1. BUILDING BETTER AND SMARTER SUBURBS – INFRASTRUCTURE STANDARDS REVIEW – SUMP PUMP SYSTEMS FOR FOUNDATION DRAINAGE IN NEW RESIDENTIAL DEVELOPMENTS

BÂTIR DES BANLIEUES MEILLEURES ET PLUS INTELLIGENTES – EXAMEN DES NORMES D'INFRASTRUCTURE – SYSTÈMES DE POMPE D'ASSÈCHEMENT POUR LE DRAINAGE DES FONDATIONS DANS LES NOUVEAUX QUARTIERS RÉSIDENTIELS

COMMITTEE RECOMMENDATION, AS AMENDED

That Council approve the screening criteria and requirements for sump pump systems set out in this report, as amended by the following:

1. the second sentence of the second full paragraph on page 4 of the report be modified to read in accordance with the following:

> **Constructing the foundation above the post development seasonal high water table ensures that perimeter foundation drains are only required during atypical conditions, such as very large storm events or unusually high water table conditions (e.g. during spring runoff conditions following a winter with very high snowfall).**

2. the second sentence of the second full paragraph on page 5 of the report be modified to read in accordance with the following:

> **The main focus of the hydrogeological investigations will be the determination of the post development seasonal high water table, with the goal of ensuring that underside of footing elevations are maintained above this level such that the operation of sump pump systems is only required during unusual conditions.**

3. the second sentence of the first criterion for Requirements for Sump Pump Systems on page 6 of the report be modified to read in

accordance with the following:

The monitoring well program shall be designed and supervised by a hydrogeologist or qualified engineer, who will also be responsible for the overall hydrogeological assessment.

RECOMMANDATION DU COMITÉ, TEL QUE MODIFIÉE

Que le Conseil approuve les critères et les exigences concernant les systèmes de pompe d'assèchement qui sont énoncés dans le présent rapport, tel que modifiée par ce qui suit :

1. **Modifier le rapport en ces termes la deuxième phrase du deuxième paragraphe complet de la page 4 :**

   Construire les fondations au-dessus du niveau saisonnier de la nappe d'eau près de la surface du sol après aménagement garantit que les drains de fondation du bâtiment ne serviront qu'en cas de conditions atypiques (gros orage ou niveau inhabituel de la nappe, par exemple pendant le ruissellement printanier, après un hiver très enneigé).

2. **Modifier le rapport en ces termes la deuxième phrase du deuxième paragraphe complet de la page 5 :**

   L'objectif principal des évaluations hydrogéologiques sera de définir le niveau saisonnier de la nappe d'eau près de la surface du sol après aménagement, tout en veillant à ce que la sous-face des élévations de surface demeure au-dessus de ce niveau, afin que les systèmes de pompes d'assèchement ne fonctionnent qu'en cas de conditions inhabituelles.

3. **Modifier le rapport en ces termes la deuxième phrase du premier critère de la section « Requirements for Sump Pump Systems » (Conditions d'utilisation de pompes d'assèchement) à la page 6 :**

Le programme des puits de surveillance ne doit être mis sur pied et chapeauté que par un hydrogéologue ou un ingénieur qualifié, qui sera également responsable de l'ensemble de l'évaluation hydrogéologique.

DOCUMENTATION/DOCUMENTATION

1. Director's Report, Infrastructure Services, Planning, Infrastructure and Economic Development Department, dated 4 December 2017 (ACS2017-PIE-IS-0014)

   Rapport du Directeur, Services de la planification, Direction générale de la planification, de l'infrastructure et du développement économique daté le 4 décembre 2017 (ACS2017-PIE-IS-0014)

2. Extract of draft Minutes, Planning Committee, 12 December 2017

   Extrait de l'ébauche du procès-verbal, Comité de l'urbanisme, le 12 décembre 2017

Report to
Rapport au:

Planning Committee
Comité des transports
12 December 2017 / 12 décembre 2017

and Council
et au Conseil
31 January 2018 / 31 janvier 2018

Submitted on December 4, 2017
Soumis le 4 décembre 2017

Submitted by
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File Number:ACS2017-PIE-IS-0014

SUBJECT: Building Better and Smarter Suburbs – Infrastructure Standards Review – Sump Pump Systems for Foundation Drainage in New Residential Developments

OBJET: Bâtir des banlieues meilleures et plus intelligentes – examen des normes d'infrastructure – systèmes de pompe d'assèchement pour le drainage des fondations dans les nouveaux quartiers résidentiels

REPORT RECOMMENDATIONS

That Planning Committee recommend Council approve the screening criteria and requirements for sump pump systems set out in this report.

