

TO:	CHAIR AND MEMBERS WASTE MANAGEMENT WORKING GROUP MEETING ON JANUARY 18, 2018
FROM:	JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE
SUBJECT:	UPDATE REPORT #7: PROPOSED ALTERNATIVE METHODS (ALTERNATIVE LANDFILL DESIGN CONCEPTS FOR EXPANSION)

RECOMMENDATION

That, on the recommendation of the Director - Environment, Fleet and Solid Waste, this report **BE RECEIVED** for information.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

Relevant reports that can be found at www.london.ca under City Hall (Meetings) include:

- Appointment of Consulting Engineer for Various Technical Studies as part of the Environmental Assessment Process for the Proposed Expansion of the W12A Landfill Site (July 17, 2017 meeting of the Civic Works Committee (CWC), Item #6)
- Update and Next Steps – Resource Recovery Strategy and Residual Waste Disposal Strategy as part of the Environmental Assessment Process (February 7, 2017 meeting of the CWC, Item #10)
- Individual Environmental Assessment Long Term Solid Waste Resource Recovery & Disposal Plans (October 6, 2015 meeting of the CWC, Item #14)

Relevant reports that can be found at www.london.ca under City Hall (Meetings – Advisory and other Committees) include:

- Update Report #6: Proposed Technical Studies for Inclusion in Terms of Reference (September 28, 2017 meeting of the Waste Management Working Group (WMWG), Item #8)
- Decision Report #1: General Framework for the Community Engagement Program for the Resource Recovery and Residual Waste Disposal Strategies as part of the Environmental Assessment Process (January 19, 2017 meeting of the WMWG, Item #5)

COUNCIL’S 2015-2019 STRATEGIC PLAN

Municipal Council has recognized the importance of solid waste management in its 2015-2019 - Strategic Plan for the City of London ([2015 – 2019 Strategic Plan](#)) as follows:

Building a Sustainable City

- Strong and healthy environment
- Robust infrastructure

Growing our Economy

- Local, regional, and global innovation
- Strategic, collaborative partnerships

Leading in Public Service

- Proactive financial management
- Innovative & supportive organizational practices
- Collaborative, engaged leadership
- Excellent service delivery

BACKGROUND

PURPOSE:

This report provides the Waste Management Working Group (WMWGG) with an overview of the alternative landfill design concepts (known as “Alternative Methods”) that are proposed to be included in the Terms of Reference for completion of the Individual Environmental Assessment (EA) for the expansion of the W12A Landfill.

CONTEXT:

It has been proposed that expansion of the W12A Landfill is the overall preferred alternative to meet the City of London’s long term residual waste needs. This is based on the conclusions of the *W12A Landfill Area Study* (IBI & MacViro, 2005) and an assessment of residual waste disposal alternatives using screening criteria from the *Terms of Reference Codes of Practice* (MOECC, 2014).

It has also previously been determined the capacity of the W12A Landfill will need to increase by an additional 14,600,000 m³ of airspace in order to add another 25 years of disposal capacity. The expanded site would operate through to the year 2050.

The proposed expansion of the W12A Landfill will occur above and/or immediately beside the existing W12A Landfill.

DISCUSSION

Development of Alternative Landfill Design Expansion Concepts

Three landfill design concepts were developed and available to the public at the second series of open houses for the Residual Waste Disposal and Resource Recovery Strategies. These open houses took place on November 29 and November 30, 2017. Afternoon and evening sessions were held at the Horton Street Goodwill and the Lambeth Community Centre.

The development of the alternative expansion configurations (height and slope angles) included consideration of the geotechnical aspects (i.e., stability and settlement) and hydrogeological factors including:

- The geometrical factors need to comply with the requirements of O. Reg. 232/98, (i.e., landfill side slopes must not be too steep ...4 horizontal (H):1 vertical (V) or flatter, landfill top slopes must not be too flat...not 20H:1V or steeper, below grade side slopes but not be too steep...3H:1V or flatter).
- Preliminary geotechnical assessment indicates that the underlying soils do not present a practical design constraint to the height of landfill side slopes in terms of stability or in terms of subgrade settlement.
- Based on hydrogeological assessment of potential leachate impacts on groundwater quality, it is not anticipated that a geomembrane liner will be required beneath the possible horizontal expansion limits to demonstrate and achieve compliance with the current groundwater quality standards.
- In view of the above, horizontal expansion areas will continue to utilize the natural low permeability clay till deposit as a natural liner, above which will be constructed a leachate collection piping system with continuous drainage blanket as set out in O.Reg. 232/98 (similar to the approach in the current Phase 2 area of the W12A Landfill).
- A perimeter leachate collection system is present around the north and east sides of the Phase 1 area. It will be necessary to ensure that the function of this system, i.e., collection and conveyance of leachate that seeps along the base of the Phase 1 landfill area to the perimeter, continues when the site is expanded.

The characteristics of the existing and proposed site design and engineering system requirements, including conceptual design mitigation measures (i.e., mitigation measures at the conceptual design stage), can affect the environment and site activities such as operational and maintenance requirements. These potential effects will be assessed in the EA.

During the initial stage of the EA, the three different landfill design concepts will be refined as the various technical studies are completed.

Landfill Expansion Alternatives

As noted above, three landfill expansion alternatives were developed and are presented in Appendix A. A comparison of the physical differences in the three alternative expansion alternatives are summarized in Table 1.

Table 1 – Comparison of Alternative Design Concepts

Consideration	Alternative Design Concept			
	Existing Landfill	#1	#2	#3
Description	-	Vertical expansion over existing footprint	Horizontal expansion to the north with vertical expansion over part of existing footprint	Horizontal expansion to the east with vertical expansion over part of existing footprint
Total Footprint Area (ha.)	107	107	134	143
Peak Waste Elevation (metres above sea level - masl)	292	318	310.3	306.7
Average Height of Peak above Ground (m)	9	35	27	24
Volume of Excavation (cu.m.)	0	0	2,040,000	986,000
Total Additional Airspace (cu.m.)	-	14,600,000	14,600,000	14,600,000

Visibility of Landfill Expansion

Visibility of the landfill from off-site vantage points is an important consideration in developing expansion concepts, since it will be part of the comparative evaluation of expansion alternatives in the EA and the visibility of the landfill must be acceptable to the community. Given the large increase in height, renderings of the view of the landfill from various locations was developed for the design concept #1 which has the highest peak. These renderings were available at the open houses to help with the discussions. Renderings from one of the views (the view from Highway 401) is presented in Appendix B for information purposes.

Feedback from the Open Houses suggests that no design alternatives will need to be excluded because of concerns from the community about visual impacts.

Evaluation Criteria

The selection of the preferred Alternative Design Concept in the EA will require a systematic evaluation of the three alternatives. The proposed evaluation criteria to be used in the evaluation (listed in Appendix C) were previously presented to the WMWG. These evaluation criteria were identified at the Open Houses.

No additional criteria were suggested and none were asked to be removed. The criteria considered most important by the public who attended the Open Houses were groundwater quality, aquatic ecosystems, terrestrial ecosystems, air quality and surface water quality.

It is important to note that over the last 40 years the evaluation criteria have remained similar for most landfill siting processes creating a substantial body of knowledge and understanding. What has changed is the level of sophistication of data and data analysis, the ability to perform stronger cause and effect analysis, the creation of stronger predictive modelling tools, and the role of mitigative measures. Site specific conditions often require more emphasis be placed on certain criteria and level of information/data used in the evaluation. In summary, landfill engineers, scientists and planners have better tools and information to work with to meet more stringent environmental standards and community expectations.

ACKNOWLEDGEMENTS

This report was prepared with assistance from Mike Losee, Division Manager, Solid Waste Management and Jane Kittmer, Solid Waste Planning Coordinator.

