

TABLE OF CONTENTS

LETTER OF TRANSMITTAL

CORPORATE AUTHORIZATION

ACKNOWLEDGEMENT

EXECUTIVE SUMMARY

	Page No.
1.0 INTRODUCTION & BACKGROUND	1
1.1 General.....	1
1.2 Background Information	1
1.3 Study Purpose and Objectives	1
1.4 Project Deliverables.....	2
1.5 Key Issues, Constraints and Opportunities.....	3
1.5.1 Resolution of Competing Interests	3
1.5.2 Historical Resources Challenges	3
1.5.3 Bridge Replacement Opportunities	4
1.5.4 Steep Grades on South Approaches.....	4
1.5.5 Hairpin Curve at Saskatchewan Drive/Queen Elizabeth Park Road	4
1.5.6 Environmental Issues.....	4
1.5.7 Utilities	4
1.5.8 Construction Staging and Related Traffic Accommodation	5
1.6 Other Project Influences	5
1.6.1 Transportation Master Plan, “The Way We Move,” Bylaw 15101....	5
1.6.2 Capital City Downtown Plan	5
1.6.3 Walterdale Bridge Crossing Strategic Planning Concept Study, 2008	6
1.6.4 West Rosedale Urban Design Plan	6
1.6.5 EPCOR Power Plant Repurposing.....	6
1.6.6 Grade Separated Pedestrian Accommodation	6
1.6.7 Alberta Legislature Centre Redevelopment Master Plan	7
1.6.8 Bicycle Transportation Plan (BTP) and Cycling	7
1.6.9 Alberta’s Capital City Integrated Planning and Design Initiative.....	7

1.6.10	South Bank	7
1.6.11	River.....	7
2.0	PROJECT EVALUATION	8
2.1	Project Workshop (Start-Up).....	8
2.2	Design Criteria.....	8
2.3	Option Development and Evaluation	8
2.4	Bridge Option Development	8
2.5	Public Involvement	9
2.6	Historical Resources.....	10
2.7	Environmental Program.....	11
2.7.1	Data Gap Analysis	11
2.7.2	Environmental Permitting and Approvals	12
2.8	Collision Statistics.....	13
2.9	Traffic Analysis	13
2.9.1	Network Traffic Analysis.....	13
2.9.1.1	Background	13
2.9.1.2	Network Assumptions	13
2.9.1.3	Analysis Options	14
2.9.2	Analysis and Results.....	14
2.9.2.1	System-wide Analysis.....	14
2.9.2.2	Comparison of Options	16
2.9.2.3	Closure of Existing Bridge	17
2.9.2.4	Kinsmen Sports Centre Access	17
2.10	Geotechnical Considerations.....	18
2.10.1	Introduction	18
2.10.2	South Slope Geology	18
2.10.3	Preliminary Assessment of Route Options.....	18
2.10.3.1	Alignment Option 1	18
2.10.3.2	Alignment Option 4	19
2.10.3.3	Alignment Option 3	19
2.10.3.4	Alignment Option 2	19
2.10.4	Geotechnical Ranking of Alternative Alignments	19
2.11	Artist Selection.....	20
3.0	ROADWAY/BRIDGE ALIGNMENT OPTIONS	21
3.1	General.....	21
3.1.1	Option 1 – Base Option.....	21

3.1.2	Option 2 – Grade Separation at Saskatchewan Drive	21
3.1.3	Option 3 – Grade Separation at River Valley Road	22
3.1.4	Option 4 – Realigned Bridge Crossing 280 m East	22
3.2	Conceptual Road/Bridge Alignment Recommendation	23
3.2.1	North Side of the River	23
3.2.2	Bridge Crossing	23
3.2.3	South Side of River	25
3.2.3.1	Do Nothing Option	25
3.2.3.2	Grade Separation – Queen Elizabeth Park Road under Saskatchewan Drive	25
3.2.3.3	Modified At-Grade Intersection – Gateway Boulevard and Saskatchewan Drive	26
3.2.3.4	Grade Separated Gateway Boulevard under Saskatchewan Drive	26
3.3	Interim Road Alignment Option Conclusions	26
3.3.1	North of the River	26
3.3.2	River Crossing	26
3.3.3	South Side of River – Top of Bank	27
3.3.4	Interim Road Alignment Option Summary	27
3.4	River Crossing Alignment Evaluation	27
3.5	Bridge Cross-Section Evaluation (3 Lanes vs. 4 Lanes)	30
3.5.1	Cost	30
3.5.2	Construction of the New Bridge	31
3.5.3	Estimated Use of a Southbound Lane	31
3.5.4	Impact on the Existing Cemetery and Interpretive Belvedere	32
3.6	Recommended Roadway	32
3.7	109 Street / Walterdale Hill Road Bus Lane Elimination	33
3.7.1	Option 1	33
3.7.2	Option 2	34
3.7.3	Option 3	35
3.7.4	Recommendation	35
4.0	BRIDGE CONCEPT DEVELOPMENT	37
4.1	Introduction	37
4.2	Existing Bridge	37
4.3	Bridge Evaluation Criteria	41

