



## Chapter 14

# SITE CONSTRUCTION ACTIVITIES

### 14.1 Construction Schedules and Phases

A construction schedule should generally be prepared as part of the erosion and sediment control plan (ESCP) as described in Section 7.3. The construction schedule allows the engineering plans reviewer and the construction inspector to understand the sequence of construction. Typical tasks may include:

- Site mobilization and traffic control
- Installing erosion and sediment controls
- Clearing and grubbing
- Cut and fill operations
- Installing underground utilities and stormwater system
- Seeding, sodding, planting trees, and other landscaping activities
- Street and parking lot construction
- Installing pavement surface
- Installing sidewalks and curbs
- Installing streetlights and signs
- Excavating for building foundations

The construction schedule should indicate how many days are required for each task. Estimate the duration of each task by using realistic number of workdays with allowance for the weather. Computerized scheduling software is often beneficial in terms of revising and adapting schedules to delays caused by weather, broken equipment, subcontractors, material shortages, difficult construction, etc. Advanced scheduling methods usually keep track of available manpower and resources for maximum efficiency. Typical methods may include:

- CPM (Critical Path Method)
- PERT (Planning Evaluation and Review Technique)
- Milestone charts

The construction contractor should notify the city inspector of any major changes or delays to the construction schedule, thus allowing the required construction inspections in Chapter 13 to proceed in a timely fashion.

Construction phases are highly recommended for larger projects such as residential subdivisions, commercial business parks, shopping malls, office complexes, etc. The goal of construction phasing is to minimize the amount of disturbed area at any given time. Construction phases often allow a contractor to make more efficient use of resources and manpower. See Chapter 5 of the Knoxville BMP Manual for additional discussion of construction phases and the effective use of erosion and sediment controls. See AM-02 of the Knoxville BMP Manual for further discussion of construction scheduling and a very brief example of the PERT method.



## 14.2 Good Housekeeping and Other BMPs

The construction contractor must prevent pollution in all forms on the project site. Potential problems may include excessive noise, construction traffic, dust and other forms of air pollution, leaks and spills, trash, debris, etc. Many departments within the City of Knoxville are specifically instructed to be responsive to citizen complaints in such matters as codes enforcement, zoning violations, stormwater quality and illegal dumping. In addition to City of Knoxville personnel, TDEC also has a large office inside the city limits with many regulatory inspectors who are instructed to respond to complaints from any Tennessee citizen.

Therefore, it is in the best interests of the contractor to prevent or reduce pollution and other nuisance conditions. The first step is to institute good housekeeping measures on the construction site. These measures (which are often called best management practices or BMPs) will help to maintain safe working conditions, orderly traffic at the site, efficient use of limited space, and protection of materials and equipment. Basic rules for good housekeeping include:

- Maintain well-defined paths for vehicle traffic and pedestrian traffic. Ensure adequate visibility and sight distance for safety reasons.
- Store materials and equipment in an orderly manner to prevent waste or damage.
- Supply electricity, lighting, heating, fans, etc, to various locations on the construction site, as needed, in an orderly manner using equipment designed for the particular purpose.
- Provide labeled containers in convenient locations for all types of waste and excess materials. Encourage recycling of materials when possible.
- Adequate supervision and guidance should be provided for all personnel on the construction site.
- Security measures should be taken to prevent or discourage visitors, trespassers or neighborhood children from entering the site.

Liquid materials must be stored in sturdy non-leaking containers that are chemically inert. Equipment fueling and maintenance should not take place at the construction site to minimize the potential for spills and leaks. The Knoxville BMP Manual contains many other recommendations for construction contractors under the AM category (Activities & Methods).

## 14.3 Waste Management

A major part of the effort to maintain good housekeeping practices is to effectively manage materials and resources at the project site. Waste management, and material storage in general, is often neglected, which actually costs the contractor both time and money because waste handling is a fact of life. In addition, incorrect waste management may cause pollution or other violations for which the contractor can be fined or even shut down. Therefore, plan to manage waste materials in accordance with state and local regulations to avoid problems.

Table 14-1 provides a list of information sources on locating waste management guidance. The Office of Solid Waste has waste inspectors to locate and prevent illegal dumping and trash disposal. The Stormwater Engineering Division has stormwater inspectors to locate and prevent illegal discharges to the stormwater system and natural creeks.



Table 14-1 Sources for Waste Management Guidance		
Document	Subject	
Knoxville BMP Manual	AM-01	Employee Training (Quick Reference for Disposal Alternatives) -- Table AM-01-1
	AM-06	Material Delivery and Storage
	AM-07	Spill Prevention and Control (Emergency and Regulatory Contacts) -- Table AM-07-1
	AM-08	Waste Management and Recycling
	AM-09	Sanitary and Septic Waste Management
	AM-10	Contaminated Soil Management
	AM-18	Concrete Waste Management
Policy 11	Sediment Disposal for Detention Basin Maintenance	
Office of Solid Waste -- on the city website at <a href="http://www.ci.knoxville.tn.us/solidwaste/">http://www.ci.knoxville.tn.us/solidwaste/</a> Telephone: 865-215-2921 (information on waste collection, recycling, illegal dumping, etc.)		

#### 14.4 Maintenance of Stormwater Facilities During Construction

The construction of stormwater facilities must occur early during the construction process for a number of reasons:

- Underground features that involve trenching and excavations must be coordinated with the grading operations.
- Detention basins also involve substantial grading efforts and must be considered during cut/fill volumes analysis.
- The construction site needs to be well-drained in order to allow operations to continue smoothly and on time.

