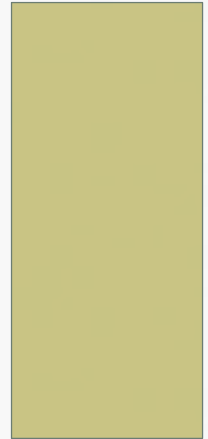


# SIMPLIFIED BRIDGE PROCESS

## EXPLAINED FROM AN ENGINEER'S PERSPECTIVE

JIM HENRY, P.E., P.S., SENIOR PROJECT ENGINEER  
FORMER (RETIRED) KNOX COUNTY ENGINEER



# DEFINITION

## **“Simplified Bridge Process”**

- |                    |  |
|--------------------|--|
| What is it?        | A money-and-time saving tool for County Engineers to use in bridge replacement (LBR funds).  |
| How does it work?  | A simple site specific set of plans (8 sheets) coupled with reference to ODOT standard drawings and a lump sum bid, approx. 15 items. Some confuse it with Design Build. |
| Who can use it?    | It was launched statewide in April-May 2016.   |
| What will happen?  | Applicants have to specify the method when submitting to the CEAO.   |
| What should we do? | Encourage familiarity with the new method of replacement among the County Engineers.   |

# CRITERIA

## Simplified Bridge Process

Concept: Patterned after what several county engineers were doing with OPWC funds, where a bridge foot print was identified, and the prospective contractors bid lump sum and provided stamped shop drawings with their bid. For the pilot program, the criteria to be met were: (Many of them are requirements of LBR program.)

- Short span, nominally not more than 50 to 60 feet
- No right of way issues - adequate existing width
- No in-stream work, so the environmental clearance was simple and non-controversial  
[This means step-back of existing abutments if replaced]
  - No Historical Structures
  - No scenic Rivers
  - No delineated wetlands
- Can't violate the existing lower chord (violation would affect the environmental clearance and require a hydrology study justification for proposed structure)
- Minimum width of bridge 24 ft. (except for low volume roads)
- Off federal aid system
- Less than 50% sufficiency rating if total replacement, less than 80% if abutments re-used (capped) for best ranking
- General appraisal 5 or less
- Minimum right of way width of 40 ft. (60 ft. is preferred)

# ARGUMENTS ADDRESSED

## Arguments against Simplified Bridge Process:

- No one is responsible for design
  - This is countered by: Contractor provides stamped shop drawings for the structural integrity of the super-structure and the abutments (if new) and a load rating
  - Revisions have been made to the process to include consultant responsibility for the design (signed stamped plans), Hec-Ras and scour analysis while the geo-tech consultant is responsible for the abutment design and detail
- There is no mechanism for field revisions with lump sum
  - We have made field revisions on several of the projects successfully, with Change Orders to reflect this

# ODOT SELECTION CRITERIA

SIMPLIFIED BRIDGE PROCESS (SBP) SELECTION CRITERIA: Criteria 1-11 must be met in order to use the Simplified Bridge Process. Criteria 12 and 13 determine level of environmental effort and permit level.	CHECK HERE CRITERION CAN BE MET	CHECK HERE IF CRITERION CANNOT BE MET
1. The bridge structure will be replaced on essentially the existing alignment, profile, and grade.		
2. <b>No new r/w of any type will be required</b> for the demolition/construction of the bridge structure. The existing bridge must be located in the right-of-way as well as the proposed bridge.		
3. The existing bridge structure does not cross a railroad.		
4. The existing bridge structure to be removed is not designated as historic per Buckeye Assets or the ODOT OES Historic Bridge List.		
5. There are no Section 4(f)/6(f) resources/properties located adjacent to the bridge structure. For example, public parks or National Register properties.		
6. Based on the estimate of the beam depth of the new structure, the new structure will meet local flood plain requirements. (Floodplain permit is to be provided by the LPA prior to plan file)		
7. The bridge does not cross and streams designated as Section 10 or Section 9 waters; does not cross any state or national wild or scenic river or within the associated 1000' scenic river corridor.		
8. Wetlands will <b>not</b> be impacted during the demolition or replacement of the bridge structure.		
9. The bridge demolition or replacement does not require any diversion of the stream.		
10. The existing stream channel will not be modified in anyway by the demolition/construction of the bridge structure.		
11. The bridge demolition and replacement can be completed without any type of work that requires cofferdams, or any other type of temporary in-stream fill. This means causeways <b>cannot</b> be constructed.		
12. The project will not result in any <b>work or fill</b> in the water. This means no rock channel protection or any work below the Ordinary High Water Mark (OHWM can be determined by DEC).	No USACE Permit needed/ avoidance plan note needed	Permit needed see #13 below
13. The project will require rock channel protection below the Ordinary High Water Mark and within existing r/w, less than 100' in any direction from the abutment, and can meet the conditions of Army Corps of Engineers (USACE) Nationwide Permit #3/#14.	Apply for USACE Permit	Exceeds NWP permit limits- cannot be processed as SBP