4.4	Downtown and Parks Plans.....	42
4.5	Structural Design Criteria	42
4.6	Hydrotechnical Considerations.....	42
4.7	Geotechnical Considerations.....	43
4.8	Existing Pedestrian and Bicycle Circulation.....	45
4.9	Roadway Geometry and Related Issues	45
4.10	Bridge Alternatives	46
4.10.1	General	46
4.10.2	Girder Precedents	46
4.10.3	Extradosed Precedents.....	47
4.10.4	Arch Precedents.....	47
4.10.5	Cable Stayed Precedents	47
4.10.6	Pedestrian and Bicyclist Precedents	48
4.10.7	Design Detail Precedents.....	48
4.11	Girder Alternative.....	48
4.11.1	Structural System.....	48
4.11.2	Girder Types.....	48
4.11.3	Spans	49
4.11.4	Design and Construction Considerations	49
4.12	Extradosed Alternative	49
4.12.1	Structural System	49
4.12.2	Girder Types	50
4.12.3	Spans.....	50
4.12.4	Design and Construction Considerations	50
4.13	Arch Alternative	51
4.13.1	Structural System.....	51
4.13.2	Arch Rib Types.....	51
4.13.3	Spans.....	51
4.13.4	Design and Construction Considerations	51
4.14	Cable Stayed Alternative	52
4.14.1	Structural System.....	52
4.14.2	Cable Stay Tower.....	52

4.14.3	Spans	52
4.14.4	Design and Construction Considerations	53
4.15	Costs for Bridge Alternatives	53
4.15.1	Initial Costs	53
4.15.2	Life Cycle Costs.....	55
4.16	Discussion and Recommendation	55
4.17	Conceptual Design of Preferred Alternative	62
4.17.1	Structural Design and Details.....	62
4.17.2	Architectural Design and Details	63
4.17.3	Urban Design and Integration.....	64
4.17.4	Public Art.....	65
4.18	Costs for Preferred Arch Alternative	66
4.18.1	Initial Costs	66
4.18.2	Life Cycle Costs	66
4.18.3	Enhancements	67
4.19	Constructability	68
4.20	Schedule	69
4.21	Summary and Conclusions.....	69
5.0	SUPPORTING STUDIES	71
5.1	Utilities.....	71
5.2	Drainage.....	72
5.3	Geotechnical.....	73
5.3.1	Subsurface Conditions	73
5.3.2	Alignment Alternatives on South Valley Slope	74
5.3.3	Bridge Foundations	74
5.4	Historical Resources.....	75
5.4.1	'Statement of Justification'	75
5.4.2	General Background	76
5.4.3	Community Engagement.....	76
5.4.4	General Considerations	77
5.4.5	Moving Forward	78
5.5	Environmental.....	78

