

3.0 ROADWAY/BRIDGE ALIGNMENT OPTIONS

3.1 GENERAL

The four (4) roadway/bridge realignment options that were developed and exhibited at the Open House are shown on **Exhibits 3.1 to 3.4**. The main features of each option are summarized below:

3.1.1 Option 1 – Base Option

This option represents bridge replacement with no significant modifications or improvements to the approach roads. This option may or may not have southbound access to the Kinsmen across the bridge, and could therefore provide a three (3) lane bridge (all northbound) or a four (4) lane bridge with three (3) northbound lanes and one (1) southbound lane.

- Minor modifications to the bridge orientation, but the north end of the bridge lands at the existing location.
- The south end of the bridge will need to be raised to provide clearance to flood levels. The final elevation of the bridge would depend on the type of bridge (bridge depth), but the south end would likely require a raise of at least 3.5 m, and therefore, significant road reconstruction would be required at the south end of the bridge.
- Minimal vertical adjustment is required at the north end of the bridge; accordingly, minimal widening only would be required. Anticipate road widening generally on the west side of 105 Street to minimize disturbance on the east side.
- No impact on End of Steel Park, as the hairpin curve at Saskatchewan Drive is maintained.

3.1.2 Option 2 – Grade Separation at Saskatchewan Drive

This option provides the added attributes of both a southbound connection to Kinsman across a new bridge, but also a southbound connection from Kinsman to Calgary Trail.

Option 2 provides improved horizontal and vertical geometrics for Queen Elizabeth Park Road and Walterdale Hill Road, and provides a four (4) lane bridge (three (3) northbound and one (1) southbound). The option would require the south approaches to the bridge to be raised which creates some challenges and requires reconfiguration of the Kinsman parking lot access. Gateway Boulevard is proposed to be realigned to 102 Street north of 82 Avenue and is proposed to be depressed under Saskatchewan Drive. This option realigns Gateway Boulevard to the east of the Strathcona Farmers' Market parking lot which addresses some concerns regarding pedestrian connectivity.

- Minor modifications to the bridge orientation to develop improved geometrics on the south approaches, but the north end of the bridge lands at the existing location.

- Grade separated, where Gateway Boulevard crosses Saskatchewan Drive, and the preferred approach would have Gateway Boulevard under Saskatchewan Drive, to reduce the vertical distance (longitudinal grades) between Saskatchewan Drive and the south end of the bridge (the existing elevation difference is ≈ 36 m / 120 ft).
- The new road footprint on the south side is quite significant as most of the alignment is off the existing Queen Elizabeth Park Road. Even with a depressed Gateway Boulevard, extensive retaining walls or elevated roadway (structure) will be required for the south approach.
- Major impact on End of Steel Park, and creates depressed roadway or tunnel through the north part of Old Strathcona.

3.1.3 Option 3 – Grade Separation at River Valley Road

Option 3 provides a four-lane bridge, three lanes northbound and one lane southbound for access to Kinsman. A grade separation is provided at River Valley Road/105 Street. The intersection at Saskatchewan Drive/Gateway Boulevard is intended to be at-grade, but would require very high fills or elevated road on structure (+13m fills) and tight, horizontal geometry on Gateway Boulevard north of Saskatchewan Drive. Gateway Boulevard would be realigned to 102 Street through End of Steel Park.

- With grade separation at River Valley Road and 105 Street, this option could provide an elevated 105 Street over a significant historical resource, but provides adverse connection to southbound access to Kinsman.
- North departure from the bridge adversely impacts the proposed West Rossdale Redevelopment, and no direct access from 105 Street to River Valley Road.
- Traffic analysis suggests operational concerns on the north side of the river.
- Geotechnical concerns related to high fills on unstable slopes on the south bank.
- Significant impact on End of Steel Park.

3.1.4 Option 4 – Realigned Bridge Crossing 280 m East

Option 4 provides a bridge location approximately 280 m downstream of the existing bridge, and therefore requires very significant new road construction on both the south and north approaches. The option could accommodate three northbound lanes and one southbound lane (access to Kinsman) on the bridge. This option relocates the major route north of the river off 105 Street to an alignment approximately 250 m east, between EPCOR Water and EPCOR Power sites, and intersects with Rossdale Road at 96 Avenue on the west side of Telus Field.

- The option appears to have many benefits related to the redevelopment of West Rossdale and EPCOR Power site (moves the main route to the perimeter of the redevelopment area).
- This option will likely require a fairly high bridge due to the shortened south approach, and therefore will likely require extensive use of retaining walls or elevated roadways.

