Site Preparation

The following was excerpted from the comments from two experts in the field of Site Preparation and Evaluation: Steve Anderson of P&C Construction Company and Wesley Spang of Geocon Northwest. Both individuals offer their own unique approach to site preparation. The following brief focuses on both perspectives jointly rather than one single perspective.

Introduction

Preparing a site for construction is the first and important step in the process of construction. As well, site evaluation is just as necessary as site preparation. The proper evaluation of a site can determine how efficient the construction process will be. Disregarding a proper site evaluation can lead to unexpected construction delays as well as additional construction costs. Site preparation, which for the purposes of this brief involves schools, assures the safety of the construction team as well as the students and faculty.

Site Preparation[1]

Proper **site preparation**, as well as staging and management, relies heavily on the **safety of students and faculty**. **Safety** is always the number one priority of construction teams. When working construction at a school, safety becomes even more of a concern for the site preparation process as well as the construction process itself. Being able to **separate the construction from the normal flow or rhythm of the school**, while difficult, is a very integral feature of site preparation. To aid this process, construction personnel need to have **authorization badges** for occupied sites. Putting up **posts and other signs** can also help the safety of a site. Such signs need to communicate the fact that **children are present** and that **safety is a top priority**. The project safety also entails that the site, as well as the campus, is tobacco free.

A **proper logistics plan** of the project is a necessary tool that will aid in the site preparation. A logistics plan will include a **summary of work** highlighting the different phases of the construction. The summary of work will also have the estimated **dates of completion** for the different phases. The logistics plan will also discuss the means for the construction team to effectively **minimize the effect of the construction**, detailing where construction traffic is allowed and how safety will be maintained for the students and faculty. The centerpiece of the logistics plan will also include a **detailed map** showing where construction will be and where storage and access points will be.

Master construction scheduling is an integral component to any major construction project. This scheduling is also a very important part of the site preparation. The master schedule gives

[1] The following has been adapted from a presentation given by Steve Anderson, P&C Construction Company. The presentation was delivered at the 2008 Bonds & Ballots Conference; 1/24/08, Salem, OR.

the construction team a chance to gauge their progress as well as a chance to view upcoming deadlines. Creating a **"Three-Week Look Ahead"** schedule also helps with the master schedule, since most projects can take from months to years to complete. The look ahead schedule keeps the project organized while also pairing down the construction duties to focus on the incumbent weeks. The look ahead schedule contains only a specific part of the construction project and which days it is supposed to be worked on.

A case study of **Barnes Elementary School** in Beaverton, Oregon detailed how **proper site preparation helped move along a construction project**. The study listed the **student population**, the **features of the construction project**, as well as any **significant site logistic challenges**. Of these challenges, **keeping students isolated from the construction** and keeping the **main entrance to the school open** during the construction were listed at the top. With proper site preparation, including logistic plans and detailed schedules, these challenges become easier to alleviate during the course of the construction project.

Site Evaluation[2]

A **site evaluation** is an important task to undertake when considering possible construction or property purchase. A site evaluation best done **prior to the purchase** of property so as to avoid any **surprises** that may result in **additional construction costs** or even **schedule delays**. For the initial screening of a potential site, there exist public resources for site and soil information. These resources, such as the **USDA Soil Surveys** and the **Oregon Department of Geology and Mineral Industries**, can be found online at www.or.nrcs.usda.gov/pnw-soil/or-data.html and www.oregongeology.com. The USDA Soil Surveys have information on every county such as **a survey map** and **report** as well as **soil information to a depth of approximately five feet**. The Oregon Department of Geology and Mineral Industries' resource has **geologic maps and hazard maps** for most areas. Another valuable online resource, the **Oregon Water Resources Well Logs,** contains previous **well logs** and **geotechnical borings**. It can be found at http://apps2.wrd.state.or.us/apps/gw/well. log/default.aspx. All of these resources will help a site evaluation consider potentially adverse site development conditions such as **rock, peat, shallow groundwater, steep slopes, previous development, and adjacent development**.

Some common issues that come with the eventual site preparation are **grading with moisture sensitive soils**, **building foundations**, **undertaking excavations**, and **securing pavements**.

The main problem that arises in regards to **grading with moisture sensitive soils** is that native silt and clay soils are typically **wet with high moisture contents** that **preclude proper compactions**. This can even occur in the summer months. Remedial measures for this include **aeration**, replacement with **granular soil or cement treatment**, and using **geogrid/geotextile**. Securing an **earthwork contractor** with prior experience who can enforce these means and methods during construction phases is critical for the site's safety.

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Building foundations can be done with three common methods. The first is **conventional wall and spread (column) footings**. The next deals with **intermediate foundation systems** such as **GeoPiers**, **stone columns**, and **helical anchors**. The third method is a simple **pile/pier foundation**.

Excavations must be governed by OSHA regulations based on **soil characteristics and excavation height**. They also deal with **temporary slopes** that can be shored with **soil nails or tiebacks.**

A significant **pavement** issue is **subgrade preparation/stabilization**. Since the pavement fits directly in the subgrade, it is important to secure a **safe and stable site** for the subgrade. As well, **porous pavement construction** is fast becoming popular as part of a building's **LEED certification**.

Case Histories:

These following case histories highlight different construction sites that all came across **different issues and conflicts** as a result of **poor and improper site preparation**. These issues, while avoidable, ended up costing the constructions teams **valuable time and money**.

Case History 1 was a project on the coast. This project did not undertake a pre-purchase geotechnical evaluation. The site was underlain by loose sand as well as soft clay. This lead to the spending of over $1 million in site improvement costs in order to stabilize the property for earthquake shaking. Development at the site remains uncertain.

Case History 2 was a school site in the Portland area. The owner did not want to pay for site stabilization at the beginning of the project. Subgrade areas became highly disturbed at the end of the building's construction. This required cement treatment for parking and roadway pavement construction, adding to the cost of the project.

Case History 3 was a school site in East Vancouver. The site secured an earthwork contractor (E.C.) based on the lowest bid. This lowest bid meant the E.C. had no prior experience with a general contractor. A lack of equipment and a lack of understanding of soil conditions by the E.C. resulted in a large volume of import gravel material for the site. Additionally, the E.C. went bankrupt, resulting in numerous project delays and increased costs for the project.

Lessons to take away from these case histories are to perform an initial site evaluation as soon as possible. This can be easily factored in to either the pre-purchase or pre-construction budget. It is also important to make room for site stabilization costs in the budget, even in the summer months.