

Use of Soil Amendments on Construction Sites

The use of soil amendments (including cement treated base (CTB) and cement kiln dust (CKD)) on development sites must be approved by King County. The approval process is described in BMP Info Sheet #11, "Processing Requirements for Use of Soil Amendments on Construction Sites".

Note: Additional BMPs may be required to prevent adverse impacts to the public and/or the environment. It is the responsibility of the permit holder to remain in compliance with all other applicable local, state, and federal regulations.

Category of Action	Specific Action	CTB/CKD Best Management Practices
1. Materials Source Analysis	Solubility Testing & Specifications	<ul style="list-style-type: none"> A. If CKD is proposed, a chemical analysis of soluble pollutants of the product to be used will be provided to the Washington State Department of Ecology (DOE) and the King County Department of Development and Environmental Services (DDES) in advance of any product is applied. B. CTB/CKD mixing percentage is anticipated to be approximately 3 percent to 5 percent. C. A Geotechnical Engineer will establish the mixing percentage for the on-site soils. D. All treatment procedures shall be directed, monitored, and verified by a Geotechnical Engineer. E. Soil amendments will never occur in excess of the ability of the on-site equipment and resources to meet all BMP requirements specified herein.
2. Site Preparation	Runoff Collection System	<ul style="list-style-type: none"> A. Areas that are to be treated as shown on the plan are flagged off to prevent equipment from leaving treated area and going onto untreated areas, and to prevent unauthorized equipment from entering the treated area. B. Assessment of surface runoff collection points are noted. C. Cutoff trenches, collection sumps, and pumps are installed. D. Sealed storage tanks will be properly sized to contain all runoff from treated areas. E. Sealed storage tanks shall be set up and ready for use to treat contact water. F. An approved wheel wash will be constructed at the construction exit, typically a paved ramp sump that utilizes high-pressure washers. G. Copies of Treatment Plan, Approval, and Contingency Plan area are required to be located on site.
3. Lay-down Mixing Equipment		<ul style="list-style-type: none"> A. Exposure of CTB/CKD materials to air to be minimized. Delivery tankers shall be set up to place CTB/CKD directly into spreading trucks or equipment. B. CTB/CKD operations are only allowed during daylight hours. C. Tarps or dust bags will be used over the discharge truck hose at

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		<p>unloading to prevent dust particles for becoming airborne.</p> <p>D. Unloading will occur at the lowest possible pump pressure.</p> <p>E. Unloading and mixing will be avoided on high wind days. PSAPCA Section 9.15 prohibits visible emissions of fugitive dust.</p> <p>F. CTB/CKD to be placed on ground by large wheeled spreaders designed for this purpose capable of measuring application.</p> <p>G. When spreading CTB/CKD it shall be kept 2-3 feet away from untreated areas boundaries to prevent the material from migration and contaminating outside the treatment zone.</p> <p>H. Treatment area will be kept damp/wet at all times CTB/CKD is being spread and mixed. Skirting around applicator/spreader and mixer is required to minimize CTB/CKD dust.</p> <p>I. CTB/CKD is to be roto-tilled into soil immediately after being spread onto soils and shall be done with a skirted tiller.</p> <p>J. Direct auguring machine that measures, spreads, and mixes CTB/CKD in one operation is preferred.</p> <p>K. Compaction will be complete within 2 hours after CTB/CKD application.</p>
4. Site Management	Work Progress and Weather Conditions	<p>A. Dust suppression by use of water trucks shall be used on areas where work on dry soil is performed and potential airborne contamination may occur.</p> <p>B. The volume of CTB/CKD allowed on site will be limited to the amount that can be used within a normal workday. Every effort will be made to forecast the daily delivery rate to match the daily on-site use rate.</p> <p>C. CTB/CKD will not be added to soils at a rate that exceeds the ability of on-site resources to immediately commence mixing and compacting.</p> <p>D. No work will occur in rain heavier than drizzle, or under drizzle that exceeds 6 hours duration, or under any rainfall which generates runoff from the areas being worked.</p> <p>E. Should the weather change to stop the application, remaining CTB/CKD will be covered and contained to prevent stormwater from entering storage containment, and causing runoff .</p> <p>F. All vehicles and equipment leaving the treatment area/site must be cleaned/washed to prevent CTB/CKD from leaving site. Wash water will be contained and treated as needed.</p> <p>G. CTB/CKD contact water in the wheel wash will be removed from the site via a vactor truck for transport to an approved off-site treatment or disposal facility in accordance with all federal, state, and local laws and regulations; or, if permitted, to the sanitary sewer system.</p>
5. Surface Water Collection		<p>A. Surface runoff from the treated areas is to be collected and stored in onsite sealed treatment tanks.</p> <p>B. A rigid schedule of TESC inspection, maintenance, and drainage controls will be maintained.</p> <p>C. Temporarily plugging and using detention facilities is not allowed as a storage practice.</p> <p>D. Runoff from compacted areas amended with CTB/CKD will be directed to previously sealed tank(s) until pH levels of water are verified to be within acceptable background water limits. No uncontrolled discharge or infiltration from the sealed tank(s) will be allowed.</p> <p>E. Drainage from areas amended with CTB/CKD within the past 72 hours will be prevented from co-mingling with any other project drainage.</p>
6. Discharge	Applicable	<p>A. Any and all discharges from this site will be in compliance with all</p>