# PROGRAM DETAILS

## SIMPLIFIED BRIDGE PROCESS 2003 TO 2013 CONSTRUCTION KNOX COUNTY

PID	BR. NO.	Township	Road No.	Road Name	SLM	Retired SFN	New SFN	Estimate \$	PID Federal \$ Max	Geo-Tech	R/W (ft)	Proposed Span (ft)
75254	1	Hilliar	CH 21	Croton				PILOT PGM		N	60	44
75254	67	Pike	CH 15	North Liberty				lump sum		N	40	32
75254	3	Pleasant	CH 54	Big Run				incl.all 4 br		N	30	38
75254	150	Wayne	CH 11	Sparta				397,000.00		N	60	54
83294	1	Monroe	CH 8	Gilchrist	3.37	4234057	4234111	226,119.57	575,000	Y	60	43
83294	4	Miller	CH 57	Rangeline	3.66	4233867	4233816	268,909.18		Y	60	69
83294	2	Miller	CH 23	Possum	2.95	4233859	4233808	236,943.25		Y	60	59
83296	178	Clay	CH 17	Hopewell	10.93	4232453	4232526	244,916.63	1,195,000	Y	60	50
83296	192	Harrison	CH 35	Pipesville	1.97	4231325	4231384	197,512.08		Y	36	37
83296	170	Clay	TR 155	Bowman	0.61	4235479	4235428	170,963.17		Y	30	43
83298	10	Clinton	TR 389	Lower Green Valley	2.14	4235576	4235517	249,021.52	1,707,500	Y	40	62
83298	68	Pike	CH 15	North Liberty	7.38	4234456	4234480	193,276.18		Y	40	44
83298	51	Berlin	CH 5	Old Mansfield	8.27	4230442	4230493	204,072.33		Y	60	39
83298	90	Clinton	TR 386	Banning	1.02	4235614	4235673	270,747.35		Y	60	72
84875	157	Clay	CH 73	Deal	1.70	4232445	4232399	286,356.65	400,900	Y	60	60
87384	10	Brown	TR 324	Bear Run	0.11	4235134	4235061	203,615.00	1,343,000	Y	40	53
87384	5	Hilliar	TR 107	Hall	0.75	4235940	4235991	198,200.00		Y	60	41
90583	76	Liberty	TR 382	Dunham	1.18	4236416	4236254	341,924.00	1,118,150	Y	60	60
89154	4	Clay	CH 31	Grove Church	1.32	4232429	4232488	217,700.00		Y	60	46
89155	1	Clinton	CH 7	Granville	0.18	4232615	4232569	194,315.00		Y	60	30
89156	110	Morgan	CH 27	Sycamore	15.22	4231120	4231171	214,888.57		Y	60	39
92964	82	Butler	TR 169	Billman	1.68	4235312	4235363	191,812.10		Y	30	34
92965	11	Brown	TR 324	Bear Run	1.39	4235142	4235088	235,956.25		Y	40	51
92966	21	Liberty	TR 365	Liberty Chapel	1.64	4236408	4236866	213,267.50		Y	60	35
94448	117	Morgan	CH 27	Sycamore	13.31	4232112	4231163	305,000.00	437,950	Y	60	39
98626	65	Miller	TR 135	Ward	1.46	4236823	4231163	295,000.00	434,625		60	
98813	5	Harrison	TR 226	Caves		4235843		318,000.00	420,850			

# BIDDING SIMPLIFIED

## PROPOSAL FORMS - BID BLANK

Bridge Replacement for KNO-CR8  
BF7 / PID 83294

Item	Description	Quantity	Units	Unit Price	Extension
201	Clearing and Grubbing	1.00	LS	\$	\$
202	Portions of Structure Removed	1.00	LS	\$	\$
690	Earthwork, Misc.	1.00	LS	\$	\$
606	Guardrail Items (SEE: Scope of Services)	1.00	LS	\$	\$
690	Pavement, Misc.	1.00	LS	\$	\$
690	Erosion Control, Misc.: Silt fence and mulch items, dump rock fill	1.00	LS	\$	\$
690	Traffic Control, Misc.: Signs, striping, and reflectors; mailbox support replacement	1.00	LS	\$	\$
505	Pile Driving Equipment Mobilization	1.00	LS	\$	\$
507	14" Cast in place, reinforced concrete piles furnished	800.00	LF	\$	\$
507	14" Cast in place, reinforced concrete piles driven	750.00	LF	\$	\$
523	Dynamic load testing	1.00	EA	\$	\$
530	Substructure	1.00	LS	\$	\$
530	Superstructure	1.00	LS	\$	\$
613	Low strength mortar backfill	1.00	LS	\$	\$
614	Maintaining traffic	1.00	LS	\$	\$
623	Construction layout stakes	1.00	LS	\$	\$
624	Mobilization	1.00	LS	\$	\$
TOTAL PROPOSAL:				\$	\$

**E. P. FERRIS**  
JTS  
ASSOCIATES  
INC.

Geotech & Foundation Engineering

# BANNING ROAD





# BANNING ROAD



# LOWER GREEN VALLEY ROAD





# LOWER GREEN VALLEY ROAD



# NORTH LIBERTY ROAD



# NORTH LIBERTY ROAD





# SIMPLIFIED BRIDGE PROCESS TEMPLATE

## Examples of Content:

- Front sheet layout
- Plan and profile sheet with centerline references
  - Including pile type and pay length
  - Existing and proposed structure information
- General Notes
- Pile cut off length and estimated pay length
- Abutment elevations
- Finish deck elevations
- Beam layout plan
- Reinforcing steel list with bending diagram
- Transverse section
  - Composite and non-composite
  - Box-beam shapes
- Deck Plans
  - Various lengths: 39, 49, 59, 64, 69, 79 ft
  - Widths: 20, 24, 28 ft
  - Composite and non-composite
- Abutment types: numerous
- Skew and non-skew

Link to Template CAD Files:

[Simplified Plan Template](#)

# SIMPLIFIED PLAN SHEET TEMPLATES

## Instructions for Use of Simplified Plan Sheet Templates

The intent of this template is to provide a tool for designers to guide them in creating plan sheets when using the simplified plan process. The use of these sheet templates does not relieve the designer of the responsibility to perform the necessary structural calculations and analysis to design a structure in accordance with AASHTO/ODOT specifications. Ultimately, it is the designer's responsibility to verify that the plan sheets reflect a working design.

### Appendices:

- Appendix 1 – Template Prints (11x17, annotated in color)
- Appendix 2 – Template Prints (11x17, annotations off)
- Appendix 3 – Matrix Prints (fit to 11x17 for reference)

### File Naming:

- Sheet template files have generic file name prefix "CRXX\_XXXX".
- Designer shall name files created from the templates using the bridge number following typical ODOT file naming standards per Section 304 of the CADD Engineering Standards Manual. Use "CR" for county route and "TR" for township route.

### Print and Display Settings:

- Sheet template files have been set up with two "Saved Views" included:
  - Scratch Print – displays all data fields and "SC\_Scratch10" level guidance text.
  - Final Print – displays only levels that should be printed in final plots.

INSTRUCTIONS CONTINUE ON NEXT PAGE →

### Sheet Border:



Figure 1: Sheet Border Template

- One sheet border template is provided – CRXX\_XXXXBRDR.dgn (see Figure 1 above).
- This file is referenced to all sheets except Site Plan and Title Sheet.
- Designer is to complete all information in the title block. Refer to Section 102 and Figure 102.5.3 of the 2007 BDM.

# SIMPLIFIED PLAN SHEET TEMPLATES

Title Sheet (1/8) or (1/9):

[illegible]

Figure 2: Title Sheet Template (GT01 version shown; GT02 version similar)

- Two sheet templates are provided (see Figure 2 above):
  - CROQ\_XXXXGT01.dgn – for plans where Contractor provides the box beam design
  - CROQ\_XXXXGT02.dgn – for plans where Designer provides the box beam design
- Select the appropriate sheet template GT01 or GT02.
- Designer to complete all information on title sheet and provide location map.
- Designer to provide list of standard drawings, supplemental specifications, etc.
- Red text on "SC\_Scratch10" level provides additional guidance.

