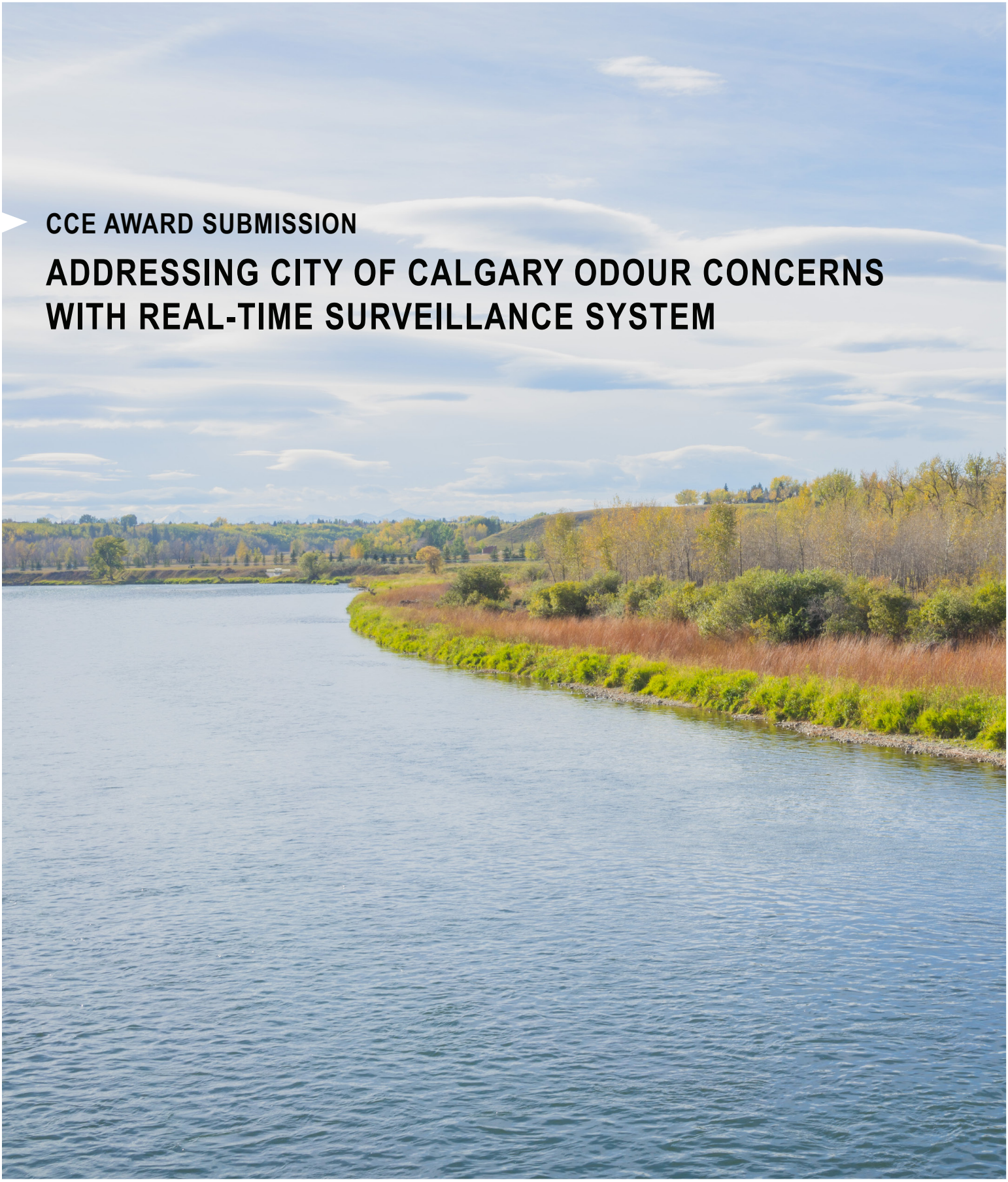
CCE AWARD SUBMISSION

ADDRESSING CITY OF CALGARY ODOUR CONCERNS WITH REAL-TIME SURVEILLANCE SYSTEM



Golder Associates

SUMMARY

Golder Associates was retained by the City of Calgary to identify the source of foul odours occasionally present in residential communities surrounding the City's Fish Creek Wastewater Treatment Plant. Golder and sub-consultant Airdar, developed a unique air quality monitoring study to effectively locate, measure and continuously monitor odours in real-time. The study quickly identified an onsite odour source which was repaired promptly. Odour surveillance continues to enhance the livable environment for surrounding communities. (73 Words)

Figure 1 – Fish Creek Wastewater Treatment Plant Location. Map shows that the Fish Creek Provincial Park boundary borders the FCWWTP on the south boundary, the residential community of Deer Run to the north, the Bow River to the east and the community of Parkland to the west.

