

TABLE OF CONTENTS
Level 2 Inspection Manual

1.0	CHAPTER 1 – INTRODUCTION.....	1-1
1.1	INTRODUCTION	1-1
1.2	LEVEL OF INSPECTION	1-1
1.2.1	LEVEL 1 INSPECTIONS.....	1-1
1.2.2	LEVEL 2 INSPECTIONS.....	1-1
1.2.2.1	Types of Level 2 Inspections	1-2
1.3	ITEMS COMMON TO LEVEL 2 FORMS	1-2
1.3.1	BRIDGE STATIONING AND ELEMENT NUMBERING.....	1-2
1.3.1.1	Longitudinal Direction	1-3
1.3.1.2	Transverse Direction	1-3
1.3.1.3	Adding or Removing Elements.....	1-4
1.3.1.4	Intersections	1-4
1.3.2	INVENTORY DATA.....	1-4
1.3.2.1	Bridge File Number.....	1-4
1.3.2.2	Legal Land Location	1-4
1.3.2.3	Latitude/Longitude	1-5
1.3.2.4	Road Authority and Region (Road Auth./Region)	1-5
1.3.2.5	Bridge Or Town Name.....	1-5
1.3.2.6	Stream Name	1-6
1.3.2.7	Highway Number And Control Section (Highway #:Cntrl Sec).....	1-6
1.3.2.8	Road Classification.....	1-6
1.3.2.9	Average Annual Daily Traffic (AADT/Year)	1-7
1.3.2.10	Detour Length.....	1-7
1.3.2.11	Structure Usage.....	1-7
1.3.2.12	Year Built	1-7
1.3.2.13	Clear Roadway and Skew	1-8
1.3.3	SCHEDULING INFORMATION FIELDS	1-8
1.3.3.1	Previous Inspection Date.....	1-9
1.3.3.2	Inspection Required Date (Insp. Req'd Date: ____Based On)	1-9
1.3.3.3	Current Inspection Date.....	1-9
1.3.3.4	Inspector's Code.....	1-9
1.4	ADDITIONAL INVENTORY INFORMATION.....	1-9
1.4.1	NUMBER OF SPANS (NO. OF SPANS).....	1-10
1.4.2	SPAN TYPES.....	1-10
1.4.3	SUBSTRUCTURE TYPES	1-10
1.4.4	SPAN LENGTHS	1-11
1.4.5	TOTAL LENGTH	1-11
1.4.6	COMMENT FIELDS.....	1-11
1.5	THE LAST PAGE OF THE LEVEL 2 FORMS	1-11
1.5.1	LEVEL 1 INSPECTION (INFORMATION ONLY)	1-11
1.5.2	ITEMS REQUIRING IMMEDIATE ATTENTION.....	1-12
1.5.3	LEVEL 2 INSPECTION SPECIAL REQUIREMENTS	1-12
1.5.4	INSPECTOR.....	1-13
1.5.4.1	Recommendations for Adjustments to the Inspection Schedule.....	1-13
1.5.4.2	Inspector Information and Inspector's Team Information.....	1-13
1.5.4.3	Miscellaneous Comments	1-13

1.5.5	REVIEWER.....	1-14
1.5.5.1	Review Date	1-14
1.5.5.2	Approved Adjustments to the Bridge Inspection Schedule	1-14
1.5.5.3	Reviewer Information.....	1-14
1.5.5.4	Miscellaneous Comments	1-14
1.5.5.5	Default Number of Inspections	1-15
1.5.5.6	Default Cycle	1-15
1.5.5.7	Number Completed To Date	1-15
1.5.5.8	Next Inspection Required Date	1-15
2.0	CHAPTER 2 – CONCRETE DECK INSPECTION (CDK2).....	2-1
