



THE ENGINEER'S TOOLBOX

CONSTRUCTABILITY REVIEWS

IS THE JOB BUILDABLE??

Constructability reviews are conducted during various phases of a design effort. The structured review is performed to validate that a project can be built as designed, identify potential construction-related issues and develop & present alternatives to the design team for evaluation. The review is typically performed by a team member who is not directly involved in design document preparations and who is experienced in the construction phases of similarly-scoped projects.

REVIEW THE OVERALL PROJECT

The first step in reviewing a set of drawings is to get a 30,000 foot view of the job as a whole. You need to have a full understanding of your battle space. Where are you? What is your jobsite bounded by? These simple questions are simple but the answers need to be understood in order for you to have a good overall picture of the project.

1.	Construction Constraints - Horizontal
2.	Construction Constraints - Vertical
3.	Construction Constraints - Operational
4.	Outside Coordination Requirements
5.	Construction Schedule / Work Periods
6.	Environmental Issues
7.	Safety Issues
8.	Construction Costs
9.	Permitting / Contracting / Packaging
10.	Technical Review Categories

CONSTRUCTION CONSTRAINTS

- ◆ Right of Way and adjacent properties
- ◆ Adjacent construction contracts
- ◆ Local agency roadways
- ◆ Airspace constraints
- ◆ Below-grade limiters (like utilities, groundwater & soils)
- ◆ Operational impact factors that might effect site access, traffic flow or material delivery)

CONSTRUCTION SCHEDULE & WORK PERIODS

- ◆ Work periods
- ◆ Noise restrictions
- ◆ Lane closure restrictions (daytime, night & weekends)
- ◆ Utility outage periods (or lack thereof)
- ◆ Overall job completion timeframe

DETAILED CATEGORY REVIEW

After you've developed an understanding of the site & project parameters are you ready to dig into the details of the job. Usually, reviewing the individual work groups takes a solid knowledge base & field experience in building the various elements. You have to have seen something actually constructed to assess it.

BRIDGE CONSTRUCTION

- ◆ Material lay down area requirements
- ◆ Crane placement
- ◆ Beam & girder erection planning
- ◆ Temporary support requirements (shoring towers, bracing, coordination with ground-level elements)
- ◆ Traffic patterns bordering the work area causing spatial constraints for construction operations
- ◆ Contractor ingress & egress requirements to the work area
- ◆ Bridge foundation construction considerations

FOUNDATION CONSTRUCTION

- ◆ Foundation type review & optimizing selection
- ◆ Soils report review
- ◆ Equipment spatial requirements
- ◆ Work area access review
- ◆ Crane & material handling operational requirements
- ◆ Vibrations & displacement monitoring requirements

TEMPORARY EARTH RETENTION SYSTEM

- ◆ System type & method selection
- ◆ Site construction logistics & needs
- ◆ Heavy equipment placement locations & restrictions
- ◆ Temporary vs. permanent systems
- ◆ Adjacent areas/use impact effects of selected systems

DRAINAGE & UTILITY COORDINATION

- ◆ Installation relative to traffic staging
- ◆ Pipe jacking & boring construction & operational requirements
- ◆ Temporary earth retention review for deep utilities
- ◆ Temporary drainage needs due to construction staging & maintenance of traffic requirements
- ◆ Utility relocation requirements (underground and aerial)

WORK ZONE CONSTRUCTABILITY

- ◆ Work zones, MOT and construction site access are reviewed:
- ◆ Paving equipment requirements (both for PCC and HMA pavements)
- ◆ Conflicts with adjoining contracts
- ◆ Coordination with adjacent agencies & concurrent projects (detour routes)
- ◆ Work area ingress & egress locations, needs for off-site property easements & use agreements
- ◆ On-site material handling & processing locations (concrete or HMA crushing & recycling, earthwork stockpiling)



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DETAILED CATEGORY REVIEW (CONT'D)

MOT STAGING DEVELOPMENT

- ◆ General sequencing of the work
- ◆ Coordination of traffic stages with underground construction requirements
- ◆ Assess need for off-ROW site access and/or haul roads
- ◆ Temporary concrete barrier requirements

CONSTRUCTION SCHEDULE

- ◆ Overall review of construction scheduling, phasing of work
- ◆ Stage-by-Stage review (MOT phasing or general work package assembly logic)
- ◆ Workforce production forecasting
- ◆ Weather-sensitive work elements & winter shutdown considerations
- ◆ Railroad coordination impacts
- ◆ Long-lead, owner-furnished & material procurement planning
- ◆ Accelerated bridge construction implementation consideration review

FORMATING YOUR REVIEW

When you are assembling your review, you'll likely be red-lining prints and keeping notes. Use sheet/drawing number references with your comments. Be clear with your findings. Provide a suggested solution to your findings: Don't just say "This detail is incorrect" without giving the designer additional input on how the design could be improved.

REVIEW COMMENT FORM		
Reviewer		
Issue No.	Drawing/Sheet Number	Comments
1		General Roadway
1.1		
1.2		
2		Utility Coordination
2.1		
2.2		
3		Structures
3.1		
3.2		
4		Traffic Control
4.1		
4.2		

DEVELOPING YOUR OWN SYSTEM

You will want to setup & customize your own constructability review system and tailor your categories to the types of project elements you're working with. The more accustomed you become to performing reviews the easier the process becomes. Spend as much time as you can reviewing as many facets of the project and the design documents as possible.

ABOUT THE AUTHOR



Bob Hildebranski is a licensed civil engineer with over 30 years of industry experience in road, bridge & heavy civil construction. His website <https://hildebranski.com> is a resource for Resident & Construction Engineers, Construction Project Managers & Civil Engineers to gain practical skills, tools & knowledge that they can apply in their daily work activities.

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