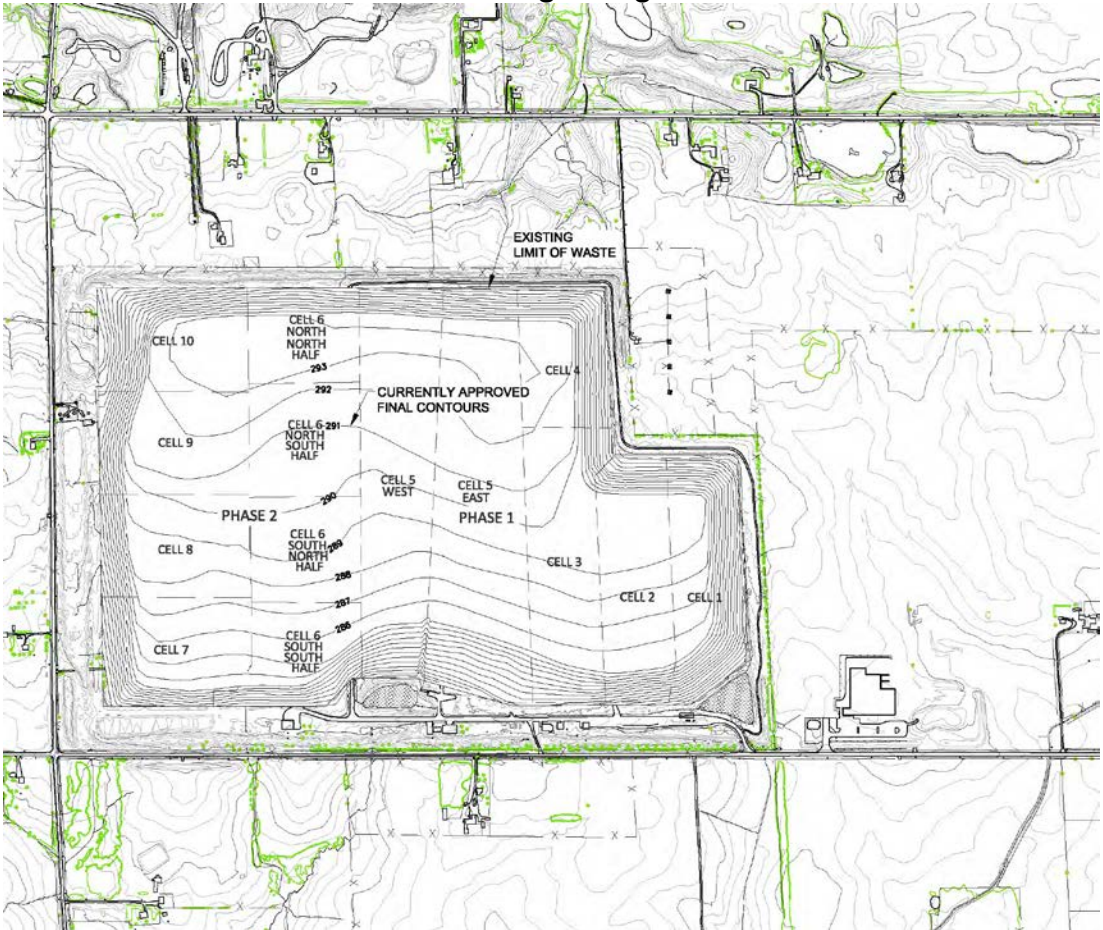
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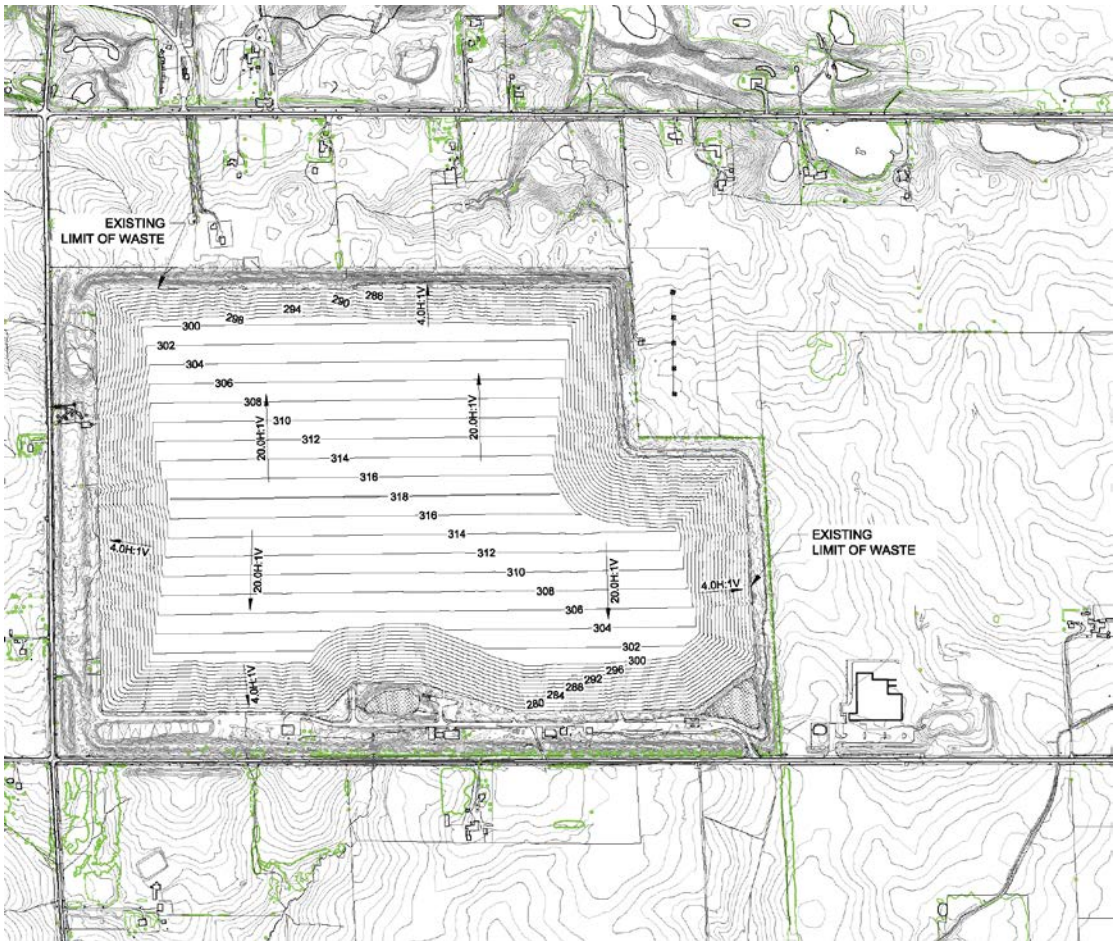
- Attachments
- Appendix A – Alternative Design Concepts
 - Appendix B – W12A Landfill Renderings
 - Appendix C – Evaluation Criteria