2.1	INTRODUCTION	2-1
2.1.1	PURPOSE OF LEVEL 2 CONCRETE DECK INSPECTIONS	2-1
2.2	LEVEL 2 ELEMENT RATINGS.....	2-2
2.2.1	PERCENT INSPECTED (%/I) AND RATING BREAKDOWN	2-2
2.2.2	CONDITION LAST / CONDITION NOW	2-3
2.2.3	COMMENT FIELDS.....	2-4
2.2.4	FOLLOW-UP ACTION.....	2-4
2.2.5	CRACK WIDTHS	2-4
2.2.6	SCALING.....	2-5
2.2.7	SPALLING	2-5
2.2.8	STAINING.....	2-5
2.2.8.1	Stained Cracks	2-6
2.3	THE CDK2 FORM - STRUCTURE INVENTORY INFORMATION	2-6
2.3.1	ADDITIONAL STRUCTURE INVENTORY INFORMATION.....	2-6
2.4	WEARING SURFACES	2-6
2.4.1	WEARING SURFACE INVENTORY INFORMATION	2-7
2.4.2	WEARING SURFACE INSPECTION	2-8
2.4.2.1	Rating Wearing Surfaces.....	2-8
2.4.2.2	Measured Damage	2-10
2.4.2.3	Comments	2-11
2.5	CONCRETE OVERLAYS	2-11
2.5.1	CONCRETE OVERLAY INVENTORY INFORMATION	2-11
2.5.2	CONCRETE OVERLAY INSPECTION.....	2-13
2.5.2.1	Rating Concrete Overlays	2-13
2.5.2.2	Measured Damage – Concrete Overlay.....	2-14
2.6	CONCRETE DECKS.....	2-15
2.6.1	CONCRETE DECK INVENTORY INFORMATION.....	2-15
2.6.2	CONCRETE DECK INSPECTION ITEMS.....	2-17
2.6.2.1	Deck Top Ratings	2-17
2.6.2.2	Measured Damage – Deck Top	2-18
2.6.2.3	Deck Underside Ratings.....	2-19
2.6.2.4	Measured Damage – Deck Underside	2-20
2.7	EDGE ELEMENTS	2-21
2.7.1	CURB, PARAPET, MEDIAN, AND SIDEWALK INVENTORY INFORMATION	2-21
2.7.2	CURB AND PARAPET INSPECTION ITEMS	2-22
2.7.2.1	Curb/Parapet Ratings by Length (Curb/Parapets rtg, % len.).....	2-23
2.7.2.2	Measured Damage – Curbs and Parapets.....	2-24
2.7.3	MEDIAN AND SIDEWALK INSPECTION ITEMS.....	2-25

2.7.3.1	Median/Sidewalk Ratings by Percent Area (Medians/ Sidewalks rtg, % area)	2-25
2.7.3.2	Measured Damage - Medians and Sidewalks	2-26
2.8	DECK JOINT INSPECTIONS	2-27
2.8.1	DECK JOINT INVENTORY INFORMATION	2-27
2.8.2	DECK JOINT INSPECTION ITEMS	2-28
2.8.2.1	Percent of Deck Joints Inspected (%/I)	2-28
2.8.2.2	Percent of Joints That Leak (Leakage - % Jts)	2-28
2.8.2.3	Percent of Joint Length That Leaks (Leakage - % Len)	2-29
2.8.2.4	Superstructure and Substructure Damage Rating (Sup, Sub)	2-29
2.8.2.5	Level 1 Joint Rating (L1 Jnt Rtg)	2-31
2.9	OTHER CDK2 DATA – LAST PAGE	2-32
2.10	CONCRETE DECK INSPECTION SUPPLEMENT	2-32
3.0	CHAPTER 3 – COPPER SULFATE ELECTRODE TESTING (CSE2)	3-1
3.1	INTRODUCTION AND BACKGROUND	3-1
3.1.1	THE CORROSION PROCESS	3-1
