CITY & COUNTY OF DENVER COMMUNITY PLANNING & DEVELOPMENT BUILDING PERMIT POLICY		
Subject:	**EXCAVATION, BENCHING AND SHORING for IRC Structures**	
Approved:	**Scott V. Prisco, AIA - Building Official**	
Number: ADMIN 130.2A	**Effective Date:** September 26, 2008 **Revised:** January 26, 2018	Page **1** of **3**

Reference: ADMIN Section 130.2, IBC and IBCA Section 3307

Scope: This policy establishes the conditions, procedures and specific submittal requirements for the review and inspection of benching and shoring for any structure designed and permitted under the International Residential Code, including new construction, additions and accessory structures.

Policy: Shoring is required for all excavation for construction that would result in slopes to the walls of the excavation that are steeper than 1.5 feet horizontal to 1 foot vertical, or as indicated in the geotechnical investigation report. Benching may be considered if there has been soils testing completed on the site with a corresponding geotechnical investigation report that is sealed and signed by a licensed engineer in the State of Colorado. The report must clearly indicate that soils can achieve safe conditions for adjacent properties and workers performing the excavation. Excavations with vertical cuts up to 4 feet in depth are permitted without shoring or benching or separate permits as long as the top edge of the cut is at least as far from the property line as the depth of the excavation – for this condition, the six-foot tall fences required by IBC 3306.9 are required if excavation depth exceeds 30 inches. All OSHA Health & Safety Construction-related Regulations, including but not limited to Subpart P - Excavations, must be followed. Benching or shoring must meet all benching and shoring requirements listed herewith and within the IRC and DBCA.

For detached one- and two-family dwellings and their accessory structures, submittal for benching or shoring shall be included in the submittal for the structure's construction permit, but shall be issued separately as an 'excavation only' permit for the excavation and / or shoring. For townhouses and their accessory structures, submittal for a benching or shoring permit shall be separate from the submittal for the structure's construction permit.

Geotechnical engineering / soils reports. A geotechnical engineering / soils report submitted with a permit application is considered "current" if the date of the report is within two years of the date of submittal. If the report is older than two years but not older than five years, applicants must also submit a letter signed and sealed by the geotechnical engineer of record (or from another engineer in that company) confirming the applicability and recommendations of the original report. Reports older than five years will not be accepted.

Shoring specific submittals / requirements. Shoring shall have the following requirements and submittals shall include:

1. One copy of geotechnical investigation report with excavation / shoring evaluation bearing the Colorado registered seal and signature of the soils engineer of record.
2. One set of the shoring design calculations and two sets of the shoring construction documents prepared, sealed and signed by a Colorado registered professional engineer.
    - Construction documents must show adjacent property lines, distance of shoring installation from the property lines, and any structures that are within 10 feet of the proposed shoring. The adjacent structures shall include those on adjacent properties if within the aforementioned 10 feet.
    - Shoring design shall reference the geotechnical investigation report and provide recommendations on the type of shoring based on the geotechnical investigation report.
    - All shoring reviewed by the residential team are required to meet the following criteria. Any deviations from these criteria will require a plan review from the structural plan review team and will require log-in at the counter as a commercial workflow.
        - Concrete Piers shall be spaced not more than 3'-0" on center,
        - Concrete piers must be at least 10" diameter and reinforced based on design analysis by a Colorado registered professional engineer, and

- The pier embedment, measured from the lowest point of the excavation to the bottom of the pier, must be at least equal to the depth of the excavation. For example, if excavation is a 10' depth, the pier must have at least 10' embedment below the lowest excavation point. Note: under certain soils conditions and water table levels this may not be adequate and requires verification from the soils and structural engineers.

3. Submit evidence of notification to adjacent property owners per IBCA Section 3307.1.1.
4. Provide name and phone number of designated special inspector / engineer inspecting the installation of shoring.
5. Copy of the Excavation Bond approval from the Department of Public Works, Right-of-Way Permitting for those excavations that extend within one foot of the angle of repose, or a slope of one to one, to any public sidewalk, street, alley or other public property, per the provisions of IBCA Section 3307.3.
6. Other information required for completion of permit application.

Benching specific submittals / requirements. Benching shall have the following requirements and submittal shall include:

1. One copy of geotechnical investigation report with excavation / shoring evaluation bearing the Colorado registered seal and signature of the soils engineer of record.
2. Two sets of the benching construction documents prepared, sealed and signed by a Colorado registered professional engineer.
    - Construction documents must show adjacent property lines, distance of benching installation from the property lines, and any structures that are within 10 feet of the proposed benching. The adjacent structures shall include those on adjacent properties if within the aforementioned 10 feet.
    - Benching design shall reference the geotechnical investigation report and provide recommendations on the type of benching based on the geotechnical investigation report.
    - All benching reviewed by the residential team are required to meet the following criteria. Any deviations from these criteria will require a plan review from the structural plan review team and will require log-in at the counter as an intermediate commercial project.
        - If there is an existing structure within a horizontal distance from the vertical face of a bench that is equal to the depth of the bench, engineer must outline if underpinning is required and specifically outline the contractor's excavation procedures. Underpinning documents must be reviewed, approved and included with the benching submittal and permit.
        - Any benching within 5 feet of a property line must have the vertical face of the bench located a minimum horizontal distance from the property line that is equal to the depth of the bench.

EXCEPTION: The following allows benching (excavation) to be substituted for shoring and the setback requirements waived. If the adjacent homeowner signs an affidavit allowing the use of their property for excavation and benching, an exception can be made. This must be submitted to the Building Official or approved designee for approval. There must be proof / verification that there are no structures in or around the area of excavation.

Prior to excavation for benching or shoring a pre-construction meeting is required. Before starting any excavation or shoring work, the contractor shall meet the Building Inspection Division Construction Inspector on site to review construction / excavation procedures, including but not limited to, fencing and signage, as well as compliance with and appropriateness of the benching or shoring plan.

Special inspection is required for all shoring projects. The owner must hire the special inspector.

Finaling the shoring. Once the required shoring has been inspected by the special inspector and the concrete and reinforcement is in place, the shoring piers have been given the required time to cure (usually 7 days) and the excavation is completed, contact the Building Inspection Division to schedule a final inspection. The special inspector shall provide a report outlining their inspection of the shoring installation with an original seal and signature of an engineer, which shall be provided to the Construction Inspector at the time of final inspection.

Finaling for benching. Once all benching is completed contact the Building Inspection Division to schedule a final inspection.

Once the shoring or benching has obtained its final sign off from the Building Inspection Division Construction Inspector, then the permit for the construction of the structure may be issued.

END OF DOCUMENT