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February 11, 2018

Site Plan (2/8) or (2/9):

**PROYECTO:** DISEÑO DE UN SOPORTE PARA LA MONTAJE DE UN MOTOR ELÉCTRICO

**FECHA:** 10/05/2016

**HOJA:** 1 DE 1

**PROYECTISTA:** J. L. GARCÍA

**REVISOR:** J. L. GARCÍA

**APROBADO:** J. L. GARCÍA

**LISTA DE MATERIALES:**

CANTIDAD	DESCRIPCIÓN
1	ACERO
1	ALUMINIO
1	COPOLIMERO

**DETALLES:**

1. VISTA SUPERIOR

2. VISTA LATERAL DERECHA

3. VISTA LATERAL IZQUIERDA

4. VISTA FRONTAL

5. VISTA TRASERA

6. VISTA DETALLE A

7. VISTA DETALLE B

8. VISTA DETALLE C

9. VISTA DETALLE D

10. VISTA DETALLE E

11. VISTA DETALLE F

12. VISTA DETALLE G

13. VISTA DETALLE H

14. VISTA DETALLE I

15. VISTA DETALLE J

16. VISTA DETALLE K

17. VISTA DETALLE L

18. VISTA DETALLE M

19. VISTA DETALLE N

20. VISTA DETALLE O

21. VISTA DETALLE P

22. VISTA DETALLE Q

23. VISTA DETALLE R

24. VISTA DETALLE S

25. VISTA DETALLE T

26. VISTA DETALLE U

27. VISTA DETALLE V

28. VISTA DETALLE W

29. VISTA DETALLE X

30. VISTA DETALLE Y

31. VISTA DETALLE Z

32. VISTA DETALLE AA

33. VISTA DETALLE AB

34. VISTA DETALLE AC

35. VISTA DETALLE AD

36. VISTA DETALLE AE

37. VISTA DETALLE AF

38. VISTA DETALLE AG

39. VISTA DETALLE AH

40. VISTA DETALLE AI

41. VISTA DETALLE AJ

42. VISTA DETALLE AK

43. VISTA DETALLE AL

44. VISTA DETALLE AM

45. VISTA DETALLE AN

46. VISTA DETALLE AO

47. VISTA DETALLE AP

48. VISTA DETALLE AQ

49. VISTA DETALLE AR

50. VISTA DETALLE AS

51. VISTA DETALLE AT

52. VISTA DETALLE AU

53. VISTA DETALLE AV

54. VISTA DETALLE AW

55. VISTA DETALLE AX

56. VISTA DETALLE AY

57. VISTA DETALLE AZ

58. VISTA DETALLE BA

59. VISTA DETALLE BB

60. VISTA DETALLE BC

61. VISTA DETALLE BD

62. VISTA DETALLE BE

63. VISTA DETALLE BF

64. VISTA DETALLE BG

65. VISTA DETALLE BH

66. VISTA DETALLE BI

67. VISTA DETALLE BJ

68. VISTA DETALLE BK

69. VISTA DETALLE BL

70. VISTA DETALLE BM

71. VISTA DETALLE BN

72. VISTA DETALLE BO

73. VISTA DETALLE BP

74. VISTA DETALLE BQ

75. VISTA DETALLE BR

76. VISTA DETALLE BS

77. VISTA DETALLE BT

78. VISTA DETALLE BU

79. VISTA DETALLE BV

80. VISTA DETALLE BW

81. VISTA DETALLE BX

82. VISTA DETALLE BY

83. VISTA DETALLE BZ

84. VISTA DETALLE CA

85. VISTA DETALLE CB

86. VISTA DETALLE CC

87. VISTA DETALLE CD

88. VISTA DETALLE CE

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93. VISTA DETALLE CJ

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95. VISTA DETALLE CL

96. VISTA DETALLE CM

97. VISTA DETALLE CN

98. VISTA DETALLE CO

99. VISTA DETALLE CP

100. VISTA DETALLE CQ

101. VISTA DETALLE CR

102. VISTA DETALLE CS

103. VISTA DETALLE CT

104. VISTA DETALLE CU

105. VISTA DETALLE CV

106. VISTA DETALLE CW

107. VISTA DETALLE CX

108. VISTA DETALLE CY

109. VISTA DETALLE CZ

110. VISTA DETALLE DA

111. VISTA DETALLE DB

112. VISTA DETALLE DC

113. VISTA DETALLE DD

114. VISTA DETALLE DE

115. VISTA DETALLE DF

116. VISTA DETALLE DG

117. VISTA DETALLE DH

118. VISTA DETALLE DI

119. VISTA DETALLE DJ

120. VISTA DETALLE DK

121. VISTA DETALLE DL

122. VISTA DETALLE DM

123. VISTA DETALLE DN

124. VISTA DETALLE DO

125. VISTA DETALLE DP

126. VISTA DETALLE DQ

127. VISTA DETALLE DR

128. VISTA DETALLE DS

129. VISTA DETALLE DT

130. VISTA DETALLE DU

131. VISTA DETALLE DV

132. VISTA DETALLE DW

133. VISTA DETALLE DX

134. VISTA DETALLE DY

135. VISTA DETALLE DZ

136. VISTA DETALLE EA

137. VISTA DETALLE EB

138. VISTA DETALLE EC

139. VISTA DETALLE ED

140. VISTA DETALLE EE

141. VISTA DETALLE EF

142. VISTA DETALLE EG

143. VISTA DETALLE EH

144. VISTA DETALLE EI

145. VISTA DETALLE EJ

146. VISTA DETALLE EK

147. VISTA DETALLE EL

148. VISTA DETALLE EM

149. VISTA DETALLE EN

150. VISTA DETALLE EO

151. VISTA DETALLE EP

152. VISTA DETALLE EQ

153. VISTA DETALLE ER

154. VISTA DETALLE ES

155. VISTA DETALLE ET

156. VISTA DETALLE EU

157. VISTA DETALLE EV

158. VISTA DETALLE EW

159. VISTA DETALLE EX

160. VISTA DETALLE EY

161. VISTA DETALLE EZ

162. VISTA DETALLE FA

163. VISTA DETALLE FB

164. VISTA DETALLE FC

165. VISTA DETALLE FD

166. VISTA DETALLE FE

167. VISTA DETALLE FF

168. VISTA DETALLE FG

169. VISTA DETALLE FH

170. VISTA DETALLE FI

171. VISTA DETALLE FJ

172. VISTA DETALLE FK

173. VISTA DETALLE FL

174. VISTA DETALLE FM

175. VISTA DETALLE FN

176. VISTA DETALLE FO

177. VISTA DETALLE FP

178. VISTA DETALLE FQ

179. VISTA DETALLE FR

180. VISTA DETALLE FS

181. VISTA DETALLE FT

182. VISTA DETALLE FU

183. VISTA DETALLE FV

184. VISTA DETALLE FW

185. VISTA DETALLE FX

186. VISTA DETALLE FY

187. VISTA DETALLE FZ

188. VISTA DETALLE GA