RECOMMANDATIONS DU RAPPORT

Quel le Comité de l'urbanisme recommande au Conseil d'approuver les critères et les exigences concernant les systèmes de pompe d'assèchement qui sont énoncés dans le présent rapport.

BACKGROUND

Building Better and Smarter Suburbs (BBSS) was launched in the fall of 2013 to examine design challenges and opportunities associated with new greenfield developments. The focus of the initiative is on improving land efficiency, affordability and livability in new suburbs within the current urban boundary.

The Infrastructure Standards Review (ISR) is a Term of Council Strategic Initiative and was launched to align and complement the BBSS Project. The focus of the ISR is to confirm established levels of service, then review and implement infrastructure standards that achieve lifecycle economies in construction, maintenance and/or replacement costs for the City while ensuring the on going protection of public health and safety.

An update on BBSS-ISR was received by Council on May 24, 2017. The update identified revised infrastructure standards and estimated savings for both lifecycle and development charge costs.

Building on these efforts, the City undertook a review of the use of sump pumps in new subdivisions and is proposing to allow the use of sump pump systems for foundation drainage in certain new residential developments.

This permission would be limited to greenfield developments in areas with clay soils, where full municipal services are being proposed and where there are constraints on

development using gravity drainage systems or third pipe system, which would otherwise be preferred. The potential rate of groundwater into the foundation drain is a function of both the elevation of the water table, and the permeability of the surrounding soils. Sump pumps in clay soils should cycle less frequently than those in sandy soils because the clay soils are less permeable.

While sump pumps have been used in the City in areas without storm sewers and as part of the City's Protective Plumbing Program, sump pumps have not otherwise typically been applied in new developments built with storm sewers.

The City's proposal to allow the use of sump pump systems for foundational drainage in new residential neighbourhoods is also supported in the BBSS Strategic Direction and Action Plan and more specifically:

- Ensuring communities are land and infrastructure efficient with the potential to ease the pressure on the urban boundary.
- In suburban areas with clay soils and fill restrictions the use of sump pumps may lower construction costs and therefore this may increase the affordability.
- Balancing good urban design with long-term maintenance and operational costs, including:
    - Possible reduction of lightweight fill (Styrofoam).
        - Excessive lightweight fill limits landscaping possibilities.
    - In some instances, decrease the amount of submerged storm sewer pipes:
        - Submerged storm sewer increases long-term maintenance costs by having more frequent cleaning requirements and higher volume of sediment removal.

DISCUSSION

Residential dwellings with full basements are commonly constructed with perimeter foundation drains to collect infiltrating groundwater and/or percolating precipitation. The foundation drains provide a means of conveying the water away from the foundation in

order to avoid basement flooding and potential foundation damage due to hydrostatic pressure. The City's preference is to have the outlet of the perimeter foundation drains flow by gravity to a storm sewer. However, recent developments have demonstrated that site constraints make adhering to this requirement very difficult and often impractical to achieve. This has resulted in the consideration of sump pumps located within basements as an alternative. With a sump pump system, the water from the perimeter foundation drains collect in a sump in the basement and is pumped to a storm sewer. The City's Sewer Connection By-law (By-law No. 2003-513) accommodates this by allowing for the use of sump pumps systems "where building drains are too low to permit gravity flow."

Level of Service

Whether the outlet for the perimeter foundation drains flows by gravity or through a sump pump connected to the storm sewer, both perform the same function. That is to evacuate water that may accumulate from around the foundation. The difference is that with a sump pump system, there is an increased requirement on the part of the homeowner to periodically inspect and maintain this mechanical system.

To reduce the risk associated with relying on a mechanical system, increased diligence is required in establishing the basement and footing elevations in accordance with a hydrogeological assessment. Constructing the foundation above the seasonal high water table ensures that perimeter foundation drains are only required during atypical conditions, such as very large storm events or unusually high water table conditions (e.g. during spring runoff conditions following a winter with very high snowfall). The risk of not doing so is that foundation drains may be required to function for extended periods, increasing the risk of basement flooding due to failure of any of the various components of the foundation drainage system or result in a damp basement environment, which can negatively impact indoor air quality.

