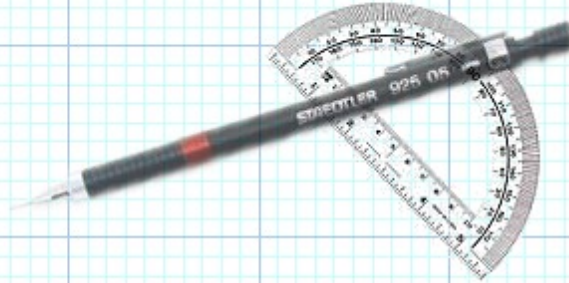
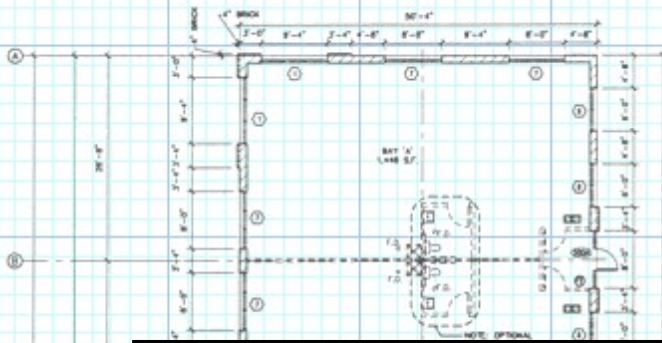


Facility Audit Report

Wascana School



Facility Audit report for: Wascana School

Regina, SK

Report Created: 2014-05-05

Facility Details

Facility: Wascana School
Address: 4210 4th ave.
Location: Regina, SK S4T 0H6
Facility Zone: 5
Grade Configuration: Elementary Schools
Facility Code: WASC

Date Built: 1951-00-00
Construction Type:
Replacement Cost: \$0
FCI:

Contact Name: Dean Miezianko
Contact Phone: 1-306-791-8528
Contact Email: dean.miezianko@rbe.sk.ca

Audit Details

Audit ID: [192 \(click here for full Audit Information\)](#)
Audit Date: 2012-02-13
Date Completed:
Status: Scheduled
WorkOrder #:
Overall Rating: 6.1
Evaluator: Ron Christie
Service Provider: JC Kenyon Engineering Inc.

Summary:

The Structural Facility Audit of Wascana School was conducted in January and February of 2012 by Holly Wallace, P. Eng. and Brad Taylor, Engineering-In-Training, J.C. Kenyon Engineering Inc.

Notes

2012-03-07 10:44:37 Holly Walace

Our review of the Wascana School building has been based on site observations as well as drawings provided to us by Regina Public Schools. Our inspection was visual only. No wall, ceiling nor floor finishes were removed to better access the structural elements of the building and no testing was performed.

According to the drawings, Wascana School was originally constructed in 1951. In 1958 an addition was added to the north side of the original building.

The north wing of this building, which includes the 1958 addition, is a two storey building with a basement. The basement of this area consists of classrooms, storage, bathrooms, and lunch rooms. The main floor consists of classrooms as well as a library. The second floor consists mainly of classrooms.

The basement floor of the 1951 north wing consists of reinforced concrete slab on grade which is located 5 feet below the grade level. The basement walls of this building consist of concrete columns spaced approximately 12 feet apart with a 12 inch thick reinforced concrete wall between the columns. The wall only comes to grade level at which point there are windows. The main floor, second floor and roof consist of structural slab spanning between reinforced concrete beams. The beams are supported by the concrete columns along the perimeter of the building as well as the two rows of interior columns down the corridor. The structural slab on the main and second floor is 4.5 inch thick and the roof structural slab is 4 inches thick. The foundation of this building consists of strip footings around the perimeter which widen into square footings at column locations. There are also two rows of square footings in the interior of the building beneath the columns. The exterior of this building is mainly brick veneer.

