WATER USE TRACKING

CA-7

2 POINTS

GOAL

Generate project-level information about construction water use.

CREDIT REQUIREMENTS

Create a spreadsheet that records total water use during construction. This spreadsheet should identify, at minimum:

1. Dates of use.
2. Amounts of use.
3. Locations and sources of water used.
4. Potability of water source(s).
5. Each construction activity requiring water use.
6. Total water quantity used in each construction activity.
7. Method of measurement to determine total quantity used.
8. Disposal practice for unused water.
9. Type of water use permit, if any.
10. Total cost of water used from each source, if any.

Details

Water use can be measured by meter, hose capacity, number of water tanks, pumping rate over time, or other appropriate source-dependent estimates.

The credit does not require specific performance criteria for water conservation. Eventually, water use data will be compiled to establish benchmarks for roadway construction water efficiency and to develop guidelines for appropriate water conservation practices and principles to reduce potable water usage and negative impacts to the environment.

DOCUMENTATION

- Copy of the spreadsheet used to record construction water use.

RELATED CREDITS

- ✓ PR-7 Pollution Prevention Plan
- ✓ PR-10 Site Maintenance

SUSTAINABILITY COMPONENTS

- ✓ Ecology
- ✓ Expectations
- ✓ Exposure

BENEFITS

- ✓ Improves Accountability
- ✓ Increases Awareness
- ✓ Creates New Information

APPROACHES & STRATEGIES

- Ask individual workers to record water use on their daily reports.
- Provide copies of the tracking spreadsheet at locations where water is used and measured for gathering consistent recordings.

Example: Sample Spreadsheet

Sample spreadsheet entries for different construction activities that commonly use water are shown in Table CA-7.1 for three different types of projects. Note that each activity has a separate column and associated data. Note that, realistically, the data for the project will require information for each activity on the project that uses water and will likely be larger than the small sample shown.

Table CA-7.1: Sample Water Use Spreadsheet Entries for Different Types of Projects

Project Type	*Urban*	*Rural (Delivered Water)*	*Rural (Well Water)*
Date(s)	6/1/09 - 6/12/09	January - May 2009	August 2009
Construction Activity	Dust suppression	Mixing concrete	Equipment cleaning
Water Volume Used	12,000	27,000	3,500
Volume Unit	Gal	gal	Gal
Measurement Method	City water meter	750 gallon tanks	Hose meter
Water Location/Source	Hydrant	Tank delivery	On-site well
Potable Water?	Yes	No	Yes
Disposal Practice of Unused Water	Stormdrain	Storage	Ground surface
Water Use Permit Type	Hydrant	None	None
Water Cost (per gal)	-	$8.13	$0.08
Water Cost (per ccf)	$4.00	-	-
Total Cost	$64.16	$219,510.00	$280.00
Notes	Hydrant permit fees not included.	Includes delivery charge	-

Some commonly useful conversions for water volume are shown in Table CA-7.2.

Table CA-7.2: Typical Units of Water Volume

U.S. Customary Units	Metric Units (S.I.)
1 cubic foot (cf) = 7.481 gallons (gal)	1 liter (L) = 0.001 cubic meters (m^3)
100 cubic feet (cf) = 1 centum cubic foot (ccf)	1 cubic meters (m^3)= 1000 liters (L)

Example: Monitored Water Sources for Road Construction in the U.S.

- Montana limits water leases for construction to 60,000 gallons/day or 120,000 gallons/day/project (Overcast, 2001). Requests for more water must be accompanied by an analysis of potential adverse effects and a description of planned mitigation actions at the proposed point of diversion.
- Oregon allows public agencies to register a water use for road and highway maintenance, construction; in lieu of a permit for a water right (Oregon Water Resources Department, 2007).
- The City of Bend, Oregon requires hydrant use permits for water measurement, protection of drinking water quality, water system operational protection, and fire hydrant integrity and maintenance. The permits apply to water obtained by normal meter installation, daily fill station use, monthly hydrant meter and backflow units, or custom water supply installation.
- The City of Southlake, Texas regulates water use only during drought conditions.