Jurisdictional Review

The use of a sump pump system for foundation drains is not new and is commonly applied in municipalities across Canada. A review of specific policies, technical requirements and recommendations from 14 Canadian municipalities (such as Calgary, Edmonton, Vancouver, Winnipeg, London), two American states (Wisconsin and Connecticut), the National Research Council and the Institute for Catastrophic Loss

Reduction was completed. All these jurisdictions permit the use of sump pumps for urban residential developments. The variance is in the level of hydrogeological investigations that are required, the preferred outlet location for the sump pump (surface vs to a storm sewer) and the technical details for the sump pump systems.

Stakeholder Engagement

In addition to the jurisdictional review, as part of the BBSS-ISR process, a Technical Advisory Committee was established with representation from different city departments, industry (land developers, consultants) and a hydrogeologist retained by the City. Based on the work completed by this group, the City is proposing changes to foundation drainage requirements to permit the use of sump pump systems in some circumstances, in new greenfield residential developments. Gravity outlet to a storm sewer will remain the City's preferred servicing option, but consideration of sump pumps will allow some residential developments to proceed that would otherwise not be practical under current requirements.

Given the increased maintenance and operation responsibilities for homeowners, purchasers will be provided with information on the use and maintenance of the sump pump system. In addition, conditions will be included as part of planning approvals, such as within subdivision agreements, to require that prospective purchasers be notified with respect to the sump pump system through the purchase and sale agreement to ensure purchasers are aware of these responsibilities. These notices would also be registered on title.

Screening Criteria

The City has developed screening criteria and sump pump requirements with an emphasis on hydrogeological investigations, water table considerations, and sump pump system requirements. The main focus of the hydrogeological investigations will be the determination of the seasonal high water table, with the goal of ensuring that underside of footing elevations are maintained above this level such that the operation of sump pump systems is only required during unusual conditions.

The use of sump pump systems for the purpose of foundation drainage will require all of the following conditions to be satisfied prior to acceptance and implementation:

1. The area under consideration is underlain by clay soils subject to grade raise restrictions.

2. The finished grades that would be required to allow gravity drainage would exceed permissible grade raises, potentially leading to long-term settlements that exceed Ontario Building Code and City of Ottawa standards. In making this determination, the proponent must allow for the placement of lightweight fill under the garage and porch. The use of sump pump systems would thus alleviate excessive areas of lightweight fill (beyond the garage and porch), long duration (multi-year) pre-loading, or other such extreme means to prevent long-term settlements.

   Grade raise restrictions are to be determined by a geotechnical engineer with specific experience in this matter. The analysis and results must be to the satisfaction of the City of Ottawa.

3. Hydraulic grade lines (HGL) cannot reasonably be lowered any further due to outlet restrictions. Outlet restrictions need to be clearly defined and reasonable options considered. In addition, increasing the storm sewer pipe size to reduce the HGL should have a higher priority than the implementation of sump pump systems.

Requirements for Sump Pump Systems

If the site meets the above site screening criteria, then sump pump systems may be used provided the following measures are implemented to ensure their long-term performance:

1. A hydrogeological assessment of the seasonal high water table using properly sealed monitoring well installations will be required and this assessment must be detailed in the geotechnical investigation report. The monitoring well program shall be designed and supervised by a hydrogeologist, who will also be responsible for the overall hydrogeological assessment.

2. Requirements for the hydrogeological assessment will be defined in the City of Ottawa Sewer Design Guidelines. This will include requirements for the identification of the pre-development high water table, anticipated post-development changes to the long-term water table (where supporting data is available in order to assess these changes), the potential for short-term groundwater concerns during transient events (e.g., spring melt, high intensity storm events), and estimated rate of

groundwater ingress for both long-term and transient conditions. This assessment shall be used to support the setting of the underside of footing (USF) elevations for proposed residences in the affected area.

3. In addition to the main sump pump, a back-up system will be required with minimum capacity and continuous hours of operation as will be specified in the City of Ottawa Sewer Design Guidelines. Since the sump pump system will be expected to cycle periodically (i.e., non-continuous operation) the overall reserve time of operation should be much longer.

