Water Quality Sampling and Analysis on Construction Sites
Level 2 Pre & Post Assessment

- This is not a test

- It’s an assessment of the effectiveness of the course material
Who Are We

- Who am I?
- What is my background?
- What is my storm water background?
- What is my sampling background?
- Audience Introductions
Why Are You Here?

- To Review Regulations and Permits
- To Learn About SWRCB and Caltrans Sampling and Analysis Requirements
- To Review SAP Guidelines
- To Review Sample Collection Procedures
What Will You Learn?

- What are the pollutants of concern
- The requirements of Resolution 2001-046
- Caltrans requirements
- How to use the Pollutant Testing Guidance Table
- How to review Sampling and Analysis Plans
- An overview of field sampling methods
Keep in mind

-Caltrans personnel will not be taking water quality samples – this is the responsibility of the contractor

-WPCP projects are not subject to these requirements
Glossary

- **BMP** - Best Management Practice
- **CPD** – Construction Procedure (Program) Directive
- **CSWC** – Construction Storm Water Coordinator
- **NPDES** - National Pollutant Discharge Elimination System
- **RWQCB** - Regional Water Quality Control Board
- **SAP** – Sampling and Analysis Plan
- **SSP** – Standard Special Provision
- **SWPPP** - Storm Water Pollution Prevention Plan
- **SWRCB** - State Water Resources Control Board
Introduction

Course Highlights

- Introduction
- NPDES Permit Requirements
- Caltrans Requirements
  - Construction Procedure Directive – CPD
  - Caltrans Special Provisions and Handbooks
- 303(d) Sedimentation / Siltation or Turbidity
- Non-visible Pollutants
- Sampling and Analysis Plan Review Guidelines
- Contractor Sample Collection Procedures
- Inspection Tips
Introduction

➤ First things first

➤ Caltrans personnel will not be collecting any samples – this is the responsibility of the contractor or their lab

➤ Sampling and Analysis requirements apply to SWPPP projects only – for now
Resolution 2001-046

- San Francisco Bay Keepers lawsuit
- Modification to California's General Construction Permit Monitoring and Reporting Section
- Requires that permittees implement specific sampling and analytical procedures
- Determine whether BMPs implemented on construction site are
  - Preventing further impairment of water bodies by sediment
  - Preventing other pollutants from causing or contributing to exceedances of water quality objectives
Introduction

What are these Sampling and Analysis requirements intended to do?

The requirements are intended to determine if BMPs implemented on the construction site are effective for preventing sediment/silt and other non-visible pollutants from impacting water quality objectives.
What are the Pollutants

Non Visible Pollutants -

Construction Materials

Sediment/Silt and Turbidity
Introduction

How do they Affect Your Site?

⇒ Almost every job site has the potential to contribute pollutants to storm water runoff such as;

- Sediments from disturbed soil areas

- Toxic pollutants from chemical compounds and materials used to build projects, including structures
303(d) listed Water Bodies

- In 2002, 685 water bodies were listed as impaired in the State of California, most of them for multiple pollutants.
- 134 of the 685 water bodies are listed as impaired for sediment / siltation and turbidity
- Example 303(d) water bodies: Tomales Bay, Morro Bay, Truckee River, San Diego Creek and Buena Vista Lagoon
- 2004 Update currently being prepared by the SWRCB
What is....

⇒ Sediment
  • Soil particles that have been dislodged from their original or placed location and deposited down gradient

⇒ Siltation
  • The deposition of finely divided soil and rock particles upon the bottom of streams and river beds and in reservoirs

⇒ Turbidity
  • Cloudiness of water quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. Measured in Nephelometric Turbidity Units (NTU)
Sediment / silt in a water body:

- Decreases water clarity, which causes a decrease in aquatic plant production, obscures sources of food, habitats, refuges, and nesting sites of fish
- Fills gravel spaces in stream bottoms, smothering fish eggs and juvenile fish
- Carries nutrients such as nitrogen and phosphorous that may cause algal blooms
- Pesticides attach to soil particles and enter waters
- Decreases recreational, commercial, and aesthetic values of water bodies
- Decreases quality of drinking water
Introduction