The basement of the 1958 addition in the north wing of the building consists of 5 inch thick reinforced concrete slab on grade with a 1 inch thick cement topping. The basement walls of this building consist of concrete columns with reinforced concrete wall between the columns. The wall goes to the grade level at which point there are windows. The main floor, second floor and roof consist of a system of 14 inch concrete ribs with 2 inch concrete slab between the ribs. There are concrete beams around the perimeter of the building to support the rib system. The beams are supported by concrete columns. The foundation of this building consists of concrete grade beams and piles.

The south wing of this building, constructed in 1951, consists of a single storey with a partial basement where the boiler room is located. The main floor consists mainly of classrooms, offices, and a gymnasium.

The boiler room is the only portion in the south wing of the building with a basement. This consists of reinforced concrete slab on grade which is located 5 feet below the grade level. The exterior basement walls consist of concrete columns spaced approximately 12 feet apart with a 12 inch thick reinforced concrete wall between the columns. The walls between the boiler room and the rest of the south wing consist of 12 inch reinforced concrete. The main floor and roof consist of structural slab spanning between reinforced concrete beams. The beams are supported by the concrete columns along the perimeter of the building as well as concrete columns in the interior. The structural slab on the main is 4.5 inch thick and the roof structural slab is 4 inches thick. The foundation of this building consists of strip footing. At the exterior of the building the strip footings widen into square footings at column locations. In the interior of the building there are square footings at column locations. The exterior of this building is mainly brick veneer.

The rest of the south wing is single storey with a crawl space beneath it. It is split into two separate crawl spaces, a smaller one under the gymnasium and a larger one under the rest of the south wing. The foundations of both crawlspaces consist of strip footings at the perimeters and square footings in the interiors. The perimeter strip footings support 12 inch reinforced concrete foundation walls and the interior square footings support concrete columns or piers. The main floor consists of 5 inch structural slab in the gymnasium and 4.5 inch structural slab in the rest of the south wing. The structural slab spans between reinforced concrete beams which are supported by the foundation wall and the columns below. The roof of the majority of the south wing is 4 inch thick concrete slab spanning between concrete beams. The concrete beams are supported by concrete columns in the walls of the building as well as interior columns. The gymnasium roof is a different construction than the rest of the south wing. It consists of long span joists with 2 inch tongue and groove wood decking spanning between the roof joists. The roof joists are supported by 12 inch tile wall. Similarly to the rest of the building the exterior of the building is mainly brick veneer.

From our assessment of this school it was concluded that this building is in poor condition. It has experienced and continues to experience significant foundation movement resulting in cracks in the walls, slabs, columns, and heaving of basement floors. The foundation movement this building is experiencing has caused and continues to cause increased stress to the building which has already resulted in the failure of a column. To permanently fix these issues would be a very expensive undertaking involving underpinning of the building.

It is our opinion that this school is not suitable for long term occupancy without major upgrades. As it is our understanding that the school will be closed in 2013, our recommendation is to do ongoing inspections every 6 months to monitor the condition of the existing structure for any changes. The next inspection should be scheduled for July 2012.

Audit Rating Summary

Category	Average Rating	Estimated Deficiency
Envelope	6.8	\$50,000
Interiors	7.0	\$25,000
Structural	5.0	\$3,010,000
Total:		\$3,085,000

Rating Guide		
Rating	Response	Definition
10	Non Essential	Like new condition. Meets current and foreseeable future requirements.
9	Non Essential	Good condition. Between new and mid forecasted life span. Meets current and near future requirements.
8	Non Essential	Good to Fair condition. Mid forecasted life span has been reached. Meets current requirements.
7	Non Essential	Fair condition. Final stages of lifespan. No deficiencies were noted. Meets current needs.
6	Essential	Reached or exceeded forecasted lifespan. Currently in serviceable condition and functions as designed. Requires monitoring.
5	Essential	Minor Deficiencies noted. Will require replacement or refurbishing within 5 years to keep element in service. Requires monitoring.
4	Essential	Moderate deficiencies noted. Will require replacement, or refurbishment within 2 years to keep element in service. Requires monitoring.
3	Essential	Major deterioration of asset, no immediate risk, has not failed. Replacement / upgrading within 2 years necessary. Requires monitoring.
2	Critical	Significant deterioration of asset, poses low to medium risk for occupant health and safety; failure imminent; replacement / upgrading within 12 months necessary. Requires action.
1	Critical	Extreme deterioration of asset, poses high risk for occupant health and safety; immediate attention required. Requires action.