Appendix A – Alternative Design Concepts

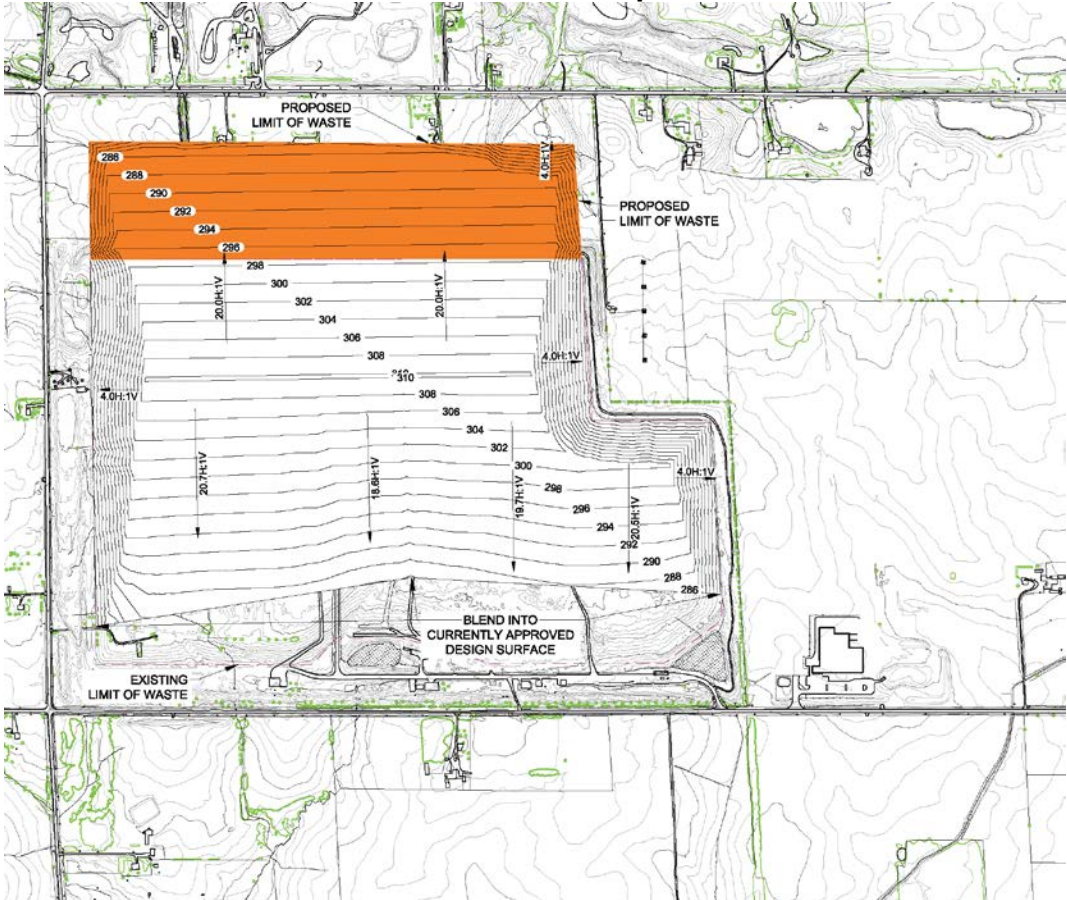
Existing Design