4. Only the perimeter foundation drainage system will be connected to the sump pit. The development of the guidelines for the sump pump system will consider the requirement of eaves troughs at the time of the original sale of the home and the incorporation of a clay seal at the ground surface surrounding the perimeter of the residence.

5. The sump pump system shall discharge to the storm sewer.

6. The installation costs for sump pump systems are the responsibility of the developer. Costs for the maintenance and operation of the sump pump system (including back-up power) and eaves trough discharge will be the responsibility of the homeowner. These conditions will be included as part of the planning approval and notice will be required within the purchase and sale agreement, as well as registered on title.

7. If the use of sump pump systems was not identified in a Master Servicing Study (MSS), there will be a requirement to update or amend said report. For new developments the MSS is to identify the need for sump pump systems where these are required.

8. All grading plans are to clearly indicate where sump pump systems are required and the City's Building Code Services are to be advised of this requirement in order to ensure that the house plumbing plans conform to this requirement.

9. The sump pump system is to conform to the City of Ottawa Sewer Design Guidelines (technical details under development and are recommended to be approved under Delegated Authority).

RURAL IMPLICATIONS

This report applies to developments in rural villages serviced by municipal storm sewers. Sump pumps are already permitted for residential developments in rural areas that are serviced by roadside ditches.

CONSULTATION

As noted, a Technical Advisory Committee was established with representation from different City departments, industry (land developers, consultants) and a hydrogeologist retained by the City. Based on the work completed by this group, the City is proposing changes to foundation drainage requirements to permit the use of sump pump systems in some circumstances, in new urban residential developments.

Given the increased maintenance and operation responsibilities for homeowners, purchasers will be provided with information on the use and maintenance of the sump pump system. In addition, conditions will be included in the purchase and sale agreement, and registered on title, to ensure purchasers are aware of these responsibilities.

COMMENTS BY THE WARD COUNCILLORS

This is a City-wide report – not applicable.

LEGAL IMPLICATIONS

There are no legal impediments to the adoption of the recommendation in this report.

RISK MANAGEMENT IMPLICATIONS

There are risk implications. These risks have been identified and explained in the report and are being managed by the appropriate staff.

ASSET MANAGEMENT IMPLICATIONS

This report is consistent with the City's Comprehensive Asset Management (CAM) Program (City of Ottawa Comprehensive Asset Management Program) objectives.

The City's proposal to allow the use of sump pump systems for foundational drainage in new residential neighbourhoods fulfils the City's obligation to deliver quality services to the community in a way that balances service levels, risk and affordability.

FINANCIAL IMPLICATIONS

The installation costs for sump pump systems are the responsibility of the developer. Costs for the maintenance and operation of the sump pump system (including back-up power) and eaves trough discharge will be the responsibility of the homeowner. These conditions will be included as part of the planning approval and notice will be required within the purchase and sale agreement, as well as registered on title.

ACCESSIBILITY IMPACTS

There are no accessibility implications with the recommendations in this report.

ENVIRONMENTAL IMPLICATIONS

Using sump pumps for foundation drainage is commonly used in other municipalities for urban residential development. Sump pumps provide an alternative for drainage and may be used upon meeting the screening and technical requirements. The City's Sewer Connection By-law (By-law No. 2003-513) allows for the use of sump pumps systems "where building drains are too low to permit gravity flow." Sump pumps provide an opportunity for livability in new suburbs within the current urban boundary.

TERM OF COUNCIL PRIORITIES

The Infrastructure Standards Review (ISR) is a term of Council Strategic Initiative and was launched to align and complement the BBSS Project.

In addition, the recommendations in this report address the following Term of Council Priorities:

- Sustainable Environmental Services (ES) – Supporting the planned growth of the city with the duty to ensure fiscal sustainability and meet legislative requirements in the delivery of municipal services.
- Financial Sustainability (FS) – Make long-term choices that allow City services to be sustainable.

SUPPORTING DOCUMENTATION

N/A

DISPOSITION

Under delegation authority, the Director of Infrastructure Services will update the City's Sewer Design Guidelines to permit the use of sump pump systems for new residential developments that meet the screening criteria requirements set out in this report.

Planning Services will work with the development industry to ensure that purchasers will be provided with information on the use and maintenance of the sump pump system and that conditions are contained within planning approvals to require that notice included in the purchase and sale agreement, and registered on title, to ensure purchasers are aware of these responsibilities.