- To reduce grades on the south approach will likely require grade separation at Saskatchewan Drive with Gateway Boulevard under, which has a major impact on End of Steel Park, and creates a depressed road/tunnel through Old Strathcona.
- Traffic analysis indicated that the new intersection of Rosssdale Road and River Valley Road would have major operational and congestion concerns during the AM Peak.
- May be feasible to retain the existing bridge for pedestrians, but the bridge would be below flood levels on the south side.

3.2 CONCEPTUAL ROAD/BRIDGE ALIGNMENT RECOMMENDATION

The four (4) road/bridge alignment options were presented at the Open House as three (3) separate elements: north side of the river, bridge crossing, and south side of the river. The focus of the technical work since the Open House has been to complete further evaluation of the options and to delve further into the details of each option. As a result of this further work, we have concluded the following for each element of the project.

3.2.1 North Side of the River

The preferred configuration on the north side of the river is to generally retain the status quo with respect to retaining an at-grade intersection at River Valley Road/Rosssdale Road, and 105 Street. Rosssdale Road will be converted to a two-way operation to meet the requirements of the West Rosssdale re-development area.

The road options that provided grade separation at River Valley Road and 105 Street, or shifted the bridge east to a new alignment were found to have unacceptable operational concerns, and would require resolution of complex and costly modification to the existing or planned infrastructure. It was concluded that further consideration of these options will not likely be prudent.

3.2.2 Bridge Crossing

Three (3) bridge crossing orientations are considered feasible for further consideration and study, and are illustrated on **Exhibits 3.5, 3.6 and 3.7**. Each option provides a southbound lane to access Kinsman from the north side of the river. As noted, the south end of the bridge must be raised to accommodate flood levels and the amount of raise required will be influenced by the bridge type (structure depth).

The elevation of the south end of the bridge, and accordingly, the south approach roads, will require reconfiguration of the access to the Kinsman parking lot. A higher elevation also has a significant impact on the extent of the road reconstruction required on both Walterdale Hill Road and Queen Elizabeth Park Road. However, higher road elevations at the south bridge approaches would be considered more favourable in terms of providing pedestrian and trail accommodation under these roadways.

The north end of the existing bridge is above flood levels, and therefore, a new bridge can be installed at the approximate current road elevations, assuming a typical structure depth. In order to protect for a future grade separated pedestrian crossing (promenade) on the north side of the river, it is suggested that either a pedestrian overpass or underpass would be feasible; however, an underpass would be more desirable and appropriate. A promenade under the bridge (along the water) would require sufficient vertical clearance (+4.0 m), and would therefore likely require the promenade to be located below flood levels, but well above normal water levels.

Exhibit 3.5 illustrates the Base Bridge Replacement Option. The option requires minimal road improvements on the north side of the river, but reorients the bridge and south approach roads to provide improved traffic flow on both Walterdale Hill Road and Queen Elizabeth Park Road. A traffic signal to meter traffic flows between Queen Elizabeth Park Road and Walterdale Hill Road will be required. This signal would also be expected to provide control for the Kinsman Access. The impact to the Kinsman parking lot may require reconfiguration to minimize loss of parking stalls.

This option would likely require the existing Walterdale Bridge to be closed totally during construction of a new bridge.

Exhibit 3.6, West Bridge Alignment Option, illustrates a replacement of the Walterdale Bridge on an alignment west of the existing bridge. This option was developed to facilitate construction of a new Walterdale Bridge without the need to close the existing bridge during construction. Our initial development and evaluation of this option indicates that appropriate geometrics, both horizontally and vertically can be achieved on the south approaches. On the north side, significant new road construction would also be required, including reconstruction of the River Valley Road and 105 Street intersection. The resulting intersection would be on skew and not provide appropriate operations.

The west alignment impacts areas on both the north and south sides of the river, which will require Historical Resource Impact Assessments as limited previous work has been completed. This could impact the schedule somewhat; however, it is the opinion of Turtle Island CRM, our Historical Resources Consultant, that any findings could likely be mitigated.

This option has a slightly greater impact on the Kinsman parking lot, although initial evaluation suggests the impacts can be mitigated through minor reconfiguration of the parking lot to minimize the loss of parking stalls.

An east side bridge replacement option shown on **Exhibit 3.7** was also developed as a bridge option that could be constructed while the existing bridge remains open to traffic. This option would require relocation of the Interpretive Belvedere at the north end of the bridge, but will not impact the Fort Edmonton Cemetery and Traditional Burial Ground. The bridge length required for this option is longer than the other two (2) options.

Road improvements on the south approaches are somewhat more extensive, but appropriate horizontal and vertical geometrics can be achieved. Road improvement costs will be somewhat higher due to the extent of retaining walls and/or elevated structures required on the approaches. The impact to the Kinsman parking lot is minimized as this option moves the south bridge approach roads away from the Kinsman parking lot, and also eliminates left turns across traffic for access to the Kinsman.

