**Seismic Project Identification Report**

**REPORT NO. SPIR-XX-XX**

**for**

**BLOCK #XX-X (BLOCK NAME)**

**SCHOOL NAME**

**School Address**

**Facility No: xxxxxxx**

**School District No. XX
Name of School District**

**Structural Engineering Guidelines for the
Performance-based Seismic Assessment and Retrofit of
Low-rise British Columbia School**

| No. | Technical Topic | Summary |  |  |
| --- | --- | --- | --- | --- |
| 1 | School Name and School District |  |
| 2 | Block No. / Name |  |
| 3 | Floor Area |  |
| 4 | Year, Number of Storeys andType of Construction |  |
| 5 | Soil Type |  | (Structural EngineerProfessional Seal and Signature) |
| 6 | Liquefaction Potential |  |  |
| 7 | Risk (H1/H2/H3/M/L) |  |  |
| 8 | Life Safety Retrofit Features |  |  |
| 9 | Phased Retrofit Features |  |  |
| 10 | Enhanced Performance Retrofit Features |  |  |
| 11 | Schedule |  | Date |
| 12 | Construction Risks |  |
| 13 | Cost Estimates |  |
| 14 | PDR Requirements |  |
|  |  |  |  |  |

|  **CHAPTER Section Title Page** |
| --- |
|  **PREFACE** | (ii) |
|  **SPIR SUMMARY** | (iii) |
| **1.0 BLOCK PHOTOGRAPHS** | 1-1 |
| **2.0 KEY PLAN AND ADJACENCY** | 2-1 |
| **3.0 BASIC EXISTING BLOCK DATA** | 3-1 |
| **4.0 PRINCIPAL ELEMENTS OF EXISTING BLOCK** |  |
|  Vertical Load-bearing Supports (VLS) | 4-1 |
|  LDRSs | 4-1 |
|  Out-of-Plane URM Walls | 4-2 |
|  Roof Diaphragm | 4-2 |
|  Floor Diaphragm | 4-3 |
|  Connections | 4-4 |
|  Liquefaction | 4-5 |
| **5.0 RETROFIT PRIORITY RANKING FOR EXISTING BLOCK** | 5-1 |
| **6.0 RETROFIT OVERVIEW** | 6-1 |
| **7.0 PHASED RETROFIT** |  |
|  Retrofit Concept | 7-1 |
|  Retrofit LDRSs | 7-3 |
|  Reference SPIRs | 7-3 |
|  Scope of Retrofit | 7-3 |
|  Retrofit Cost Estimate | 7-3 |
|  Schedule | 7-4 |
|  Construction Risks | 7-4 |
| **8.0 LIFE SAFETY RETROFIT** |  |
|  Retrofit Concept | 8-1 |
|  Retrofit LDRSs | 8-3 |
|  Reference SPIRs | 8-3 |
|  Scope of Retrofit | 8-3 |
|  Retrofit Cost Estimate | 8-3 |
|  Schedule | 8-4 |
|  Construction Risks | 8-4 |
| **9.0 ENHANCED PERFORMANCE RETROFIT** | 9-1 |
| **10.0 ARCHITECTURAL, MECHANICAL AND ELECTRICAL ENGINEERING SCOPE OF WORK** | 10-1 |
| **11.0 PDR TRB REQUIREMENTS** | 11-1 |
|  **APPENDIX A: SCOPE OF RETROFIT DETAILS** | A-1 |
|  **APPENDIX B: SCOPE OF ARCHITECTURAL, MECHANICAL AND ELECTRICAL ENGINEERING WORK** | B-1 |
|  **APPENDIX C: RETROFIT COST ESTIMATE REPORT** | C-1 |
|  **APPENDIX D: LIQUEFACTION STRUCTURAL DETAILS** | D-1 |
|  **APPENDIX E: REPRESENTATIVE STRUCTURAL DETAILS** | E-1 |
|  **APPENDIX F: PHOTOGRAPHS** | F-1 |
|  **APPENDIX G: RELEVANT REFERENCE DOCUMENTS** | G-1 |

**Figure 1.1: Elevation – Wing**

**Figure 1.2: Elevation – Wing**

**Figure 2.1: Key Plan for**

|  |
| --- |
| **Identification of Retrofit Block (Box #2-1)** |
|  |
| **Adjacency (Box #2-2)** |
|[ ]  No Significant Adjacency Issues |
|[ ]  Significant Adjacency Issues |
| **Adjacency Comments (Box #2-3)** |
|  |