INNOVATION

Golder Associates Ltd. (Golder) was retained by the City of Calgary (the City) in 2014 to resolve an ongoing issue of foul odours being present in the residential communities near the City's Fish Creek Wastewater Treatment Plant (FCWWTP) located in southeast Calgary.

As the City developed, the communities of Parkland (established in 1974) and Deer Run (1978) were built adjacent to the FCWWTP. Occasionally, a waste water treatment facility might be the source of odours in adjacent areas. The City has been diligent in reducing odours from the FCWWTP and other waste water facilities in the City to maintain a high standard of living for neighbouring communities.

The City reports that despite years of effort to effectively manage emissions and odours from the FCWWTP, odour complaints from the communities persist. The original intent of the City's proposal was to solicit bids for a conventional monitoring system, instrumenting the supposed odourous release points at the FCWWTP and thereafter, use "live" emissions data to iterate a dispersion model to simulate what odours may be present in the adjacent communities. The idea was to create a helpful notification system such that the City could respond promptly if or when odours from the FCWWTP were, or could be leading to unfavourable conditions in the communities.

When Golder received this RFP from the City in 2014, we were immediately able to envision an application for a different type of notification system, one that would not only be unaffected by the intricacies of complex wind patterns in the area making dispersion modelling results less than definitive, but a system that uses the variability in natural systems to enhance and refine the monitoring system.

Golder has been working with an Alberta company called Airdar Inc. (Airdar) since 2011. Airdar is an acronym for Air Detection and Ranging. Airdar can be understood as a cousin of technologies like Sonar and Radar. While radar uses radio waves and sonar uses sound waves to detect the nature and characteristics of distant objects, Airdar uses compounds that travel on the wind to characterize distant objects, in this case, the location(s) and emission rates of nearby and distant odour sources at the FCWWTP.

The technology is innovative because it uses what others would consider discardable data and the variability of natural systems to reveal the true source of the emissions. Other technologies are confounded by the same attributes that enhance this technique.

Figure 2 – Airdar Central Monitoring Cabinet

Figure 3 – Airdar Sample Tubing in a FCWWTP Utility Tunnel

COMPLEXITY

Prior City work to understand odour transport into the neighbouring communities was variably successful over the years. The challenge was always to pin-point the source of the offending odours. In the project RFP, the City indicated the likely odour sources and specified that instrumentation be installed at the various structure vents with higher potential to release odourous compounds and to follow-up with dispersion modelling. Those included the headworks building and the primary clarifiers and digesters where treatment takes place to clean up waste water.

When Golder reviewed the RFP, we felt that key assumptions may have been overlooked, specifically that odours leading to complaints were coming from the FCWWTP and that when they came from the facility, that the source was the assumed vents. Our strategy was to help the City understand the problem and target resources precisely, directing resources toward solving well-defined issues.

The advanced solution to the problem arose from our experience with Airdar, having worked with them on a few early, confidential projects in the Oil and Gas industry. There was enough similarity among the previous projects and this potential project, that the technology could be readily applied in this municipal setting.

This project has proven our ability to pin-point the location of and intensity of odours in near real-time. Significant odours or other compounds can be identified from many kilometers away, meaning that not only would any significant on-site odours be “sniffed out”, any significant off-site sources would also be revealed.