3.1.2	CSE TESTING IN ALBERTA	3-1
3.1.3	THE PURPOSE OF CSE TESTING	3-2
3.1.4	INTERPRETATION OF CSE TEST RESULTS	3-2
3.1.5	TESTING CYCLE	3-3
3.2	ESSENTIAL TEST EQUIPMENT	3-3
3.2.1	THE COPPER-COPPER SULFATE ELECTRODE HALF-CELL	3-3
3.2.1.1	Maintaining the Half-Cell	3-3
3.2.2	THE VOLTMETER	3-4
3.2.3	ELECTRICAL LEAD WIRE (GROUNDING WIRE)	3-4
3.3	TEST METHOD	3-4
3.3.1	LOCATE THE CSE TEST ORIGIN	3-4
3.3.1.1	Skewed Bridges	3-5
3.3.2	CSE TEST LOCATIONS	3-7
3.3.2.1	Marking Out Test Locations	3-7
3.3.2.2	Test Locations on Curbs, Medians, and Parapets	3-7
3.3.3	CLEANLINESS OF TEST LOCATIONS	3-8
3.3.4	WETTING THE DECK	3-8
3.3.4.1	Wetting Agent	3-9
3.3.5	ELECTRICAL CONTINUITY	3-9
3.3.5.1	Verifying the Electrical Continuity	3-10
3.3.5.2	The Ground Connection	3-10
3.3.5.3	Multiple Ground Connections	3-11
3.3.5.4	Connecting the Voltmeter	3-11
3.3.6	CSE TESTING	3-11
3.3.6.1	Concrete Patches	3-11
3.3.6.2	Verifying CSE Test Results	3-12
3.4	THE CSE2 FORM – STRUCTURE INVENTORY INFORMATION	3-12
3.4.1	ADDITIONAL STRUCTURE INVENTORY INFORMATION	3-12
3.5	WEATHER INFORMATION (WEATHER CONDITIONS, TEMP __ °C)	3-13
3.6	SITE AND TESTING EQUIPMENT INFORMATION	3-13
3.6.1	TEST EQUIPMENT MAKE AND MODEL NUMBER (EQUIPMENT MAKE AND MODEL No.)	3-13
3.6.2	X INCREMENT (LENGTH) INFORMATION (NUMBER, LENGTH OF EACH, LENGTH OF LAST)	3-13

3.6.3	Y INCREMENT (WIDTH) INFORMATION (NUMBER, LENGTH OF EACH, LENGTH OF LAST)....	3-14
3.6.4	ORIGIN FOR DATA	3-14
3.6.5	ELECTRICAL GROUND LOCATION AND TYPE	3-14
3.7	CSE READINGS AND RESULTS.....	3-14
3.7.1	SPAN INFORMATION (SPAN GROUP, SPAN TYPE, AND SPAN NUMBERS).....	3-14
3.7.2	CSE TEST YEAR (YEAR)	3-15
3.7.3	WEARING SURFACE TYPE	3-15
3.7.4	PERCENTAGE OF DECK AREA IN THE RANGE INDICATED.....	3-15
3.7.5	AVERAGE READINGS AND STANDARD DEVIATION FOR DECK AND CURBS	3-16
3.7.5.1	Comments	3-17
3.8	OTHER CSE2 DATA – LAST PAGE.....	3-17
3.9	SUPPLEMENTARY INFORMATION	3-17
4.0	CHAPTER 4 – CHLORIDE TESTING (CHL2)	4-1
4.1	INTRODUCTION	4-1
4.1.1	BACKGROUND - THE NEED TO DETERMINE CHLORIDE CONTENT	4-1
4.2	TEST METHOD	4-2
4.2.1	MARK OUT THE TEST LOCATIONS	4-2
4.2.2	PULVERIZE THE CONCRETE SAMPLE	4-2
4.2.3	COLLECT THE CONCRETE SAMPLE	4-2
4.2.4	PREVENT CROSS-CONTAMINATION.....	4-2
4.2.5	FILL TEST HOLES.....	4-3
4.2.6	RAPID CHLORIDE TESTS	4-3