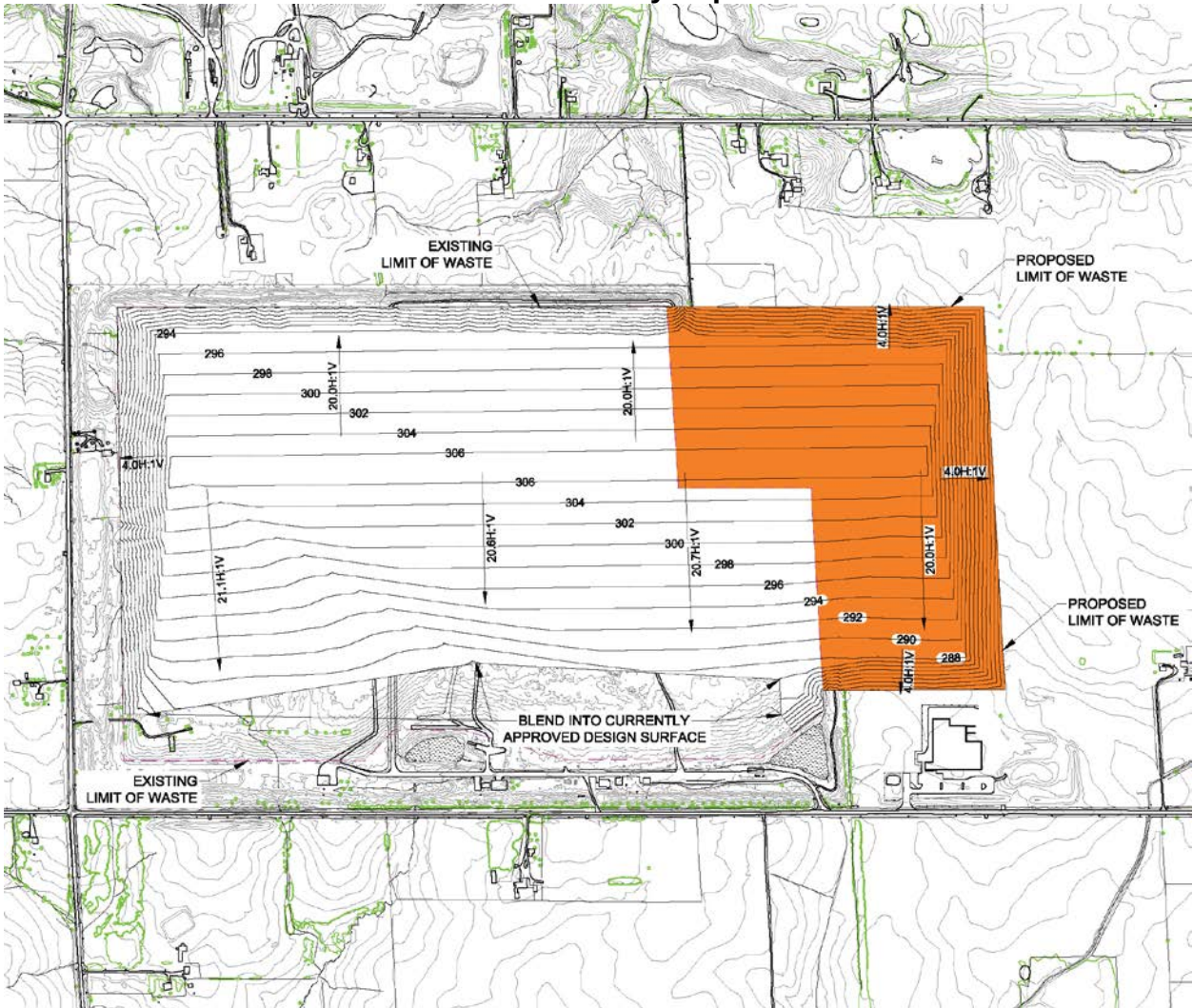
Alternative Design Concept #1
Vertical Expansion