189. VISTA DETALLE GB

190. VISTA DETALLE GC

191. VISTA DETALLE GD

192. VISTA DETALLE GE

193. VISTA DETALLE GF

194. VISTA DETALLE GG

195. VISTA DETALLE GH

196. VISTA DETALLE GI

197. VISTA DETALLE GJ

198. VISTA DETALLE GK

199. VISTA DETALLE GL

200. VISTA DETALLE GM

201. VISTA DETALLE GN

202. VISTA DETALLE GO

203. VISTA DETALLE GP

204. VISTA DETALLE GQ

205. VISTA DETALLE GR

206. VISTA DETALLE GS

207. VISTA DETALLE GT

208. VISTA DETALLE GU

209. VISTA DETALLE GV

210. VISTA DETALLE GW

211. VISTA DETALLE GX

212. VISTA DETALLE GY

213. VISTA DETALLE GZ

214. VISTA DETALLE HA

215. VISTA DETALLE HB

216. VISTA DETALLE HC

217. VISTA DETALLE HD

218. VISTA DETALLE HE

219. VISTA DETALLE HF

220. VISTA DETALLE HG

221. VISTA DETALLE HH

222. VISTA DETALLE HI

223. VISTA DETALLE HJ

224. VISTA DETALLE HK

225. VISTA DETALLE HL

226. VISTA DETALLE HM

227. VISTA DETALLE HN

228. VISTA DETALLE HO

229. VISTA DETALLE HP

230. VISTA DETALLE HQ

231. VISTA DETALLE HR

232. VISTA DETALLE HS

233. VISTA DETALLE HT

234. VISTA DETALLE HU

235. VISTA DETALLE HV

236. VISTA DETALLE HW

237. VISTA DETALLE HX

238. VISTA DETALLE HY

239. VISTA DETALLE HZ

240. VISTA DETALLE IA

241. VISTA DETALLE IB

242. VISTA DETALLE IC

243. VISTA DETALLE ID

244. VISTA DETALLE IE

245. VISTA DETALLE IF

246. VISTA DETALLE IG

247. VISTA DETALLE IH

248. VISTA DETALLE II

249. VISTA DETALLE IJ

250. VISTA DETALLE IK</

Figure 3: Site Plan Template

- One sheet template is provided – C000\_X000SP01.dgn (see Figure 3 above).
- Attach the survey base map and move/rotate sheet border as required to center the bridge location in the PLAN view area of the sheet.
- Designer is responsible for drafting PLAN and PROFILE views. When drafting the plan, locate the center of the proposed structure at Station 10+00.00 for simplicity if the proposed stationing is being set arbitrarily (e.g., the existing stationing is unknown or it is not being re-established for the project).
- Designer is responsible for providing data required on the Site Plan per *SDM 302.2.1*, including benchmarks, hydraulic data, traffic data. Placeholder text is provided in the template.
- Designer is to complete all information in the title block. Refer to Section 102 and Figure 102.5-3 of the 2007 *SDM*.
- Red text on "SC\_Scratch10" level provides additional guidance.

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Received 21.10.2018



# SIMPLIFIED PLAN SHEET TEMPLATES

## General Notes (3/8) or (3/9):

Figure 4: General Notes Template (Sheet 1 of 2)

- Two sheet templates are provided (see Figure 4 above and Figure 5 next page):
  - CRXX\_XXXXGN01.dgn – for typical general notes and structure-specific notes
  - CRXX\_XXXXGN02.dgn – for maintenance of traffic and pay item notes
- Required to complete "GN01" (shown above):
  1. Provide list of standard drawings and supplemental specifications.
  2. Provide list of all utilities having facilities in project vicinity.
  3. Provide notes on in-stream work or environmental commitments.
  4. Provide Item 202 note specific to project.
  5. Provide appropriate General Note for piles or spread footings.
- Red text on "SC\_Scratch10" level provides additional guidance.

## General Notes (4/8) or (4/9):

Figure 5: General Notes Template (Sheet 2 of 2)

- Two sheet templates are provided (see Figure 4 on previous page and Figure 5 above):
  - CRXX\_XXXXGN01.dgn – for typical general notes and structure-specific notes
  - CRXX\_XXXXGN02.dgn – for maintenance of traffic and pay item notes
- Required to complete "GN02" (shown above):
  1. Provide Maintenance of Traffic notes specific to project.
  2. Provide General Notes to further detail simplified Lump Sum pay items and provide other General Notes as required specific to project.
- Red text on "SC\_Scratch10" level provides additional guidance.

# SIMPLIFIED PLAN SHEET TEMPLATES

Superstructure Details (5/8) or (5/9):

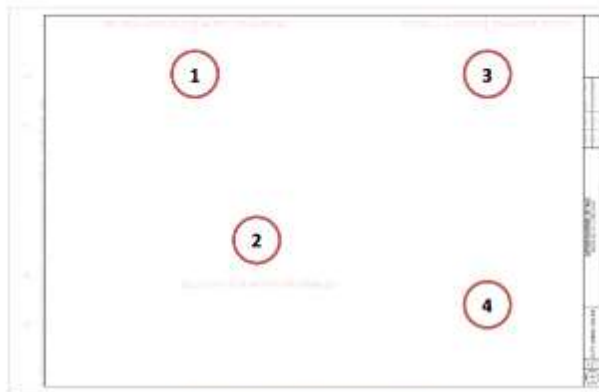


Figure 6: Superstructure Details Template

- One sheet template is provided – CRXX\_XXXXSD01.dgn (see Figure 6 above).
- Required to complete this sheet:
  1. TRANSVERSE SECTION of superstructure.
  2. STRUCTURE LAYOUT AND FRAMING PLAN for bridge.
  3. SECTION A-A through the abutment.
  4. LEGEND AND NOTES as required.
- Refer to "MATRIX-TS.dgn" for examples of Transverse Section and Section A-A.
- Refer to "MATRIX-CP.dgn" for examples of Structure Layout & Framing Plan.
- Designer is responsible for ensuring that all details shown are appropriate for the specific project and revising if required.

