

CIDH Pile Nonstandard Mitigation Meeting

The purpose of the Cast-In-Drilled Hole (CIDH) Pile Nonstandard Mitigation Meeting is to bring together the Contractor, the Engineer, and their representatives involved in CIDH pile mitigation to address a nonstandard mitigation plan for the CIDH pile in a timely manner. It is intended to quickly eliminate any nonviable mitigation methodology and focus all efforts on finding optimal alternatives to mitigate the pile repair. The meeting will provide a forum for free exchange of information so that one or more viable repair solutions can be identified. Identifying these usable repair strategies should not be viewed as directing a Contractor's work or plan. Ultimately, it is the Contractor's responsibility to select, develop, and submit the pile mitigation plan. In many cases, the completion of the CIDH concrete pile is a critical path item affecting the schedule. In these circumstances it is imperative that the project team communicates effectively so that a satisfactory mitigation plan can be developed and executed with minimal impact on the schedule and delivery of the project. Attendance of this meeting is mandatory for the following:

- Resident Engineer
- Structure Representative
- Assistant Structure Representatives
- Foundation Testing and Instrumentation Branch (FTI) representative
- Division of Engineering Services (DES) Pile Mitigation Committee representatives
- Bridge Design (BD) Structure Project Engineer and Geotechnical Services (GS) Geoprofessional who are providing construction support for the project
- Contractor's Project Manager
- Project Superintendent
- Drilling Subcontractor's Project Manager
- Drilling Subcontractor's Superintendent/Foreman
- Mitigation Plan Designer

The following general meeting agenda provides guidance for understanding the key topics that need to be addressed during this meeting for timely development of a nonstandard mitigation plan. However, these are reminders only. Review the general meeting agenda regarding your specific project and modify the meeting agenda as necessary. Certain topics may or may not be included, depending upon their applicability to a specific project.

CIDH Pile Nonstandard Mitigation Meeting Agenda/ Minutes	Date:	Project Stamp:
	Time:	
	Location:	

Facilitator:	Structure Representative:	
Invitees:	Resident Engineer: Assistant Structure Representative: Bridge Design Structure Project Engineer: Geotechnical Services Geoprofessional: Contractor’s Project Manager: Project Superintendent: Drilling Subcontractor’s Project Manager: Drilling Subcontractor’s Superintendent/Foreman: Foundation Testing and Instrumentation Branch Representative: DES Pile Mitigation Committee Chair: Mitigation Plan Designer:	By phone:
Purpose	Bring together the Contractor, the Engineer, and their representatives involved in CIDH pile mitigation to address a nonstandard mitigation plan (replacement, supplementation, or non-standard pile repair) in a timely manner.	

Time	Topic*	Who
	1. Welcome and Self Introductions	
	2. Anomaly Description Based on GGL, CSL and/or Coring	
	3. PDDF Review (Structural, Geotechnical, and Corrosion Design Requirements)	
	4. Limitation of Standard Mitigation Plan ‘B’ (Grouting Repair)	
	5. Alternative Repair Methods (i.e., Structural Bridging)	
	6. Discuss Mitigation by Supplementation or Replacement	
	7. Discuss Successful Solutions Used in Past Pile Mitigation	

Time	Topic*	Who
	8. Mitigation Plan Design Requirements	
	9. Additional Testing Requirements	
	10. Timelines and Critical Path Activities	
	11. Safety	
	12. Future Meetings	
	13. Action Items / Adjourn Meeting	

* These topics are reminders only. Items will or will not be included depending upon their applicability to a specific project.

Topic 1. Welcome and Self Introductions

- a. Pass out attendance sheet.
- b. State purpose of this meeting.
- c. Self-Introductions: state responsibilities for construction of CIDH concrete piles.

Topic 2. Anomaly Description based on GGL, CSL, and/or Coring

- a. Describe the testing performed for acceptance testing and for further evaluation of the anomaly.
- b. Characterize the defect. Define nature, location, and extent.

Topic 3. PDDF Review (Structural, Geotechnical, and Corrosion Design Requirements)

- a. Discuss the effect on structural resistance and serviceability.
- b. Discuss the effect on geotechnical resistance and serviceability.
- c. Discuss the effect on corrosion design and serviceability.

Topic 4. Limitation of Standard Mitigation Plan ‘B’ (Grouting repair)

- a. High pressure water jets are capable of nozzle pressures up to 20,000 psi and can cut limited quantities of concrete at close range if the jet can be directed and is not shadowed by reinforcing steel. It is not normally feasible to remove large quantities of concrete or other semi-structural material in this manner.
- b. This technique can be used to remediate and improve concrete which has inclusions of soil or low strength concrete. Grouting cannot be expected to restore cross sections in zones of high moment demand. Post-treatment cores or cross-hole sonic logs should show improvement but will not be free of anomalies.

- c. Grouting within the shaft may not be effective if the defects to be treated include zones on the outside of the reinforcing cage in granular soils below groundwater. In such a case, attempts to hydro-blast outside the shaft would erode unstable soils which might be expected to cave. Jet grouting around the perimeter of the shaft is a technique which might be considered.
- d. If the shaft is structurally sufficient except for concerns regarding the concrete cover on the reinforcement, or if a void exists between the outside of the shaft and the soil, then grouting around the perimeter may be considered.

Topic 5. Alternative Repair Methods (i.e., Structural Bridging)

- a. Increase the structural strength of a defective pile without complete removal of the defect.
- b. Install structural steel or pipe section cast into the central portion of the pile with regular or high strength concrete.
- c. This additional member is designed to restore structural strength to meet structural design requirements.
- d. It may be possible to extend a central drilled section into formation below tip to increase geotechnical capacity of the CIDH concrete pile.
- e. Structural enhancement can also be accomplished by drilling holes in the shaft and grouting in additional reinforcing bars (rebar) or high strength bars.
- f. Micropiles can be installed by drilling through the pile to anchor the pile into underlying formation. It may be possible to install these by drilling through existing inspection pipes.

Topic 6. Discuss Mitigation by Supplementation or Replacement

- a. In some cases where the strength or stiffness of a drilled shaft is less than required, the most effective remediation strategy might be to add additional deep foundation elements (CIDH, driven, micropile). These might be designed to supplement or even completely replace the defective CIDH concrete pile.
- b. Incorporating additional deep foundation elements into a common cap with the existing CIDH concrete pile must address the issue of strain compatibility.

Topic 7. Discuss Successful Solutions Used in Past Pile Mitigation

- a. Discuss lessons learned from previously utilized nonstandard mitigation methods and applicability to this mitigation.

Topic 8. Mitigation Plan Design Requirements

- a. Provide the Contractor's mitigation plan designer with design information (i.e., moment and shear diagrams) necessary for completion of mitigation plan.

Topic 9. Additional Testing Requirements

- a. Discuss the need for any additional testing/coring prior to mitigation for further evaluation of the defect, or after the mitigation for conformance testing.

Topic 10. Timelines and Critical Path Activities

- a. Review [Form SC-3810](#), *Pile Mitigation Flowchart*.

Topic 11. Safety

- a. Discuss applicable [Construction Safety Orders](#).
- b. Discuss [Mine Safety Orders](#) and [Tunnel Safety Orders](#) (CIDH piles greater than 30" diameter and deeper than 20').
- c. Discuss day work versus night work concerns.
- d. Discuss other project safety concerns as applicable.

Topic 12. Future Meetings

- a. Discuss the need for CIDH Pile Mitigation Plan Review Meeting.

Topic 13. Action Items / Adjourn

- a. List action items, responsible parties, and due dates.
- b. Adjourn meeting.