Alternative Design Concept #2
Vertical and North Expansion



Alternative Design Concept #3
Vertical and Easterly Expansion



Appendix B – W12A Landfill Renderings

View from Highway 401 towards W12A Landfill
Current Design



View from Highway 401 towards W12A Landfill
Design Concept #1 (Vertical Expansion)



Appendix C – Evaluation Criteria

Table C-1 – Proposed Evaluation Criteria

Component	Sub-component	Rationale for Sub-component
Natural Environment Criteria		
Atmosphere	Air quality (including odour and greenhouse gases)	Landfill expansion and associated operations can produce gases containing contaminants that degrade air quality if they are emitted to the atmosphere. Construction activities associated with landfill expansion and continued landfill operation can lead to levels of particulates (dust) in the air. Landfill operation can also result in odour effects.
Atmosphere	Noise	Landfill expansion and associated operations will generate noise that will be emitted into the atmosphere and could affect off-site points of reception.
Biology	Aquatic ecosystems	Landfill expansion can remove or disturb the functioning of natural aquatic habitats and species, including rare, threatened or endangered species.
	Terrestrial ecosystems	Landfill expansion could remove or disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.
Geology and Hydrogeology	Groundwater quality	Contaminants associated with the landfill expansion and associated operations can enter the groundwater and impact off-site groundwater or surface water.
Surface Water	Surface water quality	Contaminants associated with the landfill expansion and associated operations can seep or enter into surface water and adversely affect water quality and aquatic life.
	Surface water quantity	Operations associated with the landfill expansion can alter runoff and peak flows.
Socio-Economic Criteria		
Agriculture	Agriculture	The agricultural land base or agricultural operations may be impacted by the landfill expansion and associated operations.
Archaeology	Archaeological	A horizontal landfill expansion has the potential to affect archaeological resources.
Culture	Cultural Heritage Landscapes	Identified cultural heritage landscapes can be altered by the landfill expansion. Depending on the nature of identified cultural heritage landscapes, there could be an impact by the ongoing operation of the landfill.
	Cultural Heritage Resources	Heritage attributes of identified cultural heritage resources could be impacted by the landfill expansion and associated operations.
Land Use	Current and planned future land uses	Waste disposal facilities can potentially affect the use and enjoyment of sensitive uses in the vicinity of the site.
Socio-economic	Economic	The continued operation of the landfill can influence employment in the regional area.
Visual	Visual	The landfill expansion can affect the local community by changes in the visual appearance of the site.

Table C-1 – Proposed Evaluation Criteria

Component	Sub-component	Rationale for Sub-component
Socio-Economic Criteria (continued)		
Transportation	Traffic	The operations at the landfill can impact the surrounding traffic through changes in truck traffic to/from the landfill.
Technical Criteria		
Design and Operations	Design and Operations	Sites that require less engineering to assure protection of off-site groundwater or air quality are typically preferred from a public and regulatory perspective.