|  |  |  |
| --- | --- | --- |
| **School District (Box #3-1)** |  | **Block Name (Box #3-2)** |
|  |  |  |
| **Structural Firm (Box #3-3)** |  | **Engineer-of-Record (Box #3-4)** |
|  |  |  |
| **Years of Construction (Box #3-5)** |  | **Floor Area (Box #3-6)** |
|  |  |  |  |  |
| **Construction Type (Box #3-7)** |  | **Site Classification (Box #3-8)** |
|  |  |  |  |  |
| **Comments on Construction Type (Box #3-9)** |
|  |
| **Number of Storeys (Box #3-10)** | **Clear Storey Heights (Box #3-11)** |
|  |  |  |
| **Previous Seismic Upgrade (Box #3-12)**  |
|[ ]  No |
|[ ]  Yes |
| **Previous Seismic Upgrade Details (Box #3-13)** |
|  |

|  |
| --- |
| **List of Testing Reports (Box #3-14)** |
|  |

**(1) Vertical Load-bearing Supports (VLS)**

|  |  |  |
| --- | --- | --- |
| **VLS Type (Box #4-1)** |  |  |
|  |  |  |
| **VLS DDL (Box #4-2)** |  |  |
|  |  |  |
| **Supports Description (Box #4-3)** |
|  |
| **(2) LDRSs** |
| **Number of LDRS Prototypes (Box #4-4)** |
|  |  |  |  |  |
| **LDRS Prototype Details (Box #4-5)** |
| **Shaking Direction** | **Prototype No.** | **LDRS Prototype Description** | **Max DDL** | **Capacity** |
|  |  |  |  |  |
| **Comments on LDRS Prototypes (Box #4-6)** |
|  |

**(3) Out-of-Plane URM Walls**

|  |
| --- |
| **URM Walls (Box #4-7)** |
|[ ]  No |
|[ ]  Yes |
| **Out-of-Plane Prototype Details (Box #4-8)** |
| **Prototype No.** | **Prototype Description** | **Max.Height** | **WallThickness** | **Surcharge** |
|  |  |  |  |  |
| **Comments on Out-of-Plane Prototypes (Box #4-9)** |
|  |

**(4) Roof Diaphragm**

|  |
| --- |
| **Roof Diaphragm Material (Box #4-10)** |
|[ ]  Wood |[ ]  Concrete |
|[ ]  Steel Deck |[ ]  Braced Steel |
| **Roof Diaphragm Prototype Details (Box #4-11)** |
| **Prototype No.** | **Roof Diaphragm Prototype Description** | **Span** | **Max.Movement** | **Capacity** |
|  |  |  |  |  |
| **Comments on Roof Diaphragm (Box #4-12)** |
|  |

**(5) Floor Diaphragm**

|  |
| --- |
| **Floor Diaphragm Material (Box #4-13)** |
|[ ]  Wood |[ ]  Concrete |
|[ ]  Steel Deck with Concrete Topping |  |
| **Floor Diaphragm Prototype Details (Box #4-14)** |
| **Prototype No.** | **Floor Diaphragm Prototype Description** | **Span** | **Max.Movement** | **Capacity** |
|  |  |  |  |  |
| **Comments on Floor Diaphragm (Box #4-15)** |
|  |

**(6) Connections**

|  |
| --- |
| **Connection Risk (Box #4-16)** |
| **Connection** | **C/D** | **Non-Brittle** | **Risk** |
| VLS / Roof Diaphragm |  |[ ]  Yes |  |
|  |  |[ ]  No |  |
| VLS / Floor Diaphragm |  |[ ]  Yes |  |
|  |  |[ ]  No |  |
| Roof Diaphragm / LDRS |  |[ ]  Yes |  |
|  |  |[ ]  No |  |
| Floor Diaphragm / LDRS |  |[ ]  Yes |  |
|  |  |[ ]  No |  |
| LDRS / Foundation |  |[ ]  Yes |  |
|  |  |[ ]  No |  |
| Other (Specify) |  |[ ]  Yes |  |
|  |  |[ ]  No |  |
| **Note**: (1) Connections do not have an assigned RPR value (Chapter 5)(2) Connection risk is determined as below:(a) H (High): brittle connections with C/D < 1.0(b) M (Medium): brittle connections with 1.0 ≤ C/D < 2.0 non-brittle connections with 0.5 ≤ C/D > 1.0(c) L (Low): brittle connections with C/D ≥ 2.0 non-brittle connections with C/D ≥ 1.0(3) In Note (2) above, capacity (C) values are overstrength values. |
| **Comments on Connections (Box #4-17)** |
|  |

