

NEW CULVERT CONSTRUCTION HANDBOOK

The purpose of this handbook is to help the field inspectors find the information they need by listing the different resource documents for a particular subject.

The Article in the specifications and the Section in the Construction Manual are listed directly along with a reference to Appendix A of the handbook, which has a listing of other possible reference documents for each item in the check list.

The first draft of this handbook is being made available for use and review from the field. We encourage any questions, comments or suggestions you have regarding the handbook to be directed to Kyle Frame of the Central Construction Office (Phone 515-239-1619; Office Vision kframe or e-mail at kframe@max.state.ia.us).

Any questions concerning the purpose, intent or clarification of the resource documents or methods of construction will be addressed and added to Appendix B of the handbook as they come in.

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NEW CULVERT CONSTRUCTION

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NEW CULVERT CONSTRUCTION

Staking Check List

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A3, A5, A7, A8		
<input type="checkbox"/>	Staking Layout and Dimensions	A1, A3, A7, A8		Chapter 11 Section 11.21
<input type="checkbox"/>	Staking Control Bench marks and Cross Ties	A1, A3, A5		Chapter 11 Section 11.21
<input type="checkbox"/>	Minimum Staking Requirements	A2	Section 2526 Article 2526.01	
<input type="checkbox"/>	Independent Survey Check Performed	A2, A3, A7	Section 2526 Article 2526.01	Chapter 11 Section 11.21
<input type="checkbox"/>	Surveying Documentation	A2, A3, A7	Section 2526 Article 2526.01	Chapter 11 Section 11.21
<input type="checkbox"/>	Construction Survey Offset Stakes	A5		
<input type="checkbox"/>	Slope Stakes	A5		
<input type="checkbox"/>	Meeting to Review Staking	A3, A7		Chapter 11 Section 11.21
<input type="checkbox"/>	Verify Staking Fits Field Conditions	A5		
<input type="checkbox"/>	Preservation of Stakes	A2, A3, A7	Section 2526 Article 2526.01	Chapter 11 Section 11.21
<input type="checkbox"/>	Periodic Check of Stakes	A3		Chapter 11 Section 11.21

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Excavation and Erosion Control

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A3, A7, A9		
<input type="checkbox"/>	Erosion Control	A2, A3, A9	Section 2525 Article 2525.04	Chapter 7 Section 7.40
<input type="checkbox"/>	Classification of Excavation	A2	Section 2402 Article 2402.11	
<input type="checkbox"/>	Excavation Quantity Limits	A2	Section 2402 Article 2402.01 & 2402.12	
<input type="checkbox"/>	Cross Section Prior to Excavation	A2, A7	Section 2402 Article 2402.12	
<input type="checkbox"/>	Shoring	A1, A2	Section 2402 Article 2402.01	
<input type="checkbox"/>	Drainage Control Foundation Preparation	A2	Section 2402 Article 2402.04	
<input type="checkbox"/>	Foundation Treatment			

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Footing Foundation

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A8		
<input type="checkbox"/>	Check Layout and Dimensions In Footing Area	A1, A2, A8	Articles 2402.03 & 2415.02	
<input type="checkbox"/>	Drainage Control	A2	Section 2402 Article 2402.04	
<input type="checkbox"/>	Proper Grade Material	A2	Section 2402 Articles 2402.04	
<input type="checkbox"/>	Removal of Unsuitable Subgrade Material	A2	Section 2402 Article 2402.04 & 2402.08	
<input type="checkbox"/>	Fine Grading			
<input type="checkbox"/>	Inspection of Excavation	A2	Section 2402 Articles 2402.07	

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Forming

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A3, A7		
<input type="checkbox"/>	Check Layout and Dimensions	A1		
<input type="checkbox"/>	Form Type and Material	A2, A7	Section 2403 Article 2403.07E	
<input type="checkbox"/>	Form Quality	A2, A7	Section 2403 Article 2403.07E	
<input type="checkbox"/>	Form Support and Bracing	A2, A3, A7	Section 2403 Article 2403.07E	Chapter 11 Section 11.82
<input type="checkbox"/>	Chamfers, Fillets and Keyways	A1, A2, A7	Section 2403 Article 2403.07E	
<input type="checkbox"/>	Release Agent	A2	Section 2403 Article 2403.07E	
<input type="checkbox"/>	Culvert Extensions – Preparing Existing Surface	A2	Section 2403 Article 2403.14	
<input type="checkbox"/>	Forms and Falsework Design	A2, A7	Section 2403 Article 2403.17	
<input type="checkbox"/>	Insulated Forms	A2, A3	Section 2403 Article 2403.11	Chapter 11 Section 11.54