POTENTIAL ISSUES

1. Tracking water use on roadway construction projects may be unfamiliar to site workers. Training may be necessary to accurately track all relevant water data.
2. Water use for road construction may be regulated by local jurisdictions. Check with authorities to determine water use requirements.
3. Where roadway construction includes the use of non-potable water, there is an obligation to ensure that workplace health and safety is not negatively affected by the use of the water. This must include the management of any risks arising from the use, handling, storage, transport, and disposal of the water at the project site.

RESEARCH

Growing cities are putting stress on available water supplies, and demand for water is growing faster than the human population. A recent government survey showed that, under normal conditions, at least 36 states are anticipating local, regional, or statewide water shortages by 2013, and drought conditions will exacerbate shortage impacts (GAO, 2003). Communities in water-supply-challenged regions of the world have begun to address the ongoing issue of potable (or drinking quality) water use on road construction and maintenance projects (CFV, MAV and IPWEA, 2007). Critical to understanding the issue is to determine exactly how much water is used during roadway construction and maintenance.

Water Uses in Roadway Construction

Water has many uses for roadway construction. However, there is little information available on the amount of water used during road construction. Sand and gravel operations are major users, and cement production relies heavily on water. On-site construction uses of water include: concrete mixing, concrete curing, dust control, construction equipment washing, vegetation establishment, geotechnical borings, adding water to backfill material/soil compaction, pipe flushing and pressure testing, and site clean-up.

Water Sources for Roadway Construction

Typical water sources include natural waterbodies, potable water supply pipelines (e.g., hydrants), non-potable water from stormwater or industrial discharges, and reused water from wastewater treatment plants. Water withdrawals from these facilities may or may not be regulated by the governing jurisdiction. Frequently, water use from public supplies requires a temporary water right or permit allowing the local jurisdiction control over the amount and method of water withdrawn for approved construction uses. Many regions also regulate potential harm to fish from water withdrawal from natural waterbodies. For example, the National Marine Fisheries Service (NMFS) developed intake pumping and screening criteria for fish protection that must be installed, operated, and maintained when protected aquatic species are present (NMFS, 2008). Occasionally, these policies require water systems to measure and account for all water delivered. However, these systems are also likely to be provided by private water suppliers.

Estimates of actual water use by project activity are needed for making more informed water use decisions. To enable information sharing for improved water sourcing decisions, some regions are developing a centralized "Water Atlas" of all alternative water sources, including quality and quantity information, to reduce demand on potable supplies. Also, in development is an "Industrial Waste Water Exchange" to match producers of suitable industrial waste water with users of water for construction purposes, allowing industrial users to have their waste water disposed of and reused, resulting in potentially lower costs for both parties and less overall potable water use. (CCFV, MAV and IPWEA, 2007)

Water Potability and Quality Issues

Large volumes of potable water are commonly used in road construction, but drinking water is subject to competing demands by human populations. Also, many municipalities chlorinate their water supply, and the level of chlorine in chlorinated tap water (as high as 1.0 milligram of chlorine per liter of water) is toxic to fish and other

aquatic organisms (Greater Vancouver Regional District, 1997) and may be unsuitable for roadway use without prior mitigation.

Alternative water supplies alleviate demand for potable drinking water through management of related health and environmental risks associated with construction work activities. Brackish and oil-contaminated water show promise for road construction in water-limited regions (Taha et al., 2005; Kansas Department of Health and Environment, 2000). Construction site managers are increasingly harvesting stormwater from their own sites and storing it for later use (Queensland Government, 2007a). Recycled water from municipal wastewater treatment plants is a potable-water substitute for operational and landscaping purposes (Queensland Government, 2007b).

Discharges of construction site water are governed by the Environmental Protection Agency National Pollution Discharge and Elimination System (NPDES) permits, or state or local equivalent policies.

GLOSSARY

Brackish	Water with more salinity than fresh water but less than seawater
Potability	Water that is suitable for human consumption

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