**(7) Liquefaction**

|  |
| --- |
| **Liquefaction Potential (Box #4-18)** |
| Significant Risk of Liquefaction forHazard Return Period of 2500 Years |[ ]  Yes |  |
|  |[ ]  No |  |
| **Liquefaction Movement (Box #4-19)** |
| Risk of Significant VerticalDifferential Movement |[ ]  Yes |  |
|  |[ ]  No |  |
| Risk of Punching Failure | [ ]  | Yes |  |
|  | [ ]  | No |  |
| Risk of Significant HorizontalDifferential Movement |[ ]  Yes |  |
|  |[ ]  No |  |
| **Comments on Risk of Liquefaction (Box #4-20)** |
|  |

|  |
| --- |
| **Comments on Risk of Vertical Differential Movement (Box #4-21)** |
|  |

|  |
| --- |
| **Comments on Risk of Punching Failure (Box #4-22)** |
|  |

|  |
| --- |
| **Comments on Risk of Horizontal Differential Movement (Box #4-23)** |
|  |

|  |
| --- |
| **Risk Assessment Results (Box #5-1)** |
| **Principal Element** | **PrototypeNo.** | **Prototype Description** | **PDE** | **RPR(2)** |
| LDRS |  |  |  |  |
| Diaphragm |  |  |  | – |
| Out-of-Plane |  |  |  |  |
| **Maximum PDE / RPR** |  |  |
| **Liquefaction Risk**  |  |
| **Existing Block Retrofit Priority Ranking** |  |
| **Note:**(1)RPR – Retrofit Priority Ranking(2) Liquefaction is not assigned a PDE value. The RPR value is assigned for liquefaction on the following basis:(a) H (High): significant risk of structural failure due to liquefaction movement(b) L (Low): no significant risk of structural failure due to liquefaction movement(3) Maximum assigned RPR for an out-of-plane element is H3 for non load-bearing walls and is not restricted for load-bearing walls.(4) Diaphragms do not have an assigned RPR value (refer to Guidelines and Commentary). |
| **Comments on Seismic Deficiencies, Recommended Testing and Risk Assessment Results(Box #5-2)** |
|  |

|  |
| --- |
| **Retrofit Options Documented (Box #6-1)** |
| **No.** | **Retrofit Performance Level** | **Chapter** |
|  |  |  |
|  |  |  |
|  |  |  |
| **Comments on Documented Retrofit Options (Box #6-2)** |
|  |

**(1) Retrofit Concept**

**Figure 7.1: Typical Section –**

**Figure 7.2: Typical Section –**

|  |
| --- |
| **Comments on Figure 7.1 and Figure 7.2 (Box #7-1)** |
|  |
| **(2) Retrofit LDRSs** |
| **Number of Retrofit LDRS Prototypes (Box #7-2)** |
|  |  |  |  |  |  |
| **Retrofit LDRS Prototype Details (Box #7-3)** |
| **Shaking Direction** | **Prototype No.** | **LDRS Prototype Description** | **Max PDE** | **Max DDL** | **Rm** |
|  |  |  |  |  |  |
| **Comments on Retrofit LDRS Prototypes (Box #7-4)** |
|  |

**(3) Reference SPIRs**

|  |
| --- |
| **Reference SPIRs (Box #7-5)** |
| **Reference SPIR No.** | **Reference SPIR Description** | **Retrofit Cost($ / m2)** |
|  |  |  |
| **Comments:** |

**(4) Scope of Retrofit**

Refer to Appendix A for details on the scope of work for both the structural and non-structural retrofits.

**(5) Retrofit Cost Estimate**

Refer to Appendix B for details on the retrofit cost estimate for the phased retrofit. A summary of the phased retrofit is given on page (iii).

**(6) Schedule**

|  |
| --- |
| **Schedule (Box #7-6)** |
| Duration of Construction Period | months |
| **Comments on Operational Disruption:** |

**(7) Construction Risks**

|  |
| --- |
| **Risks (Box #7-7)** |
| **Risk Description** | **Significant Risk** |
| Asbestos |[ ]  Yes |[ ]  No |
| Vermiculite |[ ]  Yes |[ ]  No |
| Lead Paint |[ ]  Yes |[ ]  No |
| **Risk Management Comments (Box #7-8)** |
|  |

**(1) Retrofit Concept**

**Figure 8.1: Typical Section –**

**Figure 8.2: Typical Section –**

|  |
| --- |
| **Comments on Figure 8.1 and Figure 8.2 (Box #8-1)** |
|  |
| **(2) Retrofit LDRSs** |
| **Number of Retrofit LDRS Prototypes (Box #8-2)** |
|  |  |  |  |  |  |
| **Retrofit LDRS Prototype Details (Box #8-3)** |
| **Shaking Direction** | **Prototype No.** | **LDRS Prototype Description** | **Max PDE** | **Max DDL** | **Rm** |
|  |  |  |  |  |  |
| **Comments on Retrofit LDRS Prototypes (Box #8-4)** |
|  |

**(3) Liquefaction Retrofit**

**Figure 8.3: Typical Section for Liquefaction Retrofit**

|  |
| --- |
| **Comments on Figure 8.3 (Box #8-5)** |
|  |

**(4) Reference SPIRs**

|  |
| --- |
| **Reference SPIRs (Box #8-6)** |
| **Reference SPIR No.** | **Reference SPIR Description** | **Retrofit Cost($ / m2)** |
|  |  |  |
| **Comments:** |

**(5) Scope of Retrofit**

Refer to Appendix A for details on the scope of work for both the structural and non-structural retrofits.