Detailed Audit Results by Category

Structural

Standard Foundations: Continuous (Strip) Footings (A1011)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
3	2012-03-07				0	2000000.00	

Deficiencies:

This building has experienced considerable differential movement of the foundation, especially in the south wing of the building. Deterioration and damage to this building in terms of cracks in walls, columns, beams, and slabs as well as heaving of slabs has been caused by differential movement of the foundation. Differential movement is caused by settlement of the footings as the soil dries, or heaving of the foundation as the soil expands due to an increase in moisture.

The south wing of this school has experienced considerable differential movement, especially the south east corner which has noticeably dropped. This movement is believed to be caused by a decrease of moisture in the soil in the south crawl space. The footings in the south crawl space are settling which is causing increased stress on the concrete columns, slabs, and beams above the footings. In one location in the south crawlspace, a column has already failed due to the increased stress, photograph 004 and 005. This column has been fixed but there is still the risk for similar events to occur in the future. As mentioned in the main floor section, there are hairline cracks in the beams, slabs, and columns, in the main floor structure which can be seen in the crawl space below.

In the north crawl space the vapour barrier consists of a cementitious material cast on to the ground. This material is inadequate as a vapour barrier. The soil has settled and there is now a void between the barrier and ground. When walking on the cementitious barrier it often caves in, photograph 002.

It is our understanding that in response to the 2005 report the following work was recommended to be done to the crawl space in the south wing, drawings S-1 and S-2:

- Temporarily shoring selected interior columns in the south crawl space
- Jack shoring to level the main floor
- Grouting under the footings
- Removal of existing polyethylene cover which had deteriorated
- Ground preparation and the installation of a new vapour barrier membrane
- Replacement of interior column that had failed with new steel columns
- Installation of a designated walkway to service the piping
- Re-pointing of masonry
- Removal of soil on the south east corner of the building
- Removal of front planters.

During our inspection it was observed that the concrete column which had failed had been replaced with new steel columns. New vapour barrier membrane as well as a walkway to service the piping had been installed, but only for the west part of the south crawl space. New vapour barrier had not been installed in the north crawl space below the gymnasium, nor in the west part of the south crawl space where there is evidence of substantial foundation settlement. The front planters also had not been removed as previously recommended.

Recommendations:

Rectification of the problem of foundation movement would be to underpin the entire building which is an expensive process.

Without major structural upgrades to this foundation, it is not suitable for long term occupancy. As it is our understanding that this school only has a one year lifespan left and is scheduled to be closed in 2013, our recommendation is that the foundation beneath the south wing of the school be monitored for changes with ongoing inspections occurring ever six months. As previously mentioned in the last report, proper drainage away from the building should also be ensured in order to help prevent movement of the foundation.

Comments:

Movement of the footings of this building has occurred throughout the life of the building and will continue to occur. The building will continue to experience shifting of the foundation and continued cracking in walls, beams and columns, and heaving of slabs can be expected. There is also the potential of more columns failing similarly to the existing reinforced concrete column in the south crawl space.

Notes

2012-03-07 12:21:59 Holly Wallace

The foundation of the south wing consists of strip footing around the perimeter of the building and square footing in the interior. The interior footings support concrete columns or piers which then support the main floor above the crawl space. In the crawl space below the gymnasium there is a cementitious material cast on to the ground for a vapor barrier.

The north wing, which is the part of the building with a basement, consists of strip footing on the perimeter with footings increasing in size at column locations. Square footings in the interior of the building support two rows of interior columns.



Photograph 004.jpg



Photograph 005.jpg



Photograph 002.jpg

Special Foundations: Pile Foundations (A1021)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
8	2012-03-07				0		

Deficiencies:

The expansion joint between the original building and 1958 addition has opened up to form a gap. The gap is approximates 1 1/2 inches.