A cleared site is usually as impervious as the final graded site. Therefore, the cleared site is likely to contribute to increased stormwater runoff volume and even potential flooding if sufficient measures are not in place to detain stormwater, slow runoff velocities, prevent sediment, etc. A proposed detention basin should usually be constructed during initial construction grading, with suitable modifications to serve as a temporary sediment basin also.

Common methods to protect and maintain stormwater facilities during construction (along with the matching reference to the Knoxville BMP Manual) include:

- Preservation of existing vegetation (AM-03)
- Maintenance of existing drainage systems (AM-04)
- Construction road stabilization (ES-03)
- Diversions and downdrains (ES-21)
- Temporary inlet protection (ES-24)
- Temporary sediment trap (ES-18)
- Construction entrance (ES-01)
- Seeding (ES-08) / Sodding (ES-09)
- Check dams (ES-13)
- Silt fence (ES-14)
- Straw bales (ES-15)



In many cases, the developer may choose to use a permanent detention basin as a temporary sediment basin. The approved construction plans should clearly indicate if the detention basin will be used in this manner. The basin outlet structure must be suitably modified during construction to prevent sediment and silt from leaving the project site. In most cases, the computed detention basin volume is also adequate for sediment settling during construction.

Stormwater facilities (underground pipes and culverts, detention basins, other types of stormwater quality structures) must be periodically cleaned and maintained during construction. At a minimum, stormwater facilities must be cleaned as part of the final construction effort prior to the contractor leaving the construction project. An erosion control inspection must be conducted at least once a week to ensure that all erosion control systems and drainage systems are working correctly. See Policy 11 (in Appendix C) for guidance on sediment disposal from detention basins and other stormwater treatment BMPs.

#### **14.5 Notification of Spills and Other Releases**

Knoxville Water Quality Hotline (865-215-4147) is intended to receive anonymous reporting of water quality concerns and illegal discharges 24 hours per day. In an actual emergency or for HAZMAT responders, call the 911 emergency number. In response to calling the Water Quality Hotline, Engineering Department staff will then investigate, coordinate, and enforce illegal dumping, illicit discharges, and spills to the storm drainage system, river, or creeks within the city of Knoxville. Staff are on hand to only assist, not replace, your emergency response contractor or the City HAZMAT team. See the Knoxville BMP Manual under AM-07, Spill Prevention and Control, for a general list of hazardous materials contractors known to provide services in the Knoxville area. According to the Stormwater and Street Ordinance (22.5-53, Notification of Spills and Illicit Discharges):

*“As soon as any person has knowledge of any illicit spills or discharges to the stormwater system in violation of the City of Knoxville Stormwater and Street Ordinance, such person shall immediately notify the Engineering Director by telephone [i.e. the Water Quality Hotline 215-4147] of this discharge. If such person is directly or indirectly responsible for such discharge or responsible for the operation of the system or business, then such person shall also take immediate action to ensure the containment and cleanup of such discharge and shall confirm such telephone notification with a written report to the Engineering Director within three (3) calendar days. At a minimum, the written report for any illicit discharge shall include:*

- i. Date and time of the discharge*
- ii. Location of the discharge*
- iii. Material or substance discharged*
- iv. Duration and rate of flow*
- v. Total volume discharged*
- vi. Total volume recovered*
- vii. Cause or reason for the discharge*
- viii. Remediation and containment action taken*
- ix. Material Safety Data Sheets (MSDS) for the discharged material*



- x. *Action taken to prevent further discharges*
- xi. *Description of any environmental impact”*

The Knoxville Stormwater and Street Ordinance (Section 22.5-52) contains a list of the allowable stormwater discharges to the city storm drainage system, ditches, swales, natural channels, streams, creeks, or sinkholes. Any other material or substance is not an allowable discharge, and therefore is in direct violation of the city ordinance. The list of allowable stormwater discharges is also included in the Knoxville BMP Manual under AM-01 (Employee Training) and IC-01 (Non-Stormwater Discharges to Storm Drains).

In the event of a leak or spill that presents a serious hazard to life, property or the environment, the first phone call shall be made to the E911 emergency dispatching center. The second phone call should preferably be made to a hazardous materials contractor for which an arrangement has been previously established. The next phone calls shall be made to the Knoxville Water Quality Hotline and to TDEC Water Pollution Control.

The recommended course of action is listed in the Knoxville BMP Manual under AM-07, Spill Prevention and Control. A spill or leak, unless extremely minor in nature, should also be reported to the Tennessee Department of Environment and Conservation (TDEC). A minor spill typically involves a small amount of material that can be completely removed with shovels, buckets or absorbent materials. The Knoxville BMP Manual has emergency and non-emergency numbers for the municipal hazmat response team (see Table AM-07-1).

#### **14.6 Notice of Violation (NOV)**

The Stormwater Engineering Department can issue a notice of violation (NOV) for many types of illegal discharges, sediment, erosion, grading without a permit, etc. A copy of the NOV form is included in Appendix A. The NOV shall include the recommended course of action and a timetable to accomplish the corrective action. The NOV may include penalties and fines. Performing site grading or construction without a valid site development permit may result in an NOV, which will serve as a stop-work order until corrective actions are taken.

The Knoxville Stormwater and Street Ordinance (Section 22.5-6) allows the Engineering Director or his designated representatives to enter any property which is believed to discharge or contribute to the stormwater system, stream, natural drainage channel. The purposes for this right of entry are to remove foreign objects or blockages, monitor and inspect stormwater runoff quality, and to enforce any of the provisions of this ordinance. The Knoxville Stormwater and Street Ordinance (Section 22.5-54) may also require any person engaging in any activity (or owning the property in question) to undertake a reasonable monitoring effort for discharges to the stormwater system operated by the City of Knoxville. The monitoring shall be reported periodically in a report to the City of Knoxville.