and consumes dissolved oxygen
- Oxidizing chemicals react directly with oxygen in the water
- Nutrient-laden runoff triggers algae blooms; decomposing algae creates hypoxic (low O₂) zones
- Overapplication of fertilizers and organic amendments is a leading cause

Contributors

- Landscapers and revegetation crews: fertilizers, hydraulic mulch, hydroseed, compost blankets
- Site clearing: Green waste from clearing and grubbing operations
- Cleaning and sanitation: peroxides, bleach, and chlorine-based products increase COD
- Site workers: food waste and organic waste raise BOD and nutrients

Solutions

- Apply fertilizers at prescribed rates; excess application increases runoff loading without improving establishment of vegetation
- Time fertilizer and compost applications to avoid rain events within 24–48 hours depending on brand
- Contain and promptly remove organic debris and green waste from the site
- Avoid using oxidizing cleaners near drainage features or surface water

Oxygen Consumers and Nutrients

Indirect but significant threats to aquatic water quality



Toxics and Solvents

A broad category — and often the hardest to anticipate

Pollutant

- Chemicals toxic to aquatic life, wildlife, or humans at low concentrations
- Includes volatile organic compounds (VOCs), semi-volatile organics (SVOCs), pesticides, and other priority pollutants
- Gasoline alone contains 150–1,000 individual VOCs and SVOCs
- Legacy pollutants — lead, asbestos, PCBs, DDT — may be present in soils or existing structures

Cause

- Exposure to stormwater is the key variable — risk scales with how much of the material contacts storm water
- Spills are the most direct pathway (intentional or unintentional)
- Outdoor storage in open containers or containers with drips
- Inadequate containment
- Grading or demolition of contaminated areas mobilizes legacy pollutants that were previously stable

Contributors

- Painters and finishers: solvents, primers, surface coatings
- Plumbers and mechanical trades: adhesives, sealants, antifreeze, coolant
- Landscapers: pesticides and herbicides applied during site prep or final stabilization
- General trades: cleansers and degreasers
- Demolition contractors: structures containing lead paint, asbestos, or PCBs

Solutions

- Store all chemicals in covered, bermed areas; use secondary containment for liquids, and cover materials that can be moved through wind and rain
- Use and dispose of materials per label instructions and Safety Data Sheets (SDS)
- Stage spill kits at chemical storage and use areas; document response procedures
- Conduct pre-demolition hazardous materials assessment before any grading or structure removal

Toxics and Solvents

A broad category — and often the hardest to anticipate



Dissolved Solids

Salts and other soluble materials that go straight into solution

Pollutant

- Solids that dissolve completely in water and cannot be removed by settling or filtration
- Measured as Total Dissolved Solids (TDS) or specific ions (chlorides, sulfates)
- Elevated TDS is harmful to freshwater aquatic organisms
- Chlorides (salts and minerals) are particularly toxic to sensitive freshwater species and are not captured by conventional controls

Cause

- Soluble materials dissolve immediately on contact with water — there is no particle to capture
- Overapplication creates excess that washes directly into runoff without any uptake by soil or vegetation
- Source reduction is the only effective control. Once dissolved, removal is impractical on a construction site

Contributors

- Concrete and masonry workers: chloride-based admixtures
- Landscapers and revegetation crews: fertilizers are high in dissolved salts
- Earthwork contractors: magnesium chloride and other dust suppressants
- Cold-weather work: deicing agents (particularly relevant in NC mountain elevations)
- Specialty trades: water softener discharge on some project types

Solutions

- Apply admixtures, fertilizers, and dust suppressants at label rates. Overapplication is the primary risk
- Avoid applying deicers or chloride-based suppressants near drainage features, streams, or buffer areas
- Source reduction is the primary strategy. Dissolved solids cannot be captured by sediment controls

Dissolved Solids

Salts and other soluble materials that go straight into solution



De-Icers



Fertilizers



Concrete Admixtures

Pathogens

Bacteria and viruses — not only a human health concern, also an ecological one

Pollutant

- Bacteria (fecal coliform, E. coli) and viruses that impair water used for recreation, drinking, and fishing
- A single exceedance can trigger beach closures, fishing restrictions, and public health advisories
- Many NC waterways are already on the 303(d) impaired waters list for pathogen impairment
- High levels of coliform bacteria can deplete oxygen in water (hypoxic conditions)
- Promotes algal blooms and eutrophication
- Impacts plant growth

Cause

- Fecal matter from humans or animals contacts stormwater and is transported to receiving waters
- Leaks, spills, and overflow from sanitary systems are the primary construction-related pathways
- Contaminated soils previously exposed to sewage or animal waste can be a persistent source when disturbed

Contributors

- Portable sanitation facilities: spills, overflow, or improper placement near drainage
- Utility and excavation contractors: damaged or leaking sanitary sewer lines
- Earthwork contractors: grading through soils contaminated by previous land uses
- Wildlife activity on disturbed areas, particularly waterfowl near water features
- Solid waste: food waste and sanitary waste not properly contained

Solutions

- Position portable restrooms away from drainage paths, streams, and stormwater conveyances
- Service portable sanitation regularly; inspect after major storm events
- Install secondary containment under portable units located on slopes
- Inspect utility crossings for sewer line integrity during and after excavation

Pathogens

Bacteria and viruses — not only a human health concern, also an ecological one



Be a Pollutant Detective

Pulling it all together on your site

Effective stormwater compliance is not about checking boxes. It is about understanding what is actually happening on your site and staying ahead of it.

1 Walk the Site	2 Identify Sources	3 Know Your Pollutants	4 Implement/Maintain Controls
Identify every active trade and activity. • Who is here? • What are they using? • What is the grade? • Which way will water flow over the site?	For each trade, ask: • What materials come in? • What waste goes out? • Where do those materials and wastes go when it rains?	Match sources to pollutant categories. Are you dealing with sediment, pH, oils, metals, or something else?	Select BMPs matched to the actual pollutant. A silt fence does not address a concrete washout problem. Controls may need to be refreshed or reinstalled as they deteriorate or are damaged.

Document what you find. A thorough site assessment on the front end saves enforcement actions, fines, and remediation costs on the back end.

Questions?

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Permit NCG010000 and applicable NC NPDES stormwater regulations govern most construction land-disturbing activities in NC. Some projects may be subject to additional or overlapping permit requirements.