Recommendations:

The separation gap should be repaired. Underpinning of the entire original building would reduce future movement.

Comments:

According to the drawings, the 1958 addition was designed with a 1/2 inch expansion joint between the new addition and original building. Expansion joints are designed to allow for differential movement between two buildings.

The original 1951 part of this building has a footing foundation while the 1958 addition of this building has a pile system foundation. The different foundations have resulted in differential movement as there is less foundation movement in the deep, pile system than in the shallower footing system.

Notes

2012-03-07 12:25:57 Holly Wallace

The foundation of the 1958 addition consists of a grade beam and pile system.



Photograph 028.jpg



Photograph 030.jpg

Slab on Grade: SLAB ON GRADE (A1030)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
3	2012-03-07			100	0	1000000.00	

Deficiencies:

Excessive heaving and settlement has caused unevenness of the floor throughout the entire basement. In general, the floor seems to be heaved upwards at the center of the class rooms and corridors, while the slab in the boiler room has settled and cracked at column locations. The settlement of the slab at columns is an indication that the footings in the boiler room have settled at some point in the past, photograph 006.

Cracks and deterioration in the slab can be seen in the boiler room, photographs 002, 003, and 005. Cracks in the slab in the corridor can be seen in photographs 080 and 084.

Recommendations:

The extensive heaving of the floor slab could be fixed by the replacement of the existing floor slabs with structural slabs however this would be an expensive procedure.

Notes

2012-03-07 12:29:49 Holly Wallace

The boiler room and north wing of this building, including the 1958 addition, have basements which consist of slab on grade. Except for the boiler room, most of the floors are covered with finishes and are not visible.



Photograph 006.jpg



Photograph 002.jpg



Photograph 003.jpg



Photograph 005.jpg



Photograph 080.jpg



Photograph 084.jpg

Basement Walls: Basement Wall Construction (A2021)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
6	2012-03-07				0	10000.00	

Deficiencies:

Various cracks were observed in the concrete foundation wall in the boiler room, photographs 009, 010, 014, 015, and 016. Cracks were also seen on the exterior foundation wall on the south east corner of the building, photographs 034, 035, and 042.

Recommendations:

Repair cracks in walls.

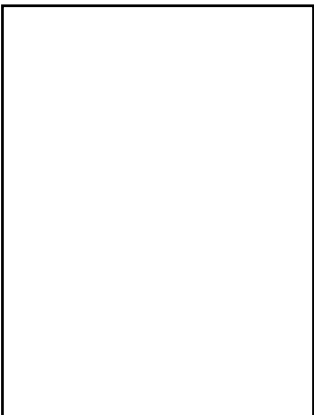
Comments:

Cracking of the foundation walls is due to foundation movement.

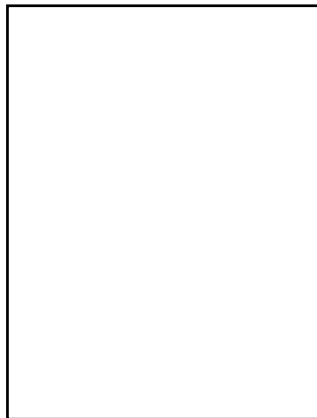
Notes

2012-03-07 12:36:55 Holly Wallace

The foundation walls in the crawlspace and in the basements consist of 12 inch thick reinforced concrete.



Photograph 009.jpg



Photograph 010.jpg



Photograph 014.jpg



Photograph 015.jpg



Photograph 016.jpg



Photograph 034.jpg



Photograph 035.jpg



Photograph 042.jpg

Envelope

Floor and Wall Construction: FLOOR & WALLS CONSTRUCTION (B1010)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
7	2012-03-07			100	0		

Deficiencies:

The main floor structural slab in the south wing of the school has a substantial slope towards the south east corner of the building. It is estimated that the floor is sloped downwards about 2 inches at the principal's office.