Abutment Details (6/8) or (6/9):

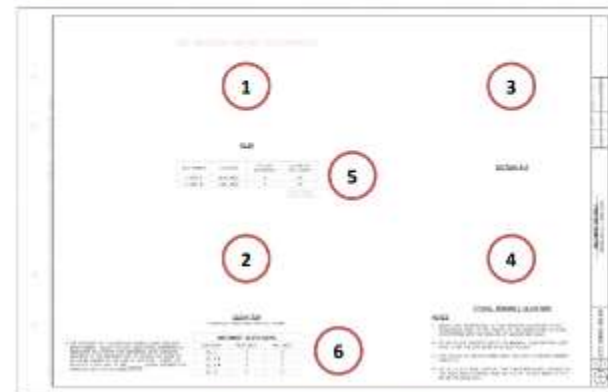


Figure 7: Abutment Details Template

- One sheet template is provided – CRXX\_XXXXSD02.dgn (see Figure 7 above).
- Required to complete this sheet:
  1. PLAN view of abutment.
  2. ELEVATION view of abutment.
  3. SECTION B-B through abutment.
  4. TYPICAL WINGWALL ELEVATION for abutment.
  5. Provide cut-off elevations and estimated pile lengths for piles.
  6. Provide table of abutment elevations.
- Refer to "MATRIX-ABUT.dgn" for examples of Abutment Details.
- Designer is responsible for designing abutment foundations (piles or spread footings).
- Verify that appropriate foundation notes have been included in the General Notes and that all information provided is accurate.
- Designer is responsible for ensuring that all details shown are appropriate for the specific project and revising if required.

# SIMPLIFIED PLAN SHEET TEMPLATES

Box Beam Details (not used) or (7/9):

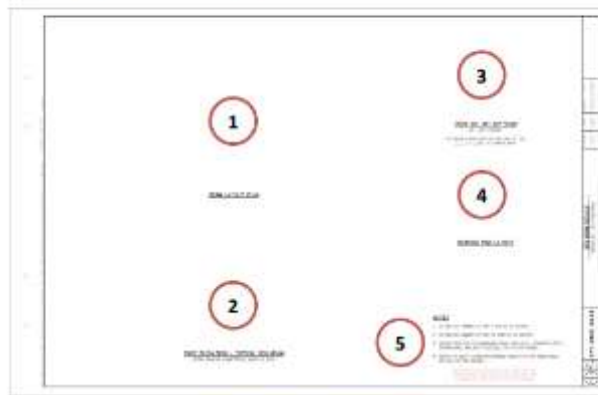


Figure 8: Box Beam Details Template

- One sheet template is provided – C000\_X000SD04.dgn (see Figure 8 above).
- Required to complete this sheet:
  1. BEAM LAYOUT PLAN for box beams.
  2. PART ELEVATION – TYPICAL BOX BEAM for box beams.
  3. BEAM SECTION showing reinforcing and strand locations.
  4. BEARING PAD LAYOUT showing size and placement of bearings.
  5. Provide beam camber notes per ODOT Bridge Design Manual.
- Refer to template for examples of Beam Section and Bearing Pad Layout. Beam Layout Plan and Part Elevation – Typical Box Beam must be drafted as required for the specific project.
- Use this sheet only if designer is providing the box beam design.

2 of 13

Printed 3/10/2017

Deck Plan & End Diaphragm Details (7/8) or (8/9):

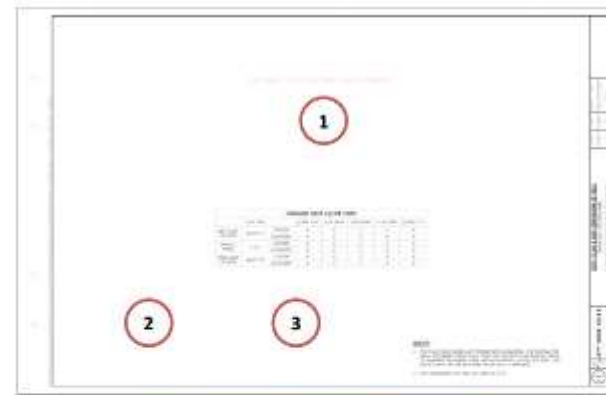


Figure 9: Deck Plan & End Diaphragm Details Template

- One sheet template is provided – CROSS\_SECTION003.dgn (see Figure 5 above).
- Required to complete this sheet:
  1. DECK PLAN for superstructure.
  2. PART ELEVATION of end diaphragm at exterior beam.
  3. SECTION C-C through end diaphragm and end of deck.
- Refer to "MATRIX-DP.dgn" for examples of Deck Slab Plan.
- Refer to "MATRIX-ABUT.dgn" for examples of Part Elevation.
- Refer to "MATRIX-TS.dgn" for examples of Section C-C.
- Designer is responsible for preparing reinforcing steel lists and elevation tables.
- Designer is responsible for ensuring that all details shown are appropriate for the specific project and revising if required.

10474

Protocol 4.16.2019

# SIMPLIFIED PLAN SHEET TEMPLATES

## Reinforcing Steel List (8/8) or (9/9):

Figure 10: Reinforcing Steel List Template

- One sheet template is provided = CR30C\_XXXXRLO1.dgn (see Figure 10 above).
- Required to complete this sheet;
  1. **ABUTMENT REINFORCING STEEL LIST** by designer.
  2. **SUPERSTRUCTURE REINFORCING STEEL LIST** by designer.
  3. **BENDING DIAGRAMS** as determined by designer.
- Designer is responsible for preparing all reinforcing steel lists.
- Designer is responsible for ensuring that all details shown are appropriate for the specific project and revising if required.

## Transverse Section Matrix "MATRIX-TS.dgn" Notes:

- Single-span composite box beam bridges using beam sizes CB17-48, CB21-48, CB27-48, and CB33-48 for bridge widths of 20', 24', 28', and 32' (CB17-48 only).
- Single span non-composite box beam bridges using beam sizes B17-48, B21-48, B27-48, and B33-48 for bridge width of 24'-0".
- Section A-A and Section C-C for composite and non composite box beams.
- All examples use TST-1-99 bridge railing and DS-1-92 drip strip.
- Designer may use the details provided to develop Transverse Sections for other bridge widths not included in the matrix.

## Deck Plan Matrix / Structure Layout & Framing Plan Matrix "MATRIX-DP.dgn" Notes:

- Deck Plan examples for single span composite box beam bridges with no skew
  - Bridge spans from 39'-0" c/c bearing to 79'-0" c/c bearing
  - Bridge widths of 20', 24', and 28'
  - All examples use TST-1-99 bridge railing
- Deck Plan examples for single-span composite box beam bridges with skew
  - Bridge spans, widths, and skews as noted
  - One two-span example is provided
  - Some examples are from projects that used DBR-2-73 bridge railing; these are provided as a guide for designers needing to develop details of bridges with skew that use TST-1-99 bridge railing
- Deck Plan examples for single-span non-composite box beam bridges
  - Two examples are provided, one with skew and one with no skew
  - Some examples are from projects that used DBR-2-73 bridge railing; these are provided as a guide for designers needing to develop details of bridges with skew that use TST-1-99 bridge railing
- Right Side, Structure Layout & Framing Plan examples are provided in similar fashion.
- Stationing shown on Deck Plan and Structure Layout & Framing Plan examples assume the center of the proposed bridge is located at Sta. 10+00.00.
- Designer may use the details provided to develop Deck Plan and Structure Layout & Framing Plan details for other bridge configurations.