6.0 COST SUMMARY 81
7.0 PUBLIC INVOLVEMENT 82
8.0 SUMMARY AND CONCLUSIONS 85

EXHIBITS

- Exhibit 1.1 – Key Issues**
- Exhibit 1.2 – Land Use Integration**
- Exhibit 2.1 – Collision Data**
- Exhibit 2.2 – Estimated Future Traffic Volumes - Road Network Option 1**
- Exhibit 2.3 – Estimated Future Traffic Volumes - Road Network Option 2**
- Exhibit 2.4 – Estimated Future Traffic Volumes - Road Network Option 3**
- Exhibit 2.5 – Estimated Future Traffic Volumes - Road Network Option 4**
- Exhibit 2.6 – Walterdale Bridge – Access to Kinsmen Options**
- Exhibit 3.1 – Walterdale Bridge Replacement - Option 1**
- Exhibit 3.2 – Walterdale Bridge Replacement - Option 2**
- Exhibit 3.3 – Walterdale Bridge Replacement - Option 3**
- Exhibit 3.4 – Walterdale Bridge Replacement - Option 4**
- Exhibit 3.5 – Walterdale Bridge Replacement - Base Bridge Option**
- Exhibit 3.6 – Walterdale Bridge Replacement - West Bridge Alignment Option**
- Exhibit 3.7 – Walterdale Bridge Replacement - East Bridge Alignment Option**
- Exhibit 3.8 – Walterdale Bridge Replacement - Proposed Improvement at Saskatchewan Drive Detail – Option 2**
- Exhibit 3.9 – Walterdale Bridge Replacement - Proposed Improvement at Saskatchewan Drive Detail – Option 3**
- Exhibit 3.10 – Proposed Improvement at Saskatchewan Drive Detail – Option 4**
- Exhibit 3.11 – Walterdale Bridge Replacement - Concept Planning Study - Plan**
- Exhibit 3.12 – Walterdale Hill Road Profile Bridge – Base Alignment Option**
- Exhibit 3.13 – Queen Elizabeth Park Road (Left Lane) to Kinsmen Profile – Base Alignment Option**
- Exhibit 3.14 – Walterdale Bridge Replacement Concept Planning Study – Typical Cross-Sections**
- Exhibit 3.15 – Recommended Plan – Ground Disturbance**
- Exhibit 3.16 – 105 Street (Walterdale) Bridge Study, Option 1**
- Exhibit 3.17 – 105 Street (Walterdale) Bridge Study, Option 2**
- Exhibit 3.18 – 105 Street (Walterdale) Bridge Study, Option 3**
- Exhibit 4.1 – Downtown and Parks Plan**
- Exhibit 4.2 – Design and Overload Trucks**
- Exhibit 4.3 – Existing Open Space, Bicycle and Pedestrian Network**
- Exhibit 4.4 – Valley and Context – Existing Views and Destinations**
- Exhibit 4.5 – Girder Bridge Precedents**
- Exhibit 4.6 – Extradosed Bridge Precedents**
- Exhibit 4.7 – Arch Bridge Precedents**
- Exhibit 4.8 – Cable-Stayed Bridge Precedents**
- Exhibit 4.9 – Pedestrian Bridge Precedents**

- Exhibit 4.10** – Design Detail Precedents
- Exhibit 4.11A** – Girder Alternative
- Exhibit 4.11B** – Girder Alternative Section in Valley
- Exhibit 4.11C** – Girder Alternative Viewpoint Renderings
- Exhibit 4.12A** – Extradosed Alternative
- Exhibit 4.12B** – Extradosed Alternative Section in Valley
- Exhibit 4.12C** – Extradosed Alternative Viewpoint Renderings
- Exhibit 4.13A** – Arch Alternative
- Exhibit 4.13B** – Arch Alternative Section in Valley
- Exhibit 4.13C** – Arch Alternative Viewpoint Renderings
- Exhibit 4.14A** – Cable Stayed Alternative
- Exhibit 4.14B** – Cable Stayed Alternative Section in Valley
- Exhibit 4.14C** – Cable Stayed Alternative Viewpoint Renderings
- Exhibit 4.15A** – Arch Concept – Bridge Elevation
- Exhibit 4.15B** – Architectural Elevation
- Exhibit 4.16A** – Arch Concept – Structural Deck Sections
- Exhibit 4.16B** – Architectural Elevation
- Exhibit 4.17** – Isometric Section
- Exhibit 4.18** – Rendering – Summer View, Looking West Along River
- Exhibit 4.19** – Bridge View – Standing on East Walk looking North
- Exhibit 4.20** – Rendering – Night-time View, Looking Northwest Toward Legislature
- Exhibit 4.21** – Rendering – Winter View, Looking From North Bank Southward
- BWAL-111-S01** – Conceptual Design – Recommended Arch Alternative
- BWAL-111-S02** – Conceptual Design – Abutment Conceptual Layout
- Exhibit 5.1** – Existing Open Space, Bicycle and Pedestrian Network
- Exhibit 5.2** – Valley and Context – Existing Views and Destinations
- Exhibit 5.3** – CCDP – Promenade – RVA – Plan Area 4
- Exhibit 5.4** – Roadway Approach Site Impact – Option 1
- Exhibit 5.5** – Roadway Approach Site Impact – Option 2

APPENDICES

Appendix A – Utilities

- Minutes
- Plans

Appendix B – Drainage Report

Appendix C – Geotechnical

Appendix D – Historical Resources

- Correspondence
- Statement of Justification

Appendix E – Environmental

Appendix F – Public Involvement

Appendix G – Option Evaluations

- Evaluation
- Exhibits

Appendix H – Public Art