When inspecting the south crawlspace, which is below the main floor of the south wing, cracks in the floor beams and slabs as well as the columns were noted in various locations, especially the south east corner of the building, photograph 016 and 017. Exposed rebar was noted in two different floor beams, photographs 011 and 012. Deflection of the floor beams can be seen in photograph 010.

In the north wing, most of the main floor beams and slabs are concealed in plaster finishes. Cracking in the plaster finish on beams were noted on the underside of the main floor, see photograph 081. Some deflection of the slab was also noted in the north wing.

Comments:

It is believed that the foundation movement caused by settling of the footing is causing the slope to the main floor as well as the cracking of the beams and slabs on the underside of the floor.

Notes

2012-03-07 12:40:38 Holly Walace

The main floor of the original building consists of reinforced concrete slabs which span between concrete beams. The slab in the gymnasium is 5 inches thick while the rest of the main floor is 4.5 inches thick. The span of the concrete slabs is approximately 12 feet in most areas, which is a long span for a 4.5 and 5 inch slab. The concrete beams are supported by concrete columns around the perimeter of the building, as well as concrete interior columns. Most of the beams and slabs are covered in plaster finishes.

According to drawings, the main floor of the 1958 addition consists of a system of 14 inch concrete ribs with 2 inch concrete slab between the ribs. Concrete beams around the perimeter of the building then support the rib system. The beams are supported by concrete columns.



Photograph 016.jpg



Photograph 017.jpg



Photograph 011.jpg



Photograph 012.jpg



Photograph 010.JPG



Photograph 081.jpg

Floor and Wall Construction: FLOOR & WALLS CONSTRUCTION (B1010)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
7	2012-03-07			100	0		

Deficiencies:

Similarly to the main floor, most of the second floor beams and slabs are concealed in plaster finishes. Cracks were noted in the plaster finish of floor beams on the underside of the second floor in various locations, see photograph 054. Deflection of the slab was also noted in the north wing.

A 1 1/2 inch gap can be seen in the floor between the original building and 1958 addition.

Recommendations:

The expansion joint between the addition and original building should be fixed.

Comments:

It is believed that the foundation movement caused by settling of the footing is causing the concrete frame to shift which has resulted in cracking of beams, columns and walls.

Notes

2012-03-07 12:45:50 Holly Wallace

The second floor of the original building, located in the north wing of the building, consists of reinforced 4.5 inch concrete slabs which span between concrete beams. The span of the concrete slabs is approximately 12 feet in most areas, which is a long span for a 4.5 inch slab. The concrete beams are supported by concrete columns around the perimeter of the building, as well as concrete interior columns. Most of the beams and slabs are covered in plaster finishes.

According to drawings, the second floor of the 1958 addition consists of a system of 14 inch concrete ribs with 2 inch concrete slab between the ribs. Concrete beams around the perimeter of the building then support the rib system. The beams are supported by concrete columns.



Photograph 054.jpg

Roof Construction: ROOF CONSTRUCTION (B1020)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
7	2012-03-07			100	0		

Deficiencies:

During our inspection evidence of water ponding was noted on the roof of the building, photographs 004. An air pocket was also noted just south of the gymnasium, photograph 001.

Cracking in the drywall at roof beam and column connections was noted in various locations.

Recommendations:

Roof drains should be kept clear to ensure proper drainage.

Comments:

Cracking at the beam and column connections is caused by the movement of the concrete frame due to foundation movement.

Notes

2012-03-07 12:47:48 Holly Wallace

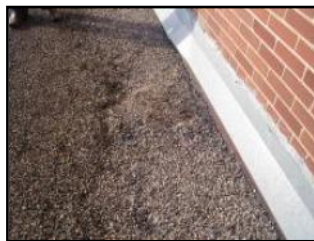
The majority of the roof over the original building consists of 4 inch structural slab spanning between reinforced concrete beams. The beams are supported by perimeter and interior concrete columns. The exception to this is the gymnasium roof and the roof of the 1958 addition.