# SIMPLIFIED PLAN SHEET TEMPLATES

## Abutment Matrix "MATR00-ABUT.dgn" Notes:

- Abutment examples for composite box beam bridges with no skew
  - Box beam sizes CB17-48, CB21-48, CB27-48, and CB33-48
  - Bridge widths of 20', 24', and 28'
  - Steel piles (left) or reinforced concrete piles (right)
  - All examples use TST-1-99 bridge railing
- Abutment examples for composite box beam bridges with skew, for reference
  - Bridge widths and skews as noted
  - One two-span example is provided also showing pier details
  - Some examples are from projects that used DBR-2-73 bridge railing
- Abutment examples for non-composite box beam bridges, for reference
  - Two examples are provided, one with skew and one with no skew
  - Some examples are from projects that used DBR-2-73 bridge railing
- Abutment and pier examples for a two-span bridge, for reference
- Designer is responsible for designing foundations, determining required number and spacing of piles, and showing the correct type, size, and spacing of piles in plan, elevation, and sections.
- Designer is responsible for determining stationing and elevations for the specific project.
- Designer is responsible for determining a site-appropriate wingwall layout for skewed bridge configurations. Example sketches are included on the right hand side of the drawing showing how both flared and straight wingwalls can be made to accommodate skew angles up to the 30-degree maximum allowed for box beams. For any skew, the joint between the superstructure and diaphragm extension for the top-mounted TST-1-99 railing post and the abutment wingwall is to be parallel to the box beams.
- Designer may use the details provided to develop Abutment details for other bridge configurations.

## Additional Information:

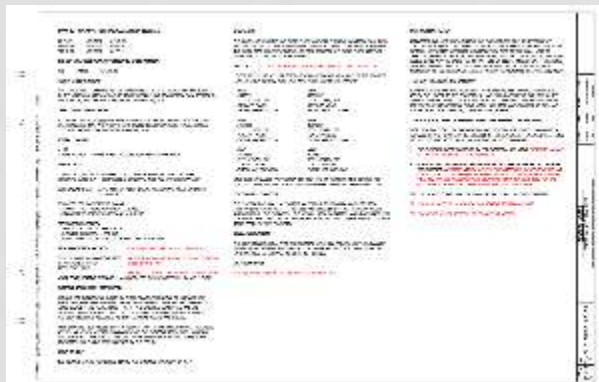
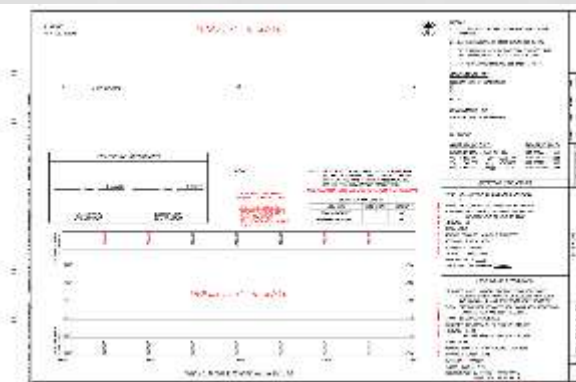
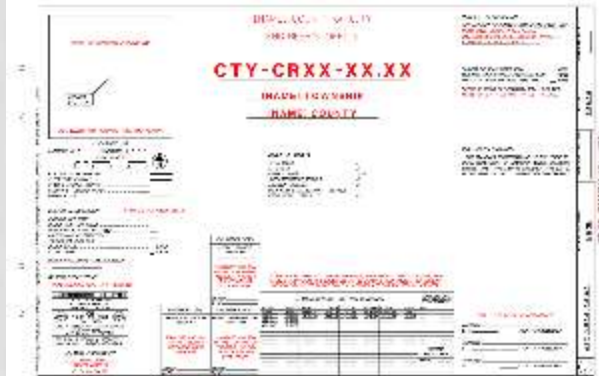
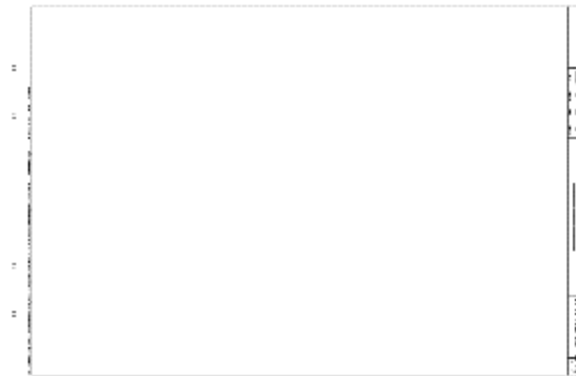
- If the designer provides the box beam design, verify that all sheet numbers have been updated to reflect the additional sheet.
- Sheet numbers used in the templates will also require updating if the templates are used for a bridge where the rear and forward abutments require separate details or a bridge that has multiple spans.
- Upon completion of using the Simplified Plan Sheet Templates, designer shall verify that all details shown are appropriate for the specific project.



# SIMPLIFIED PLAN TEMPLATE

## APPENDIX 1 - TEMPLATE PRINTS

(LUX 17, ANNOTATED IN COLOR)



# SIMPLIFIED PLAN TEMPLATE

[illegible]

A blank sheet of graph paper with a grid pattern. The vertical axis is labeled from 0 to 60 in increments of 10. The horizontal axis is labeled from 0 to 100 in increments of 10. There are some faint markings at the top of the page, possibly indicating a title or date.

Figure 1

Figure 1: A schematic diagram of a 1D lattice system. The top part shows a chain of sites with hopping parameters  $t$  and  $t'$ . A red arrow points to a specific site. Below this, a table lists the hopping parameters for different sites. The table has columns for 'Site', 't', 't'', and 't''.

Site	t	t'	t''
1	1	0	0
2	1	0	0
3	1	0	0
4	1	0	0
5	1	0	0
6	1	0	0
7	1	0	0
8	1	0	0
9	1	0	0
10	1	0	0
11	0	1	0
12	0	1	0
13	0	1	0
14	0	1	0
15	0	1	0
16	0	1	0
17	0	1	0
18	0	1	0
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94	0	1	0
95	0	1	0
96	0	1	0
97	0	1	0
98	0	1	0
99	0	1	0
100	0	1	0

Figure 1: A schematic diagram of a 1D lattice system. The top part shows a chain of sites with hopping parameters  $t$  and  $t'$ . A red arrow points to a specific site. Below this, a table lists the hopping parameters for different sites. The table has columns for 'Site', 't', 't'', and 't''.

