Parkview Elementary School

Sicamous, B.C.

School District No. 83 (North Okanagan-Shuswap)

Odour Assessment Report

4 October 2019

1.0 Executive Summary

- The inspection was completed on Tuesday, October 1, 2019.
- The facility appears to be in relatively good condition and is well utilized.
- The existing mechanical systems are in **FAIR to GOOD** condition.
- At the time of the inspection, much of the emergency odour mitigation programs had been completed and thereby eliminating any objectionable odours. Without us identifying the anomalous source of the odour, we cannot develop a specific program to mitigate it.
- The focus of the inspection changed to looking for issues with the mechanical systems that may have contributed to odorous event.
- HVAC, exhaust, plumbing and propane systems were checked for potential contribution to the odour event. Many systems are conventional and were determined not to have likely contributed to the odour event.
- For the most part, the mechanical systems are common designs which were well installed.
- The only contributing factor identified was the dirt crawlspace may have become wet after an extreme weather event. The elevated humidity in the crawlspace may have contributed to the odour event.
- The western portions of the crawlspace are properly ventilated, but the gym and central area crawlspace exhaust systems should be upgraded. The exhaust upgrade could include a couple of areas on the main floor.

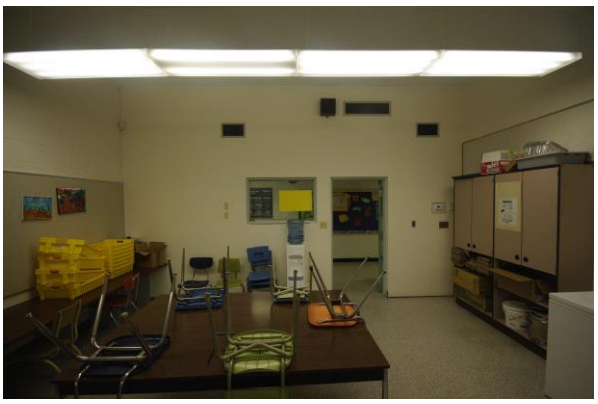
- An exhaust upgrade is estimated at ..... **$95,000**.

2.0 Description of Existing Building

- Area of building: 3,372 m².
- Original building date: 1970 with additions in 1972, 1974, 1978, 1979, and 1982.
- Mechanical systems were upgraded in 1998, 2001, 2002 and 2008.
- Description of existing building structural systems:
  - The building is single storey and is considered combustible construction.
  - The main floor has a crawlspace under the central and western portions of the building.
  - The multi-purpose room and the eastern classrooms are slab on grade

3.0 Discussion of Existing Mechanical Systems

Roof Top Units



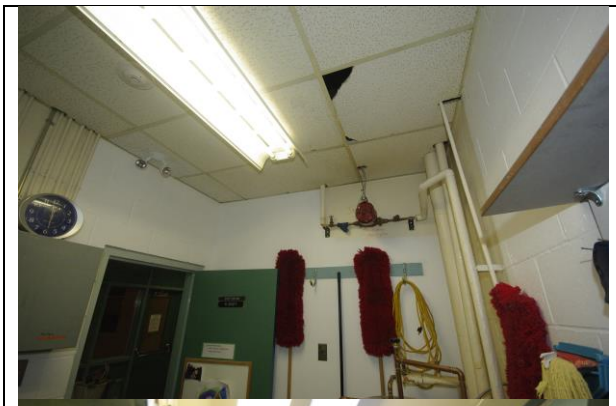
Observations:

- The **terminal equipment** for the bulk of the occupied zones is served by all electric roof top units.
- The outside air intakes (top louvre) are well away from common odour sources.
- It is noted that the units are **not** propane fired, thereby eliminating that potential odour source.
- The duct systems are well configured with ducted supply and ducted return air, except for the gym where the return air is awkwardly routed through the crawlspace.
- The ceiling spaces and crawlspaces are not used as a return air path except the gym.
- A few spot checks on the duct system showed that they were as clean as many other facilities.

Recommendations:

- Reconfigure the gym return air path and provide dedicated exhaust system for the gym crawlspace.

Main Floor Exhaust System



Observations:

- All the spaces that require exhaust have systems connected to them, except for two.
- The custodial rooms on the east end and west end of the building do not appear to have any exhaust systems.

Recommendations:

- An exhaust system should be added to the east and west custodial rooms.
- If something very odorous was stored in this space, it could have contributed to the odour event, as there is no exhaust in these custodial rooms. Whatever the potential source could have been, was removed by the time of inspection.
- The exhaust systems air balance should be checked to ensure adequate exhaust air flow for each zone.