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Reinforcing Steel

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A3, A4, A6, A7		
<input type="checkbox"/>	Reinforcing Bar List, Bent Bar Diagram and Layout	A1		
<input type="checkbox"/>	Handling and Storage	A3, A7		Chapter 11 Section 11.42
<input type="checkbox"/>	Bending or Straightening of Reinforcing Steel	A2	Section 2404 Articles 2404.04, 2404.05	
<input type="checkbox"/>	Repair of Damaged Coating	A2, A3	Section 4151 Article 4151.03B	Chapter 11 Section 11.42
<input type="checkbox"/>	Placement and Fastening	A2, A3, A7	Section 2404 Article 2404.06	Section 11.42 & 11.82
<input type="checkbox"/>	Placement and Clearance	A3, A6, A7		Chapter 11 Section 11.82
<input type="checkbox"/>	Reinforcing Supports	A2, A3	Section 2404 Article 2404.07	Chapter 11 Section 11.42
<input type="checkbox"/>	Materials	A4 IM 451.01		
<input type="checkbox"/>	Splicing	A2, A3	Section 2404 Article 2404.08	Section 11.44 & 11.82
<input type="checkbox"/>	Cleaning	A2	Section 2404 Article 2404.03	
<input type="checkbox"/>	Cutting of Reinforcing Steel	A7		

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Concrete Placement

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A3, A7		
<input type="checkbox"/>	Concrete Mix	A1, A2 IM 529	Articles 2301.13, 2415.03 & 2403.01-2403.03	
<input type="checkbox"/>	Admixtures	A2, A3, A7	Section 2403 Article 2403.03	Chapter 11 Section 11.53
<input type="checkbox"/>	Concrete Mixing and Delivery Time	A2, A3, A7	Articles 2403.06, 2301.13D	Chapter 11 Section 11.52
<input type="checkbox"/>	Concrete Testing and Modification	A2, A3, A7 IM's 204,317, 318,327,328	Section 2403 Article 2403.03	Chapter 11 Section 11.52
<input type="checkbox"/>	Placing	A2, A3, A7	Articles 2403.07, 2403.08 & 2415.04	Sections 11.56, 11.82
<input type="checkbox"/>	Vibration	A2, A7	Section 2403 Article 2403.09	
<input type="checkbox"/>	Finishing and Keyways	A2	Articles 2403.07 & 2415.04	
<input type="checkbox"/>	Protection and Curing	A2, A7	Section 2403 Articles 2403.10 & 2403.11	
<input type="checkbox"/>	Strength Requirements and Determination	A2, A7 IM 316	Section 2403 Article 2403.19	
<input type="checkbox"/>	Form Removal Surface Finish and Patching	A2, A3, A7	Section 2403 Articles 2403.18 & 2403.21	Chapter 11 Section 11.82
<input type="checkbox"/>	Checking Temperature of Concrete	A3, A7		Chapter 11 Section 11.54

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Backfill and Erosion Control

	<u>ITEMS TO CHECK</u>	<u>REFERENCE MATERIAL</u>		
		Check List Appendix	Specifications (Check Supplementals)	Construction Manual
<input type="checkbox"/>	Pertinent Documents	A1, A2, A3		
<input type="checkbox"/>	Condition of Site Material	A2	Section 2402 Article 2402.09	
<input type="checkbox"/>	Type of Acceptable Material	A2, A3	Section 2402 Article 2402.09	Chapter 11 Section 11.12
<input type="checkbox"/>	Structural Strength Prior to Backfill	A2	Articles 2402.09, 2403.19	
<input type="checkbox"/>	Backfill Placement and Compaction	A2, A3	Section 2402 Article 2402.09	Chapter 11 Section 11.12
<input type="checkbox"/>	Topsoil Placement and Finish Grading	A1		
<input type="checkbox"/>	Erosion Control Materials	A2	Section 4169	
<input type="checkbox"/>	Stabilizing Crop Seeding	A2	Section 2601 Article 2601.05	
<input type="checkbox"/>	Seedbed Preparation	A2, A3	Section 2601 Article 2601.04A	Chapter 7 Section 7.11
<input type="checkbox"/>	Preparation of Seed	A2, A3	Section 2601 Article 2601.04E	Chapter 7 Section 7.12
<input type="checkbox"/>	Application of Fertilizer	A2	Section 2601 Article 2601.04B	
<input type="checkbox"/>	Application of Seed	A2	Section 2601 Article 2601.04C	
<input type="checkbox"/>	Soil Cover and or Mulching	A2	Section 2601 Articles 2601.04G, 2601.06	
<input type="checkbox"/>	Erosion Stone	A2	Section 4130 Article 4130.05	

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Appendix A – Pertinent Document List

INFORMATION SOURCES	
<input type="checkbox"/>	A1 – Project Plans, Contract / Estimating Proposal, Addenda, Suppl. Specifications & Special Provisions
<input type="checkbox"/>	A2 – Standard Specifications
<input type="checkbox"/>	A3 – Construction Manual
<input type="checkbox"/>	A4 – Instructional Memorandum (IM) Volume II
<input type="checkbox"/>	A5 – Surveyor's Handbook
<input type="checkbox"/>	A6 – Reinforcing Steel Placement Handbook
<input type="checkbox"/>	A7 – Bridge and Culvert Structures Inspection Training Manual
<input type="checkbox"/>	A8 – Culvert Standards
<input type="checkbox"/>	A9 – Standard Road Plans

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Appendix B – Additional Information