

# **BELGRAVIA COMMUNITY CONSULTATION ON PROPOSED STORM TUNNEL**

**Held February 15, 2006 at St. Paul's United Church**

## **CONSULTATION SUMMARY**

Attendance: 46

Presenters: Russell Barth, P.Eng. - Senior Drainage Planning Engineer  
Wayne Pelz, P.Eng.- Program Manager,  
Drainage Design and Construction

### **Presentation**

Following introductions, Mr. Barth described the serious flooding that occurred in Edmonton in July, 2004, where over 4,000 basements flooded. Neighbourhoods in west and south-central Edmonton were among the worst hit, with 43 Edmonton neighbourhoods identified as priority areas for flood prevention work. While Belgravia is not among the highest priority areas, approximately 40 basements flooded in Belgravia in July, 2004.

Two communities directly adjacent to Belgravia, McKernan and Parkallen, are among the highest priority neighbourhoods. Investigations have since determined that the existing storm trunk sewer draining McKernan and Parkallen (along with portions of Belgravia and Allendale) is too small to take the flows and results in backup of the neighbourhood storm sewers during larger storm events.

Engineering investigations have determined that the best solution to reduce the flood risk for the McKernan and Parkallen neighbourhoods will be to increase the capacity of the downstream trunk sewer thus removing a critical bottleneck in the system. The existing outlet sewer runs west from 114 St. below Belgravia Road, then north below Fox Drive, then north along the foot of the valley slope and into the river near the foot of Keillor Road.

Mr. Barth outlined a tentative alignment of a proposed new storm tunnel as draining west from 114 St. below 71 Ave., then northwest on 71A Ave. to the river at the existing outlet location. The proposed tunnel is expected to have the following multiple benefits:

- reduced flood risk for McKernan and Parkallen neighbourhoods;
- reduced flood risk for portions of Belgravia and Allendale neighbourhoods;
- an adequate outlet for the future LRT underpass below Belgravia Road; and
- relief to the existing outlet sewer freeing up capacity to accommodate runoff from future developments in the south campus area.

The new sewer tunnel will be constructed by a mechanical mole machine that cuts the earth in a scraping motion that generates very little vibration. The sewer will be installed within the tunneling machine in concrete segments, which are expanded into their final position as the mole advances. The depth of this sewer will range from over 30 metres to over 45 metres deep through Belgravia, and will be constructed entirely within bedrock.

No vibrations or ground settlement are expected on the ground surface during or following construction of this tunnel.

Residents will notice construction activities in three locations. The first location is in the river valley near the existing outlet, where the tunneling operations will be based. The tunnel will be constructed from this location upstream to the end point at 114 St. and Belgravia Road. The City's trail system will be temporarily re-routed around the construction area. Construction will occur at this location for the duration of the project.

The second site of construction activity will be located in Belgravia, just off the roadway at the intersection of 71 Ave. and 71A Ave. A crane will be located at this site for approximately 1 to 2 months while an access shaft is drilled and the mechanical mole is turned such that it can continue tunneling along a new alignment (below 71 Ave.). Construction at this site will occur about half way through the project when the mole has reached that location. The crane will be removed from the site once the mole has been turned. For the remainder of the project, the site will remain fenced but open as an emergency egress location. At the end of the project, the site will be covered with a manhole remaining.

The third site of construction will be located in the green space off the south-east corner of the intersection of 114 St. and Belgravia Road. Construction activity at this site will be off the roadway and will occur in the last few months of the project. A shaft will be constructed at this location to remove the tunneling equipment and make the connections of the contributing storm sewers to the new tunnel. At the end of the project the site will be covered with a manhole remaining.

The schedule for this project involves detailed design through 2006, with construction in 2007 and 2008. The proposed alignment has not yet been finalized, but should be finalized within the next few months in order to keep on schedule. The City is committed to working with the community to determine the best alignment to take.

The cost of this project is estimated at about \$14.7 million, but City Council must yet approve the funding of this and other flood prevention works. Funding approval is expected sometime this spring.

Mr. Pelz then presented a few slides of tunneling operations and described the tunneling process in Edmonton, and specific details of this project.

### **Input from Residents**

Many residents attended the meeting and most participated in the question and discussion period. Some of the main concerns raised were as follows:

**Concern:** Why that route? Why not stay on Saskatchewan Drive South (along the edge of the community) and therefore be less disruptive to the community? Do you require the permission of the homeowner before tunneling under his property? An extra \$1 million on top of a \$15 million project doesn't seem that much.

**Response:**

- The City maintains that there will be very little disruption to the community from the tunneling operations.
- Both routes would require a turning shaft, involving a crane and a few truck loads per day of earth over the course of 1 to 2 months. The minimal disruption to the community of this construction site would be essentially the same for both alternatives.
- A strata easement is required from only one home along the preferred alignment. This alignment does depend on a successful negotiation with the homeowner.
- \$1 million is a lot of money, and worth trying to save.

**Concern:** What if settlement of homes or property does occur? How can the residents along the route be assured that the City will be responsible? Can a letter be sent to these residents clearly stating that the City will take full responsibility for settlement or property damage as a result of the tunneling work? What about the new homes that have been built?