[illegible]


DATE: _____		TIME: _____		LOCATION: _____		OBSERVER: _____	
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
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393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408
409	410	411	412	413	414	415	416

# SIMPLIFIED PLAN TEMPLATE

**APPENDIX 2 - TEMPLATE PRINTS**  
(11 X 17, ANNOTATED OFF)

**APPENDIX 2 - TEMPLATE PRINTS**  
(11 X 17, ANNOTATED OFF)

18

		1. NAME OF VESSEL 2. NAME OF CAPTAIN 3. NAME OF MASTER 4. NAME OF OWNER	
5. NAME OF CREW 6. NAME OF ENGINEER 7. NAME OF SURGEON 8. NAME OF CHARTERER		9. NAME OF PASSENGER 10. NAME OF CREW 11. NAME OF ENGINEER 12. NAME OF SURGEON 13. NAME OF CHARTERER	
14. NAME OF CREW 15. NAME OF ENGINEER 16. NAME OF SURGEON 17. NAME OF CHARTERER		18. NAME OF CREW 19. NAME OF ENGINEER 20. NAME OF SURGEON 21. NAME OF CHARTERER	
22. NAME OF CREW 23. NAME OF ENGINEER 24. NAME OF SURGEON 25. NAME OF CHARTERER		26. NAME OF CREW 27. NAME OF ENGINEER 28. NAME OF SURGEON 29. NAME OF CHARTERER	
30. NAME OF CREW 31. NAME OF ENGINEER 32. NAME OF SURGEON 33. NAME OF CHARTERER		34. NAME OF CREW 35. NAME OF ENGINEER 36. NAME OF SURGEON 37. NAME OF CHARTERER	
38. NAME OF CREW 39. NAME OF ENGINEER 40. NAME OF SURGEON 41. NAME OF CHARTERER		42. NAME OF CREW 43. NAME OF ENGINEER 44. NAME OF SURGEON 45. NAME OF CHARTERER	
46. NAME OF CREW 47. NAME OF ENGINEER 48. NAME OF SURGEON 49. NAME OF CHARTERER		50. NAME OF CREW 51. NAME OF ENGINEER 52. NAME OF SURGEON 53. NAME OF CHARTERER	
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70. NAME OF CREW 71. NAME OF ENGINEER 72. NAME OF SURGEON 73. NAME OF CHARTERER		74. NAME OF CREW 75. NAME OF ENGINEER 76. NAME OF SURGEON 77. NAME OF CHARTERER	
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86. NAME OF CREW 87. NAME OF ENGINEER 88. NAME OF SURGEON 89. NAME OF CHARTERER		90. NAME OF CREW 91. NAME OF ENGINEER 92. NAME OF SURGEON 93. NAME OF CHARTERER	
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238. NAME OF CREW 239. NAME OF ENGINEER 240. NAME OF SURGEON 241. NAME OF CHARTERER		242. NAME OF CREW 243. NAME OF ENGINEER 244. NAME OF SURGEON 245. NAME OF CHARTER	

[illegible]

1. NAME OF THE PARTY: \_\_\_\_\_  
 2. ADDRESS: \_\_\_\_\_  
 3. CITY: \_\_\_\_\_  
 4. STATE: \_\_\_\_\_  
 5. ZIP: \_\_\_\_\_  
 6. PHONE: \_\_\_\_\_  
 7. FAX: \_\_\_\_\_  
 8. E-MAIL: \_\_\_\_\_  
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 10. OTHER: \_\_\_\_\_  
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 310. REASON: \_\_\_\_\_  
 311. COMMENTS: \_\_\_\_\_<

1. **GENERAL INFORMATION**  
 a. **NAME** (Last, First, Middle Initial)  
 b. **DATE OF BIRTH** (Month/Day/Year)  
 c. **PLACE OF BIRTH** (City, State, Country)  
 d. **EDUCATION** (High School, College, University)  
 e. **CURRENT ADDRESS** (Street, City, State, Zip)  
 f. **TELEPHONE** (Area Code, Number)  
 g. **RELIGION**  
 h. **MARRITAL STATUS** (Single, Married, Divorced, Widowed)  
 i. **NUMBER OF CHILDREN** (If any, list names and dates of birth)  
 j. **PROFESSION** (Current and previous)  
 k. **SKILLS** (List any special skills or talents)  
 l. **HOBBIES** (List any hobbies or interests)  
 m. **LANGUAGES** (List any languages spoken or written)  
 n. **TRAVEL HISTORY** (List any countries visited)  
 o. **VEHICLE REGISTRATION** (State, License Number)  
 p. **DRIVER'S LICENSE** (State, License Number)  
 q. **CRIMINAL RECORD** (List any arrests or convictions)  
 r. **FINANCIAL STATEMENT** (List any assets, liabilities, and income)  
 s. **REFERENCES** (List any references or contacts)  
 t. **COMMENTS** (Any other information you wish to provide)



# SIMPLIFIED PLAN TEMPLATE

[illegible]