**(6) Retrofit Cost Estimate**

Refer to Appendix B for details on the retrofit cost estimate for the life safety retrofit. A summary of the life safety retrofit is given on page (iii). Note that the retrofit cost estimate includes the liquefaction retrofit, where applicable.

**(7) Schedule**

|  |
| --- |
| **Schedule (Box #8-7)** |
| Duration of Construction Period | months |
| **Comments on Operational Disruption:** |

**(8) Construction Risks**

|  |
| --- |
| **Risks (Box #8-8)** |
| **Risk Description** | **Significant Risk** |
| Asbestos |[ ]  Yes |[ ]  No |
| Vermiculite |[ ]  Yes |[ ]  No |
| Lead Paint |[ ]  Yes |[ ]  No |
| **Risk Management Comments (Box #8-9)** |
|  |

|  |
| --- |
| **Summary of Enhanced Performance Retrofit (Box #9-1)** |
|  |

|  |
| --- |
| **Architectural Scope of Work (Box #10-1)** |
|  |

|  |
| --- |
| **Mechanical Engineering Scope of Work (Box #10-2)** |
|  |

|  |
| --- |
| **Electrical Engineering Scope of Work (Box #10-3)** |
|  |

|  |
| --- |
| **Architectural, Mechanical and Electrical Engineering Construction Risks (Box #10-4)** |
|  |

|  |
| --- |
| **TRB PDR Requirements (Box #11-1)** |
| **No.**  | **PDR Structural Details** | **TRB Requirement** |
| 1 | Additional Field Testing |[ ]  Yes |[ ]  No |
| 2 | Custom Site Response Analysis |[ ]  Yes |[ ]  No |
| 3 | Ambient Vibration Testing |[ ]  Yes |[ ]  No |
| 4 | Additional Figures |[ ]  Yes |[ ]  No |
| 5 | Additional Photographs |[ ]  Yes |[ ]  No |
| 6 | Class C Cost Estimate |[ ]  Yes |[ ]  No |
| 7 | Other |[ ]  Yes |[ ]  No |
| **Note**: PDR Requirements are agreed to by both the Engineer-of-Record and the TRB. |
| **Risk Management Comments (Box #11-2)** |
|  |

**Seismic Project Identification Report**

**APPENDIX A**

**SCOPE OF RETROFIT DETAILS**

**for**

**BLOCK #XX-X (BLOCK NAME)**

**SCHOOL NAME**

**Table A.1: Scope of Structural Phased Retrofit**

| **No.** | **Construction Activity** | **Approx.Quantity** |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Table A.2: Scope of Structural Life Safety Retrofit**

| **No.** | **Construction Activity** | **Approx.Quantity** |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Seismic Project Identification Report**

**APPENDIX B**

**SCOPE OF ARCHITECTURAL, MECHANICAL AND ELECTRICAL ENGINEERING WORK**

**for**

**BLOCK #XX-X (SCHOOL BLOCK)**

**SCHOOL NAME**

**Introduction**

This appendix is comprised of stamped reports, one report for each discipline, for the scope of work for architectural, mechanical and electrical engineering work.

**Seismic Project Identification Report**

**APPENDIX C**

**RETROFIT COST ESTIMATE REPORT**

**for**

**BLOCK #XX-X (SCHOOL BLOCK)**

**SCHOOL NAME**

**Retrofit Cost Estimate Report**

**Seismic Project Identification Report**

**APPENDIX D**

**LIQUEFACTION STRUCTURAL DETAILS**

**for**

**BLOCK #XX-X (SCHOOL BLOCK)**

**SCHOOL NAME**

**Liquefaction Retrofit Structural Details**

**Seismic Project Identification Report**

**APPENDIX E**

**REPRESENTATIVE STRUCTURAL DETAILS**

**for**

**BLOCK #XX-X (SCHOOL BLOCK)**

**SCHOOL NAME**

**Representative Structural Details**

**Seismic Project Identification Report**

**APPENDIX F**

**PHOTOGRAPHS**

**for**

**BLOCK #XX-X (SCHOOL BLOCK)**

**SCHOOL NAME**

**Photographs**

**Seismic Project Identification Report**

**APPENDIX G**

**RELEVANT REFERENCE DOCUMENTS**

**for**

**BLOCK #XX-X (SCHOOL BLOCK)**

**SCHOOL NAME**

**Relevant Reference Documents**