4.3	TESTING LOCATIONS	4-4
4.3.1	REPRESENTATIVE TEST LOCATIONS	4-4
4.3.1.1	Testing Through a Waterproof Membrane	4-5
4.3.2	SAMPLING DEPTHS	4-5
4.3.2.1	Typical Sample Depths.....	4-6
4.3.2.2	Additional Sample Depths	4-7
4.3.3	LABELING OF SAMPLES	4-7
4.4	QUALITY ASSURANCE	4-7
4.4.1	LABORATORY TESTING.....	4-8
4.4.2	PERIODIC CHECKS WITH KNOWN CHLORIDE CONCENTRATIONS	4-8
4.5	THE CHL2 FORM – STRUCTURE INVENTORY INFORMATION	4-8
4.5.1	ADDITIONAL STRUCTURE INVENTORY INFORMATION.....	4-8
4.6	LEVEL 2 CHLORIDE TESTING SUMMARY – PAGE 1	4-9
4.6.1	TEST EQUIPMENT MAKE AND MODEL.....	4-9
4.6.2	NUMBER OF COMPONENTS TESTED.....	4-9
4.6.3	COMPONENT NUMBER (COMP No.), TYPE (COMP TYPE), AND DESCRIPTION	4-9
4.6.4	SAMPLE DEPTHS AND AVERAGE CHLORIDE CONCENTRATIONS (DEPTH (MM) AND AVG. % CL) 4-9	
4.6.5	COMMENTS	4-10
4.7	REPORTING CHLORIDE TEST RESULTS – PAGE 2	4-10
4.7.1	CHLORIDE TEST DATA – HEADER INFORMATION:	4-10
4.7.1.1	Component Number (Component No.)	4-10
4.7.1.2	Component Type	4-10
4.7.1.3	Component Description	4-11

4.7.2	RAPID CHLORIDE TEST RESULTS	4-11
4.7.2.1	Recording Chloride Test Location (Test Location)	4-11
4.7.2.2	Sample Number and Chloride Concentration (No., Depth (mm), % CL)	4-12
4.7.2.3	Sample Depth (Depth (mm))	4-12
4.7.2.4	Chloride Concentration (% CL)	4-12
4.7.3	RECORDING LABORATORY CHLORIDE TEST RESULTS	4-13
4.7.4	AVERAGE OF CHLORIDE TEST RESULTS	4-13
4.8	OTHER CHL2 DATA – LAST PAGE	4-14
4.9	ADDITIONAL INFORMATION TO PROVIDE TO THE DEPARTMENT	4-14
4.10	ALBERTA TRANSPORTATION TLT-520 TEST PROCEDURE	4-14
5.0	CHAPTER 5 – ULTRASONIC TRUSS INSPECTIONS	5-1
5.1	INTRODUCTION AND BACKGROUND	5-1
5.1.1	THE HISTORY OF ULTRASONIC TRUSS INSPECTIONS	5-1
5.2	GENERAL ULTRASONIC TESTING INFORMATION AND TRUSS BEHAVIOUR	5-2
5.3	TRUSS AND MEMBER IDENTIFICATION	5-2
5.3.1	SPAN NUMBERING	5-2
5.3.2	TRUSS MEMBER NOTATION	5-3
5.3.3	TRUSS MEMBER REFERENCES RELATIVE TO STEEL DESIGN DRAWINGS	5-4
5.3.4	BRIDGE FILE NUMBER	5-4
5.3.5	TRUSS IDENTIFICATION NUMBER ('A' NUMBER)	5-4
5.4	PREPARATION FOR LEVEL 2 TRUSS INSPECTIONS	5-5
5.5	GENERAL SAFETY PRECAUTIONS	5-6
5.6	VISUAL INSPECTION	5-6
5.7	ULTRASONIC INSPECTION	5-7
5.8	REPORTING - THE LEVEL 2 TRUSS INSPECTION FORMS	5-8
5.8.1	THE TRUSS DIAGRAM	5-9
5.8.1.1	Direction	5-9
5.8.1.2	Fixed or Expansion Bearings	5-9