1. IDENTIFICATION		2. ANALYSIS		3. RESULTS	
1.1. NAME	1.2. ADDRESS	2.1. DATE	2.2. TIME	3.1. RESULT	3.2. COMMENTS
1.3. PHONE	1.4. FAX	2.3. LOCATION	2.4. METHOD	3.3. RESULT	3.4. COMMENTS
1.5. EMAIL	1.6. WEBSITE	2.5. ANALYST	2.6. REVIEWER	3.5. RESULT	3.6. COMMENTS
1.7. OTHER	1.8. OTHER	2.7. ANALYST	2.8. REVIEWER	3.7. RESULT	3.8. COMMENTS
1.9. OTHER	1.10. OTHER	2.9. ANALYST	2.10. REVIEWER	3.9. RESULT	3.10. COMMENTS
1.11. OTHER	1.12. OTHER	2.11. ANALYST	2.12. REVIEWER	3.11. RESULT	3.12. COMMENTS
1.13. OTHER	1.14. OTHER	2.13. ANALYST	2.14. REVIEWER	3.13. RESULT	3.14. COMMENTS
1.15. OTHER	1.16. OTHER	2.15. ANALYST	2.16. REVIEWER	3.15. RESULT	3.16. COMMENTS
1.17. OTHER	1.18. OTHER	2.17. ANALYST	2.18. REVIEWER	3.17. RESULT	3.18. COMMENTS
1.19. OTHER	1.20. OTHER	2.19. ANALYST	2.20. REVIEWER	3.19. RESULT	3.20. COMMENTS
1.21. OTHER	1.22. OTHER	2.21. ANALYST	2.22. REVIEWER	3.21. RESULT	3.22. COMMENTS
1.23. OTHER	1.24. OTHER	2.23. ANALYST	2.24. REVIEWER	3.23. RESULT	3.24. COMMENTS
1.25. OTHER	1.26. OTHER	2.25. ANALYST	2.26. REVIEWER	3.25. RESULT	3.26. COMMENTS
1.27. OTHER	1.28. OTHER	2.27. ANALYST	2.28. REVIEWER	3.27. RESULT	3.28. COMMENTS
1.29. OTHER	1.30. OTHER	2.29. ANALYST	2.30. REVIEWER	3.29. RESULT	3.30. COMMENTS
1.31. OTHER	1.32. OTHER	2.31. ANALYST	2.32. REVIEWER	3.31. RESULT	3.32. COMMENTS
1.33. OTHER	1.34. OTHER	2.33. ANALYST	2.34. REVIEWER	3.33. RESULT	3.34. COMMENTS
1.35. OTHER	1.36. OTHER	2.35. ANALYST	2.36. REVIEWER	3.35. RESULT	3.36. COMMENTS
1.37. OTHER	1.38. OTHER	2.37. ANALYST	2.38. REVIEWER	3.37. RESULT	3.38. COMMENTS
1.39. OTHER	1.40. OTHER	2.39. ANALYST	2.40. REVIEWER	3.39. RESULT	3.40. COMMENTS
1.41. OTHER	1.42. OTHER	2.41. ANALYST	2.42. REVIEWER	3.41. RESULT	3.42. COMMENTS
1.43. OTHER	1.44. OTHER	2.43. ANALYST	2.44. REVIEWER	3.43. RESULT	3.44. COMMENTS
1.45. OTHER	1.46. OTHER	2.45. ANALYST	2.46. REVIEWER	3.45. RESULT	3.46. COMMENTS
1.47. OTHER	1.48. OTHER	2.47. ANALYST	2.48. REVIEWER	3.47. RESULT	3.48. COMMENTS
1.49. OTHER	1.50. OTHER	2.49. ANALYST	2.50. REVIEWER	3.49. RESULT	3.50. COMMENTS
1.51. OTHER	1.52. OTHER	2.51. ANALYST	2.52. REVIEWER	3.51. RESULT	3.52. COMMENTS
1.53. OTHER	1.54. OTHER	2.53. ANALYST	2.54. REVIEWER	3.53. RESULT	3.54. COMMENTS
1.55. OTHER	1.56. OTHER	2.55. ANALYST	2.56. REVIEWER	3.55. RESULT	3.56. COMMENTS
1.57. OTHER	1.58. OTHER	2.57. ANALYST	2.58. REVIEWER	3.57. RESULT	3.58. COMMENTS
1.59. OTHER	1.60. OTHER	2.59. ANALYST	2.60. REVIEWER	3.59. RESULT	3.60. COMMENTS
1.61. OTHER	1.62. OTHER	2.61. ANALYST	2.62. REVIEWER	3.61. RESULT	3.62. COMMENTS
1.63. OTHER	1.64. OTHER	2.63. ANALYST	2.64. REVIEWER	3.63. RESULT	3.64. COMMENTS
1.65. OTHER	1.66. OTHER	2.65. ANALYST	2.66. REVIEWER	3.65. RESULT	3.66. COMMENTS
1.67. OTHER	1.68. OTHER	2.67. ANALYST	2.68. REVIEWER	3.67. RESULT	3.68. COMMENTS
1.69. OTHER	1.70. OTHER	2.69. ANALYST	2.70. REVIEWER	3.69. RESULT	3.70. COMMENTS
1.71. OTHER	1.72. OTHER	2.71. ANALYST	2.72. REVIEWER	3.71. RESULT	3.72. COMMENTS
1.73. OTHER	1.74. OTHER	2.73. ANALYST	2.74. REVIEWER	3.73. RESULT	3.74. COMMENTS
1.75. OTHER	1.76. OTHER	2.75. ANALYST	2.76. REVIEWER	3.75. RESULT	3.76. COMMENTS
1.77. OTHER	1.78. OTHER	2.77. ANALYST	2.78. REVIEWER	3.77. RESULT	3.78. COMMENTS
1.79. OTHER	1.80. OTHER	2.79. ANALYST	2.80. REVIEWER	3.79. RESULT	3.80. COMMENTS
1.81. OTHER	1.82. OTHER	2.81. ANALYST	2.82. REVIEWER	3.81. RESULT	3.82. COMMENTS
1.83. OTHER	1.84. OTHER	2.83. ANALYST	2.84. REVIEWER	3.83. RESULT	3.84. COMMENTS
1.85. OTHER	1.86. OTHER	2.85. ANALYST	2.86. REVIEWER	3.85. RESULT	3.86. COMMENTS
1.87. OTHER	1.88. OTHER	2.87. ANALYST	2.88. REVIEWER	3.87. RESULT	3.88. COMMENTS
1.89. OTHER	1.90. OTHER	2.89. ANALYST	2.90. REVIEWER	3.89. RESULT	3.90. COMMENTS
1.91. OTHER	1.92. OTHER	2.91. ANALYST	2.92. REVIEWER	3.91. RESULT	3.92. COMMENTS
1.93. OTHER	1.94. OTHER	2.93. ANALYST	2.94. REVIEWER	3.93. RESULT	3.94. COMMENTS
1.95. OTHER	1.96. OTHER	2.95. ANALYST	2.96. REVIEWER	3.95. RESULT	3.96. COMMENTS
1.97. OTHER	1.98. OTHER	2.97. ANALYST	2.98. REVIEWER	3.97. RESULT	3.98. COMMENTS
1.99. OTHER	1.100. OTHER	2.99. ANALYST	2.100. REVIEWER	3.99. RESULT	

Figure 1 consists of four subplots arranged in a 2x2 grid, showing the evolution of the normalized magnetic field  $B/B_0$  over time  $t$ . The top row shows results for a 1000000 particle simulation, and the bottom row shows results for a 100000 particle simulation. The left column is for a 1000000 particle simulation, and the right column is for a 100000 particle simulation. Each plot shows  $B/B_0$  on the y-axis (ranging from 0.9 to 1.1) and  $t$  on the x-axis (ranging from 0 to 100). The plots show a sharp initial drop in  $B/B_0$  followed by a gradual recovery and oscillations. The 1000000 particle simulation shows more pronounced oscillations than the 100000 particle simulation.

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# SIMPLIFIED PLAN TEMPLATE

## APPENDIX 3 - MATRIX PRINTS

[FIT TO 11 X 17 FOR REFERENCE]