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Compliance	Regulations	<p>applicable federal, state, and local laws and regulations pertaining to health and safety, water, air, waste, and wildlife, including the Federal Clean Water Act, Clean Air Act, and Endangered Species Act. Laboratory analysis of water is required prior to discharge to verify compliance.</p> <p>B. No infiltration is allowed to occur if pH readings are above 8.5 standard pH units, or below 6.5 standard pH units.</p> <p>C. A pH meter must be used to determine levels. pH meter is to be calibrated following proper QA/QC procedures. Fresh buffers are to be available to re-calibrate as needed.</p> <p>D. A log of turbidity and pH readings will be kept on site for inspection.</p> <p>E. All treatment of water must be directed, bench tested, monitored and verified by a qualified water quality specialist.</p> <p>F. Treated area water runoff shall not enter the permanent stormwater system.</p> <p>G. Stormwater drainage system within treatment area is to be cleaned out prior to use for regular water runoff conveyance from untreated areas. Water from cleanout is to be tested and treated following the approved treatment criteria.</p>
7. Natural Treatment and Discharge		<p>A. The preferred method of disposal of the treatment water will be discharge to the sanitary sewer, provided a permit is obtained to do so.</p> <p>B. If infiltration is proposed, the area of infiltration is to be identified, capacity confirmed, and a contingency discharge plan in place in the event facilities fail to infiltrate.</p> <p>C. For infiltration, pH limits shall be strictly adhered to.</p> <p>D. If a permit to discharge to the sanitary sewer is not obtained, a National Pollutant Discharge Elimination System (NPDES) discharge permit is required from DOE. The retention volume of the lined pond(s) will also be increased to ensure complete control of the retained volume. Monitoring, bench testing, and controlled discharge rates, with prior approval by DOE, would be needed prior to discharge to an approved off-site surface drainage system. Sites that currently have NPDES permits will need to amend permit prior to discharge to cover this action. County approval is still required.</p> <p>E. Per KCC 9.12, discharges into receiving drainage systems shall not have acid or basic pH levels.</p> <p>F. Sealed storage tanks shall be used to reduce turbidity and pH before discharge.</p>
8. Chemical Treatment		<p>A. Carbon dioxide sparging (dry ice pellets) may be used as the chemical treatment agent to reduce the water pH.</p> <p>B. Any means of water treatment to reduce pH will require an NPDES discharge permit from DOE. Permit would only be granted after bench testing performed by an independent qualified party.</p> <p>C. Active mixing will cease if the residual retention water volume falls below the ability to treat and properly dispose of contact storm water.</p> <p>D. Discharge would only occur after the approval of DOE, following bench testing and consultation with DOE.</p> <p>E. All materials for chemical treatment will be on site and property stored, during all phases of CTB/CKD treatment.</p>
9. Water Quality	Monitoring	<p>A. Turbidity and pH will be monitored on a twice-daily basis, prior to operations and immediately upon ceasing operations, and these measurements will be recorded. Monitoring will also occur immediately after any storm event of ½ inch in 24 hours, or water</p>

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		<p>migration to the retention pond(s), and the measurements recorded. If the pH approaches 8.0, monitoring frequency will increase.</p> <p>B. Turbidity and pH monitoring will occur in all treatment facilities, stormwater detention facilities, infiltration areas (if infiltration is used), and in all surface water areas adjacent to site where stormwater potentially discharges. Additional upstream surface water sites will be established to determine background levels of turbidity and pH.</p> <p>C. All water quality monitoring data will be conducted and evaluated by an independent, qualified party and conducted using professionally supportable test protocols and QA/QC procedures.</p>
10. Reporting	Ecology and DDES	<p>A. All water quality monitoring data will be included in weekly DDES TESC reports to DDES, and in weekly NPDES reports to DOE.</p> <p>B. All work, testing, and monitoring associated with the application of CTB/CKD shall be observed by engineer. The engineer shall prepare and submit a report to the assigned DDES project inspector indicating BMPs were/were not being met.</p> <p>C. Copies of all reports and logs will be available on site during the soil and surface runoff treatment activities.</p>
Other elements to consider:		
11. Water Quality – Soils	Source Controls	<p>A. There may be very small amounts of concrete washout produced on-site as a result of construction of erosion control measures during reclamation. Concrete washout, if any, would be retained in a lined enclosure of at least 6-mil visqueen or plastic sheeting, with no outlet. The washout retention enclosure would be isolated and separate from any CTB/CKD area runoff. Contents of the lined concrete washout enclosure will be removed from the site via a vector truck for disposal in an approved off-site treatment or disposal facility in accordance with all federal, state, and local laws and regulations. Signed trip tickets, as proof of proper disposal, will be provided to DOE and DDES.</p>
B. Water Quality – pH	Cover Measures	<p>A. Areas amended with CTB/CKD for compaction after CTB/CKD addition will be covered with plastic or visqueen sheeting, or other impervious material by the end of each working day.</p> <p>B. Temporary cover will be maintained over all compacted areas amended with CTB/CKD until testing confirms that pH levels are stabilized to background measurements. [Note: Curing to avoid pH effects has no relationship to the rate at which material can be compacted in multiple lifts. Compaction will commence immediately after application and mixing, and multiple lifts will occur as quickly as each lift is compacted and ready to accept the next.]</p> <p>C. Should weather conditions prevent mixing, any unmixed CTB/CKD remaining on site will be enclosed in a sealed containment, such as portable silo, or removed from site.</p>