Turbidity

- Turbidity in water bodies effects both aquatic and human life by increasing bacteria levels, introducing viruses, and protozoan.
- Blocks light transmission and light penetration
- Reducing oxygen levels
- Affecting the food chain
Introduction

Non-Visible Pollutants

They are not visually detectable in storm water discharges

- Examples: Acids, Solvents, Lime, Gypsum, Copolymer
Introduction

How do Non-Visible Pollutants effect water bodies

⇒ They can dissolve or remain suspended in water or get deposited on the bed
⇒ Deteriorates water quality
⇒ Affects aquatic ecosystems
⇒ Pollutants can also seep down and effect groundwater
Introduction

Why should we care

- The effects of water pollution are not only devastating to people but also to animals, fish, and birds.
- Polluted water is unsuitable for drinking, recreation, agriculture, and industry. It diminishes the aesthetic quality of lakes and rivers.
- Contaminated water destroys aquatic life and reduces its reproductive ability.
- Nobody can escape the effects of water pollution.
Quick Fact Review

What are the new Sampling and Analysis requirements intended to do?
Quick Fact Review

What is a 303(d) listed water body?
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The Law

- **1948 Federal Clean Water Act (CWA)**
  - Enacted to protect water bodies within the United States

- **1970 Porter Cologne Water Quality Control Act**
  - Protecting water bodies within the state of California
  - Updated January 2002

- **1992 California’s General Permit**
  - Established Requirements for Discharges Associated with Construction Activities
General Construction Permit CAS000002 - The “02” permit

- Requires all construction projects that disturb 1 acre or more to gain coverage
- Requires all SWPPPs as of August 1, 2001 to include monitoring for BMP assessment
- 303(d) List of Water Bodies Impaired due to Sediment/Siltation and Turbidity
  - [http://www.waterboards.ca.gov/tmdl/303d_lists.html](http://www.waterboards.ca.gov/tmdl/303d_lists.html)
Modification to the General Construction Permit – adopted April 2001

⇒ Implement specific sampling and analytical procedures to determine whether BMPs implemented are:

- Preventing further impairment, from storm water discharge, of 303(d) listed water bodies for sedimentation/siltation or turbidity.
- Preventing other non-visible pollutants from causing or contributing to exceedances of water quality objectives.

⇒ The Modification is Now included in the “02” Permit
 Exceptions Listed in Permit (02)

- Discharges from Tribal Lands
  - Construction on Tribal Lands is regulated by a US EPA permit
- Lake Tahoe Hydrologic Unit
  - Lahontan Regional Water Control Board adopted a separate NPDES permit for the Lake Tahoe Hydrologic Unit
Quick Fact Review

What are the two general categories of pollutants that may be subject to sampling and analysis?
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Construction Procedure Directive (CPD 01-7) – July 2001

- Caltrans mechanism for implementing a new requirement on existing projects
- Contract Change Order (CCO)
  - Procedures for RE to follow to have Contractor:
    - Update SWPPP
    - Implement new changes
Directive issued to:

⇒ Comply with the State Water Resources Control Board Modification of General Permit (CAS 000002) - Resolution 2001-046
⇒ Include Sampling and Analytical Requirements for SWPPP projects
  • Water Pollution Control Programs (WPCPs) are exempt at this time

⇒ If your project SWPPP has not been updated to include Sampling and Analysis requirements, do so ASAP
Contract Special Provisions

- Section 10-1.02 Water Pollution Control
  - Issued to satisfy the NPDES Permit requirements
  - Defines water pollution control requirements
Contract Special Provisions

- Water Pollution Control Requirements (cont)
  - Sampling and Analytical Requirements
Construction Handbook

➡ SWPPP and WPCP Preparation Manual
  ➡ Updated version
  ➡ Section 600.4 Sampling and Analysis Plan for Sediment
  ➡ Section 600.5 Sampling and Analysis Plan for Non-Visible Pollutants
  ➡ Attachment R Sampling Activity Log/Chain of Custody Form
  ➡ Attachment S Pollutant Testing Guidance Table
  ➡ Attachment T Sampling Data Reporting Form
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Sediment / Silt / Turbidity