**Response:**

- The City will conduct some surface settlement and surface vibration monitoring during construction. If excessive settlements or vibrations are measured, corrective action can be taken in the tunneling operations to reduce the problems.
- The City may also monitor one or more homes for settlement during tunnel construction. This information would be made available to the public.
- New homes are adjacent to both routes. All new homes have a tendency to settle somewhat in their first few years. The City will need to develop a monitoring program that can distinguish between the natural settling of a new home, and the tunneling operations.
- Ultimately, the City will take responsibility for any property damage experienced as a direct result of the tunneling operations. A letter to this effect can be sent to homeowners along the route.

**Concern:** How deep is the bedrock? The draft geotechnical report identifies the material as a type of shale, not bedrock? Calling it bedrock if it is not, is misleading.

**Response:**

- Bedrock begins at a depth of about 15 metres. The tunnel is at a depth of about 40 metres, and is therefore, well within the bedrock.
- The bedrock material consists of interbedded clayshale and sandstone, a type of soft bedrock and is ideal for tunneling. Compared to a soil, the material is considered as a rather strong soil for tunneling. The material has more than enough strength for the tunnel to stand on its own without the concrete liner. But, it doesn't have to since the concrete liner will be installed within the tunneling machine, one metre length at a time.

**Concern:** What is the City's experience with building tunnels? Have there been any problems encountered? Has the City tunneled under homes before? What about frost damage?

**Response:**

- The City has its own tunnel construction equipment and crews, and has been building tunnels in Edmonton since the 1950's.
- Many unique tunneling situations have been encountered and managed. The City has tunneled under buildings before, the most recent of which was a home at a depth of about 15 metres in sedimentary material. No problems were experienced on that project.
- The City's Transportation Department has also used tunneling to construct portions of the LRT line, which included some tunneling that went under a large building at the University to within 2 meters of the building foundation. No settlement in the building occurred and no appreciable vibrations were felt.
- No frost damage is expected. Frost damage has not been encountered at other locations in the City.

**Concern:** There are rotational slumping locations along the river valley slope all throughout the area. Can you guarantee that there will be no slumping damage to the tunnel?

**Response:**

- The existing sewer outfall is located in a stable part of the river valley, just on the edge of the flat valley lands used by the equestrian centre. The new sewer is planned to discharge into the river at or near the existing outfall location. While there can be no guarantees, valley wall stability is not expected to be a concern.

**Concern:** Will the University be using this tunnel, and if so, could their flows then backup into our neighbourhood?

**Response:**

- As the University develops the south campus lands, they will construct stormwater management facilities to hold the runoff water during large events with slow release to the downstream sewer system. This will minimize the impact on the receiving sewers.
- The proposed storm tunnel through Belgravia will be oversized. It will be able to accommodate all flows that can be directed to it from existing neighbourhood sewers, and anticipated future flows from the LRT underpass and south campus lands. As well, the proposed sewer will be so deep that it would be virtually impossible for it to back up high enough to impact Belgravia.

**Concern:** Why not use the existing tunnel alignment? You could open-cut instead of tunnel. Isn't open-cut a much less expensive construction method?

**Response:**

- The existing tunnel alignment was the first alternative investigated since a much less expensive open-cut construction method could be used. This alternative was quickly dismissed as it would require the complete closure of one of Belgravia Road and Fox Drive, the highest traffic volume stretches of roadway in the City for a period of a year or more (the size/scale of the open cut section needed would require complete road closure).

**Concern:** There are many buried utilities in the vicinity of the proposed turning shaft (the intersection of 71 Ave. and 71A Ave.). How can you possibly tunnel there?

**Response:**

- A complete review of all buried utilities will be undertaken early in the detailed design project.
- Utilities tend to be buried at relatively shallow depths; no buried utilities are anticipated at the 45 metre depth of the tunnel.
- We have some flexibility in where we locate the turning shaft. We anticipate that we will find a suitable location that will avoid other buried utilities.

**Concern:** How exactly will Belgravia benefit from the new sewer? Will there be any connections made from Belgravia sewers into the new sewer? There are street flooding problems in south-east Belgravia. Can these problems also be addressed?

**Response:**

- Much of south Belgravia drains into the existing sewer. During the July, 2004 storms, the existing sewer likely backed up into Belgravia, leaving the community with no outlet for a period. The new tunnel will dramatically off-load the existing sewer, freeing up its capacity to take Belgravia discharges. This is expected to provide significant benefit to Belgravia.
- No connections are planned at this time from Belgravia sewers to the new tunnel.

- The City will investigate the storm drainage systems (storm sewer and surface drainage) in south Belgravia to identify any weaknesses and potential remedial works that can be considered. The City will conduct this investigation in the next few months and report back to the residents.

### **Next Steps**

Drainage Services will take the community's input and review route options. Another community meeting will be held once additional engineering work is completed. Drainage Services will continue to provide information and updates to interested residents through direct mail and the community league as the project develops.

Minutes prepared by:

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