Crawlspace Exhaust Systems

Observations:

- At the time of inspection, the crawlspaces were dry. There was surprisingly little odour in the crawlspace compared to other facilities. This is likely due to the recent odour mitigation efforts.
- The crawlspace on the west end of the building has an exhaust system.
- The crawlspace under the gym area is ventilated in a very unconventional manner and could encourage odours in the crawlspace to enter the occupied area.
- The crawlspace under the central portions of the building has been provided with electric heaters but does not have an exhaust system.

Recommendations:

- If for some reason, the crawlspace gets wet, it may generate the musty type of odours reported during the odour event. However, the intensity of the odour described is probably not attributable to the crawlspace. There is likely another odour source to account for the intensity, that has been removed since.
- Nonetheless, it would be advisable to have an exhaust system serving each crawlspace, to keep that space under negative pressure in relation to the occupied space, during occupied hours.

Propane Systems

Observations:

- At the time of inspection, no mercaptan (the odorant added to propane) was detectable.
- The boiler venting systems are installed to code.

Recommendations:

- No upgrades are anticipated as part of this review.

Sanitary and Storm Drainage Systems

	Observations: ♦ At the time of inspection, there was no indication of sanitary or storm systems backing up or overflowing within the building. Recommendations: ♦ No upgrades are anticipated as part of this review.

4.0 Considerations for Mechanical System Upgrade due to the Odour Event

Th odours that were described to us were very strong and musty. The odours could be considered acute, as they were described to develop over a relatively short period of time. That evidence would usually lead directly to the source, but not in this case.

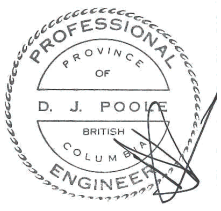
This office has been involved with investigating several odour problems. Most of the problems were chronic, long term odours and one was acute. Once the source of the odour was found, the solutions became very clear. In this case, we do not believe that we directly found the source of the odour. That may due to the crawlspace being dry now and significant odour mitigation efforts having been made.

The one project where the odours developed into an intolerable level in a very short period, involved composting. In that case, meat had entered the systems undetected and the whole batch had to be removed and the composting room thoroughly cleaned before the odours abated. We do not know if that was the problem here, but we saw a few composting stations throughout the facility. Without much other evidence, this could be something to consider.

The next item to consider, from a good design practice for mechanical systems, is to look for systems that were poorly configured, poorly maintained, or simply missing. The mechanical systems are well configured and well maintained, when compared to similar buildings that don't have this odour problem.

As we could not identify the source of the odour, there are a few custodial rooms and crawlspaces that could use an exhaust upgrade to mitigate future events. But even if these spaces were ventilated, it would not account for the intensity of the odours being experienced.

Don Poole P. Eng.



2019-10-04

Appendix A – Order of Magnitude Estimate for Budgetary Guidance

PARKVIEW ELEMENTARY SCHOOL													
													19-Oct-04
EXHAUST SYSTEMS UPGRADE													
				Equipment	Duct	Piping	Total		Equipment	Duct	Piping	Total	
	qty			Unit Cost	Unit Cost	Unit Cost	Unit Cost		Cost	Cost	Cost	Cost	**TOTAL**
Square Panel - Roof Mount	2	Unit	@	$1,400	$5,600		$7,000	/Unit	$2,800	$11,200	$0	$14,000	
In-Line Fan c/w Louver	3	Unit	@	$900	$3,600		$4,500	/Unit	$2,700	$10,800	$0	$13,500	
Check Airflow and Balance	1	Allow	@	$0	$0	$0	$2,000	/Allow	$0	$0	$0	$2,000	
Controls - Typical Controls Devices	13	Point	@	$600			$600	/Point	$7,800	$0	$0	$7,800	
Floor Grille	12	Unit	@	$300			$300	/Unit	$3,600	$0	$0	$3,600	
Mechanical Subtotal									$16,900	$22,000	$0	$40,900	**$40,900**
Electric - Power to Line Voltage Equipment	5	Unit	@				$1,000	/Unit	$0	$0	$0	$5,000	
Carpentry - Cutting and Patching	17	Unit	@				$250	/Unit	$0	$0	$0	$4,250	
Roofing - Small Curb	2	Unit	@				$2,000	/Unit	$0	$0	$0	$4,000	
Other Trades Subtotal									$0	$0	$0	$13,250	**$13,250**
Demolition			3%									$1,700	
Misc (Mobilization, Bonding, Permits, Inspection Fees)			5%									$2,800	
Overhead and Profit			12%									$6,500	
Escalation (increases from typical **Budgets** or **Location Facto**			15%									$8,200	
General Subtotal												$19,200	**$19,200**
taxes			5%									$3,700	**$3,700**
TOTAL CONSTRUCTION BUDGET													**$77,050**
Asbestos Allowance			0%									$0	**$0**
Contingency			10%									$7,800	**$7,800**
Fees and Disbursements			12%									$9,300	**$9,300**
TOTAL PROJECT BUDGET													**$94,150**