Projects that discharge directly into a 303(d) water body listed for Sediment / Silt / Turbidity require a SAP

- List of 303(d) water bodies available from SWRCB
  http://www.waterboards.ca.gov/tmdl/303d_lists.html

Determine whether there is a net increase in sediment load from storm water discharge from the project
303(d) Water Bodies

Sediment / Silt / Turbidity

Exemptions (non-direct discharge) – SAP not required

- Discharges that flow to tributaries of 303(d) waters
  - That are not listed themselves as impaired
- Discharges to Municipal Separate Storm Sewer Systems
  - Including Caltrans storm drainage system
Sediment / Silt / Turbidity

Project Discharges Directly into 303(d) Water Body

- Identify sampling locations for monitoring discharges
  - Upstream of the project
  - Immediately down stream from last discharge point of the project
  - Run-on that enters the Caltrans right-of-way

- Sampling must occur during the first two hours of discharge
  - During daylight hours – sunrise to sunset
  - Year round / seven days a week – including holidays

- Sample a maximum of four events per month
  - Minimum 72 hours of dry weather between events

- Samples collected by personnel trained in water quality sampling procedures
  - Contractors staff or Laboratory personnel
Assume:
- River is 303(d) listed impaired for sediment
- Time is 0700
- Rain event began 45 minutes ago
- Direct discharge has occurred

Is sampling required?

YES
Sediment / Silt / Turbidity Sampling Triggers

Remember: SAFETY FIRST

Where should samples be taken?

- Downstream of project
- Upstream of project

Remember: SAFETY FIRST
303(d) Water Bodies

Sediment / Silt / Turbidity

- **Analytical Requirement**
  - Impaired due to Sedimentation / Siltation
    - Settlesable Solids (SS)
    - Total Suspended Solids (TSS)
    - Or Suspended Sediment Concentration (SSC)
  - Impaired due to Turbidity
    - Nephelometric Turbidity Units (NTU)
  - Laboratory analysis in accordance with 40 Code of Federal Regulations (CFR) Part 136
    - By State of Ca. Department of Health Services certified laboratory
  - Field analysis by Contractor
    - Collection, analysis, and equipment calibration in accordance with manufacturer's specifications
303(d) Water Bodies

Sediment / Silt / Turbidity

צוע Sample Documentation

⇒ Water quality sample analytical results and Quality Assurance / Quality Control (QA/QC) Data
  • Submitted to Resident Engineer
    – 5 days for field analysis
    – 30 days for laboratory
  • Evaluation of results
  • Filed with SWPPP document
  • Category 20
Data Evaluation

- The contractor will submit an evaluation of the water quality sample analytical results, including figures with sample locations and QA/QC data for every sampling event.

- Should downstream samples exceed upstream or background levels, the WPCM will evaluate:
  - BMPs
  - Site Conditions
  - Surrounding influences/other site factors
Evaluation of Results

Data Evaluation

- Contractor will determine probable cause for the increase in levels downstream
- Appropriate BMPs will be repaired or modified to mitigate increases/discharges
- Any revisions to the BMPs will be recorded as an amendment to the SWPPP
Reporting of Results

**Sampling Data Reporting Form**

- SWPPP Preparation Manual Appendix A, Attachment T
- Contractor to use form to electronically submit data to the RE or other person designated by Caltrans
- Contractor to sign and certify all data reporting forms
303(d) Water Bodies

What if

⇒ Data shows an increase in the pollutant
⇒ The contractor should

• Identify the location of the BMP failure
• Repair or replace any BMP that has failed
• Maintain any BMP that is not functioning properly due to lack of maintenance
• Evaluate whether any additional or alternative BMPs should be implemented
• Amend SWPPP if additional BMPs were installed
303(d) Water Bodies

What may be Causing the Increase?

- Exposed soil areas with inadequate erosion control measures
- Poorly stabilized slopes
- Lack of perimeter sediment controls
- Areas of concentrated flow or unprotected soils
- Poorly maintained erosion and sediment controls
- Unprotected stockpiles
- Failure of other erosion or sediment control BMPs
303(d) Water Bodies

How is Sampling and Analysis for Sediment/Siltation or Turbidity paid for?

⇒ Extra Work at Force Account