Figure 4 – Airdar Sampling Inlet

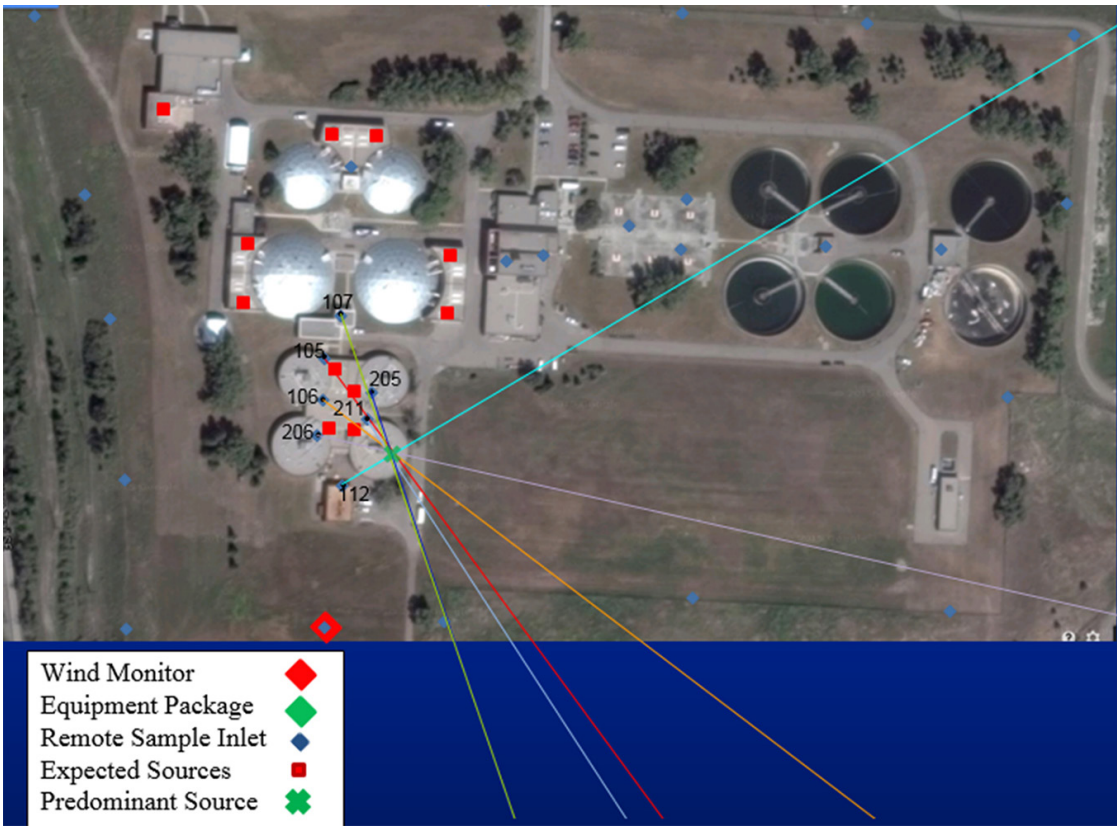


Figure 5 – Triangulation to the On-site Odour Source

SOCIAL AND/OR ECONOMIC BENEFITS

The societal benefit of using this unique approach to emissions measurement and management lies in the ability of the technology to deliver technically sound data that allows managers to accurately target resources toward real issues. The result is a more liveable and efficient city, a safer, healthier work-site and a high-level of satisfaction gained from a job done right.

Managing risks of all kinds is an integral part of managing a city or a project. Potential liabilities around a safe workplace, a livable city, financial stewardship and nuisance are important considerations. Using this technology has helped manage these risks by providing accurate and timely information so that appropriate responses can be deployed with confidence.

Project costs have been on budget. The installation and maintenance was on budget as shown in Table 1 below. Yearly maintenance is shown in Table 2 and was on budget in 2016. Upon review of the initial data in 2015, an extension to the project was discussed with the City and Golder submitted a proposal for this work. The extension work was completed on budget. Golder has worked with Airdar and the City to stay within budget and reallocate budget or services as needed. Follow up meetings with the City to discuss more work with this technology at the facility which were not included in the original budget have been fit within the budget as it stands now. There have also been additional maintenance requirements that that have fit within the current budget.

Table 1 Initial Estimated vs Actual Cost for the Airdar FCWWTP Installation (Excluding GST) Current to August 2016

DESCRIPTION	PROPOSED COST (CAD)	ACTUAL COST (CAD)
System Equipment	$135,850.00	$135,850.00
System Software	$71,436.20	$71,436.20
System Installation	$105,568.88	$105,568.88
System Services	$17,224.84	$10,119.86
Component Management	$19,619.60	$19,619.60
Total	**$349,699.52**	**$342,594.54**

Table 2 Yearly Maintenance Costs (Excluding GST) Current to August 2016

DESCRIPTION	PROPOSED COST (CAD)	ACTUAL COST (CAD) 2015	ACTUAL COST (CAD) 2016
Annual Preventative Maintenance	$116,665.91	$116,665.91	$68,903.50

Table 3 2016 Array Extension Costs (Excluding GST)

DESCRIPTION	PROPOSED COST (CAD)	ACTUAL COST (CAD)
Array Extension	$38,400.00	$38,400.00

ENVIRONMENTAL BENEFITS

This project was intended to address local needs around nuisance odours. The low threshold of human perception of H_2S gas typically associated with wastewater treatment meant in this case, that ultra-low level detection limits were required. The levels measured in this program have consistently shown that there is no imminent environmental risk associated with any odours perceived in the community. The program does however double as a warning system that would detect gases that could lead to substantially deteriorated air quality, not just the nuisance odours.