5.8.1.3	Truss Description (_____ TRUSS)	5-9
5.8.2	FOOTER INFORMATION	5-10
5.8.2.1	Bridge Name	5-10
5.8.2.2	Span Number (SPAN NO. ____ OF ____)	5-10
5.8.2.3	Inspection Date (DATE)	5-10
5.8.2.4	Bridge File Number (FILE)	5-10
5.8.2.5	Truss Identification Number (TRUSS IDENT: A _____)	5-10
5.8.2.6	Number of Truss Panels	5-10
5.8.2.7	Span Length (_____ FT./M. SPAN)	5-11
5.8.2.8	Inspector	5-11
5.8.3	THE BODY OF THE LEVEL 2 TRUSS INSPECTION FORMS	5-11
5.8.3.1	Member, A End and B End	5-11
5.8.3.2	Ultrasonic Inspections, A End and B End	5-11
5.8.3.3	Other Items	5-12
5.8.3.4	Accept/Reject Member	5-12
5.8.4	GENERAL REPORTING NOTES	5-12
5.9	REPORTING – THE LINE DIAGRAM	5-13
5.10	INSPECTION SUMMARY AND RECOMMENDATIONS SHEETS	5-15
5.10.1	HEADER INFORMATION	5-15

5.10.1.1	File	5-15
5.10.1.2	Bridge Name.....	5-15
5.10.1.3	Truss Identification Numbers (Truss Ident. No's.).....	5-15
5.10.1.4	Inspection Date.....	5-15
5.10.2	RECOMMENDATIONS ARISING FROM INSPECTION.....	5-16
5.10.2.1	Truss Identification (Truss Ident.).....	5-16
5.10.2.2	Problem Item	5-16
5.10.2.3	Recommendation	5-16
5.10.2.4	Page Reference (Page Ref.)	5-16
5.10.2.5	Authorized/Remarks	5-17
5.10.2.6	Date	5-17
5.10.2.7	General Comments	5-17
6.0	CHAPTER 6 – CULVERT BARREL MEASUREMENTS (SBM2).....	6-1
6.1	INTRODUCTION	6-1
6.2	CULVERT INVENTORY INFORMATION	6-1
6.2.1	NUMBER OF CULVERTS.....	6-2
6.2.2	PIPE NUMBER.....	6-2
6.2.3	DESIGN SPAN (OR DIAMETER) / RISE	6-2
6.2.4	CULVERT TYPE.....	6-3
6.2.5	LENGTH.....	6-3
6.2.6	CORRUGATION PROFILE.....	6-3
6.2.7	PLATE THICKNESS	6-3
6.2.8	NUMBER OF RINGS	6-4
6.2.9	ARC RADII AND CIRCUMFERENTIAL N COUNTS (TOP, SIDE, BOTTOM & CORNER ARCS).....	6-4
6.2.10	SPECIAL FEATURES	6-5
6.3	LEVEL 2 INSPECTION SUMMARY – PAGE 1.....	6-5
6.3.1	TOTAL NUMBER OF PIPES (OR SEGMENTS) MEASURED.....	6-5
6.3.2	PIPE NUMBER.....	6-6
6.3.3	MEASURED (Y/N).....	6-6
6.3.4	NUMBER OF MEASUREMENTS.....	6-6
6.3.5	NUMBER OF RINGS MEASURED	6-6
6.3.6	COMMENTS	6-6
6.4	INSPECTION DATA – PAGE 2	6-6
6.4.1	INSPECTION DATA – HEADER INFORMATION:.....	6-7
6.4.1.1	Pipe Number (Pipe No.)	6-7
6.4.1.2	Number of Measurements (No. of Measurements).....	6-7
6.4.1.3	Rings Measured	6-7
6.4.2	LEVEL 2 MEASUREMENTS	6-7
6.4.2.1	Ring Number (Rng No.).....	6-8
6.4.2.2	Ring Length (Ring Len.)	6-8
6.4.2.3	Station (Stn.).....	6-8