The gymnasium roof consists of 2 inch tongue and groove decking supported by long span joists. The roof over the 1958 addition consists of 14 inch ribs with 2 inch concrete between the ribs. Concrete beams around the perimeter of the building then support the rib system. The beams are supported by concrete columns.

The roof of this building has three different elevations. The lowest roof is the south wing. The gymnasium is approximately 10 feet higher than that of the rest of the south wing, while the north wing of the building, including the 1958 addition, is approximately 2 feet higher than the gymnasium. Photograph 008 below is the gymnasium roof, and photographs 009 and 011 are the lower south wing roof.



Photograph 004.jpg



Photograph 001.jpg



Photograph 008.jpg



Photograph 009.jpg



Photograph 011.jpg

Exterior Walls: EXTERIOR WALLS (B2010)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
6	2012-03-07				0	50000.00	

Deficiencies:

The exterior walls have been re-pointed in the past which can be seen in photographs 038, 040, and 043. Cracks have continued to develop in the brick veneer and concrete foundation wall on the south and east side of the building, which is due to shifting of the foundation, photographs 034, 035, 042, 046, 048, 051 and 045. Deterioration can also be seen in the exterior finishes, photographs 022, 023, and 024. Exterior walls should be re-pointed to repair cracks and mortar deterioration.

Recommendations:

Cracks and mortar deterioration in the exterior walls should be re-pointed. This should be done on an annual basis to maintain the integrity of the wall structure.

Comments:

Cracking is localized on the south-east corner of the building. This area seems to have experienced and continues to experience foundation shifting.

Notes

2012-03-07 12:51:05 Holly Wallace

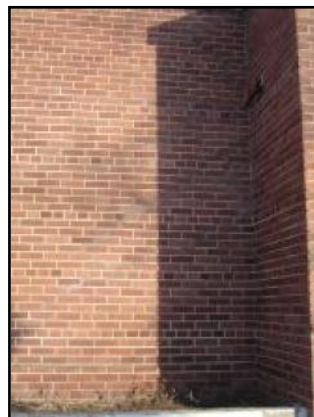
Except for the gymnasium, the majority of the exterior walls of both the original building and 1958 addition consist of reinforced concrete columns that support concrete floor and/or roof beams. The majority of the exterior walls have a brick veneer. The gymnasium exterior walls consist of load bearing 12 inch tile with a brick veneer. Photographs 058, 050, and 056, show the front or south side of the building, photograph 054 shows the west side of the building, photographs 026 and 055 show the north side and photograph 032 and 041 show the east side.



Photograph 038.jpg



Photograph 040.jpg



Photograph 043.jpg



Photograph 034.jpg



Photograph 035.jpg



Photograph 042.jpg



Photograph 046.jpg



Photograph 048.jpg



Photograph 051.jpg



Photograph 045.jpg



Photograph 022.jpg



Photograph 023.jpg



Photograph 024.jpg



Photograph 058.jpg



Photograph 050.jpg



Photograph 056.jpg



Photograph 054.jpg



Photograph 026.jpg

Interiors

Partitions: PARTITIONS (C1010)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
6	2012-03-07				0	25000.00	

Deficiencies:

There are various cracks in the drywall partition walls throughout the building. Cracks are likely caused by foundation movement.

Recommendations:

Cracks in the partition walls should be fixed.

Notes

2012-03-07 12:57:35 Holly Wallace

Partition walls appear to consist of hollow tile, photograph 056.



Photograph 013.jpg



Photograph 023.jpg



Photograph 025.jpg



Photograph 053.jpg



Photograph 054.jpg



Photograph 059.jpg



Photograph 066.jpg



Photograph 056.jpg

Stair Construction: STAIR CONSTRUCTION (C2010)

Rating	Last Update	Response	Installed	Element Life	Remaining Years	Deficiency	Project #
8	2012-03-07			100	0		

Deficiencies:

The stairs in the basement on the south side of the north wing have sunk on the north side.

Notes

2012-03-07 12:58:29 Holly Wallace

There are two different stair cases in this building. They are located in the original building, one on the far north side of the building and the second one just north of the gymnasium.