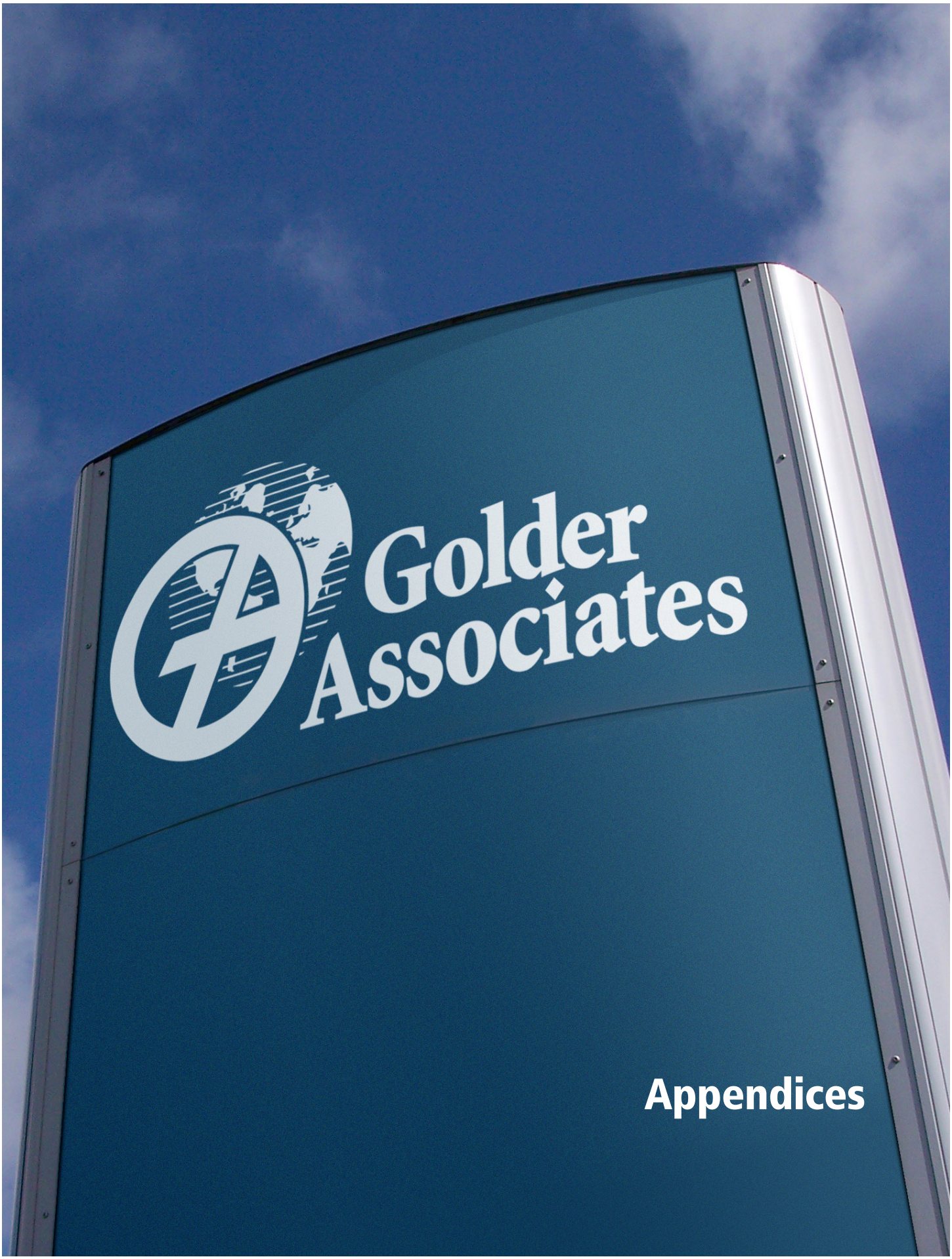
As the project currently stands, it is a very efficient, sustainable approach to managing City resources. It allows the FCWWTP management team to target resources with confidence and to communicate the results of the monitoring program with certainty to those with concerns.

MEETING CLIENT'S NEEDS

The City had made previous attempts to understand how odours may have been transported offsite from the facility to the neighbouring communities with varying degrees of success over the years. The challenge always remained to pin-point the source of the offending odours. Golder's proposal and the subsequent project execution has proven to pin-point the location of and intensity of odours from the facility in near real-time without making assumptions about where the odours were coming from or using a theoretical model to simulate where the odours may be going.

- The project was delivered on time and on budget.
- The project's technical, environmental and management risks were met through open communication and working cooperatively with the City and Airdar.
- The project was completed without any health and safety incidents.
- Golder team's commitment to our corporate values helped when dealing with technical and health and safety issues, which ended up benefiting the project.
- The responsive and proactive approach to addressing changes and requests for information aided the client's ability to make an informed choice about the use of technology.

The technology and the project have worked exceptionally well since installation and the City has chosen to use the technology as a system to alert City management personnel to pending issues and to provide them with an opportunity to act on issues that require attention and to direct resources appropriately.



Appendices

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TO SERVICE EXCELLENCE AND SUSTAINABILITY THAT YOU NEED TO BE SUCCESSFUL.

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