6.4.2.4	Span	6-9
6.4.2.5	Deflection (Def. %)	6-9
6.4.2.6	Rise.....	6-10
6.4.2.7	Sag (Sag %)	6-10
6.4.2.8	ICE.....	6-10
6.4.2.9	Longitudinal Cracks	6-11
6.4.2.9.1	Number of Longitudinal Cracks (Longitudinal Cracks - #)	6-12

6.4.2.9.2	Location of Longitudinal Cracks (Longitudinal Cracks - Location * * *)	6-12
6.4.2.9.3	Minimum Steel Remaining Between Bolts (Longitudinal Cracks - Min St.)	6-13
6.4.2.9.4	Number of Cracked Bolts Holes (Longitudinal Cracks - # Blts)	6-13
6.4.2.10	Comment Lines	6-13
6.4.3	BARREL RATING CONDITION SUMMARY (SBM2 RATING SUM.)	6-13
6.4.3.1	Percent Inspected (%/I)	6-13
6.4.3.2	Percent of the Inspected Pipe in Each Rating Category (9-7, 6/5, 4, 3, 2/1)	6-14
6.5	OTHER SBM2 ITEMS – LAST PAGE	6-14
7.0	CHAPTER 7 – VERTICAL CLEARANCE MEASUREMENTS (VCL2)	7-1
7.1	INTRODUCTION	7-1
7.2	GENERAL VERTICAL CLEARANCE INFORMATION	7-1
7.2.1	POSTING REQUIREMENTS	7-1
7.3	MEASURING THE VERTICAL CLEARANCE	7-2
7.3.1	ROADWAY COMPONENTS	7-2
7.3.2	LOCATION OF VERTICAL CLEARANCE MEASUREMENTS	7-2
7.4	INVENTORY INFORMATION	7-3
7.4.1	ADDITIONAL STRUCTURE INVENTORY INFORMATION	7-3
7.4.2	POSTED VERTICAL CLEARANCE (Y/N)	7-4
7.4.3	DESCRIPTION OF VERTICAL CLEARANCE SIGNS ON BRIDGE	7-4
7.4.4	POSTED SIGNS IN ADVANCE (Y/N)	7-4
7.4.5	REMARKS	7-4
7.5	LEVEL 2 VERTICAL CLEARANCE SUMMARY INFORMATION – PAGE 1	7-5
7.5.1	ROADWAY COMPONENTS (___BL)	7-5
7.5.2	CLEARANCE RESTRICTIONS OVER OR UNDER THE BRIDGE STRUCTURE (O/U ___)	7-6
7.5.3	LAST AND NOW COLUMNS	7-6
7.5.4	MINIMUM MEASURED CLEARANCE	7-6
7.5.5	CALCULATED POSTING CLEARANCE	7-6
7.5.6	EXISTING POSTING ON BRIDGE	7-6
7.5.7	EXISTING POSTING IN ADVANCE	7-6
7.5.8	REVISE POSTING (Y/N ___)	7-6
7.5.9	COMMENT LINES	7-7
7.6	INSPECTION DATA WORKSHEET – PAGE 2	7-7
7.6.1	SPAN IDENTIFICATION (SPAN ID)	7-7
7.6.2	ROADWAY COMPONENTS (___BL)	7-8
7.6.3	CLEARANCE RESTRICTIONS OVER OR UNDER THE BRIDGE STRUCTURE (O/U ___)	7-8
7.6.4	LOCATION (LOC.)	7-8
7.6.5	LAST AND NOW COLUMNS	7-9
7.6.6	MINIMUM (MIN.)	7-9
7.6.7	COMMENT LINES	7-9
7.7	OTHER VCL2 ITEMS – LAST PAGE	7-9
8.0	CHAPTER 8 - TIMBER CORING	8-1
8.1	INTRODUCTION	8-1
8.2	SAFETY	8-1
8.3	TOOLS AND EQUIPMENT	8-2

8.4	CORING PROCEDURE	8-2
8.5	BIM LEVEL 2 TIMBER CORING FORM	8-3
8.5.1	FILLING OUT TIMBER CORING FORM.....	8-3
8.5.2	RATING GUIDELINES	8-3
8.6	ADDITIONAL INFORMATION	8-4