Although we believe that the east side bridge option can be constructed without closing the existing bridge, additional work is required to validate the preliminary work completed to-date. The bridge type/style selected will also influence the ability to construct the new bridge with the existing bridge open to traffic.

3.2.3 South Side of River

Four (4) road options for the south bank are being carried forward for further evaluation and study, as this component appears to be the most controversial part of the Study. Each of the bridge options discussed in the previous section can be implemented by connecting to the existing Walterdale Hill Road and Queen Elizabeth Park Road (the exact location of connecting varies between options). The flexibility to ensure stageability has therefore been retained with each bridge option.

The following briefly describes the south bank road options (Gateway Boulevard/Saskatchewan Drive/Queen Elizabeth Park Road:

3.2.3.1 Do Nothing Option

This option retains the status quo, i.e.: the hair pin curve at Saskatchewan Drive/Queen Elizabeth Park Road, and appears to be supported by the neighborhood and business associations south of the river. Although the hairpin curve is considered undesirable to many motorists, it appears to function reasonably well, and has a reasonable collision record. However, we believe that prudent planning requires that an alternative be developed to improve the current situation, now or at some future date.

3.2.3.2 Grade Separation – Queen Elizabeth Park Road under Saskatchewan Drive

Option 2 realigns Gateway Boulevard to 102 Street north of Whyte Avenue to address concerns related to creating a depressed Gateway Boulevard which severe the parking lot from the market and other venues in Old Strathcona. Gateway Boulevard would be depressed under Saskatchewan Drive, would be a two-way roadway north of 86 Avenue, and provide a southbound access from Kinsmen on Queen Elizabeth Park Road. **Exhibit 3.8** illustrates this option.

Realignment of Gateway Boulevard impacts existing parking for developments along 102 Street, but does not directly impact Ritchie Mill or the Jazz Club. Modification of the Saskatchewan Drive/Gateway Boulevard intersection would be required to facilitate southbound traffic on Queen Elizabeth Park Road, accessing Saskatchewan Drive. This

option requires major roadway improvements between 82 Avenue and Saskatchewan Drive.

3.2.3.3 Modified At-Grade Intersection – Gateway Boulevard and Saskatchewan Drive

Option 3 provides an at-grade intersection for Gateway Boulevard/Saskatchewan Drive, relocated to 102 Street alignment. The option requires substandard horizontal and vertical geometrics to make up the grade difference between Saskatchewan Drive and the bridge. The option also requires lowering a portion of Saskatchewan Drive in the vicinity of 102 Street, which creates some challenges for access to existing developments in the area. The option is illustrated on **Exhibit 3.9**.

This option has significant geotechnical challenges which would likely require significant elevated road structure, approximately 13 m high. Significant additional technical work is required to confirm the feasibility of this option.

3.2.3.4 Grade Separated Gateway Boulevard under Saskatchewan Drive

This option differs from Option 2 as it retains the one-way northbound operation on Queen Elizabeth Park Road, and only moderately shifts Gateway Boulevard east to provide enhanced geometrics for the grade separation at Saskatchewan Drive. The option significantly impacts End of Steel Park, but mitigation including a covered depressed Gateway Boulevard could be created to provide enhanced park and pedestrian crossings. **Exhibit 3.10** illustrates this option.

This option could be staged with any of the bridge options currently under consideration, and provides a good staging opportunity to meet the long term demand.

3.3 INTERIM ROAD ALIGNMENT OPTION CONCLUSIONS

The Interim Report conclusions that were presented to the Transportation and Public Works Committees (TPW) of City Council were as follows:

3.3.1 North of the River

All options will consider tying into or slightly modifying 105 Street to provide an at-grade intersection with River Valley Road in approximately the existing location. Rossdale Road between 97 Avenue and River Valley Road will be converted to two-way operations for all options in accordance with the West Rossdale Redevelopment plan.

3.3.2 River Crossing

Three (3) alignment and bridge orientation options are considered feasible technically, and require further study and evaluation, subject to further direction from the City. All options provide a southbound lane across the bridge for access to Kinsman; however, this could be eliminated, if required.

3.3.3 South Side of River – Top of Bank

Four options for the south bank roadways require further consideration and evaluation to confirm technical feasibility. All bridge and approach road options have been designed to facilitate staging opportunities and allow the bridge replacement and approach roads component to be completed prior to, and separate from any south bank road improvements.

Conceptual level cost estimates for the approach road improvements indicate costs in the range of \$30 Million to \$70 Million, excluding the south bank improvements. Costs for the south bank improvements range from \$0, for the “do nothing” option, to \$43 Million for the grade separation, which includes modification of, and realignment of Gateway Boulevard to 102 Street, north of 82 Avenue.

3.3.4 Interim Road Alignment Option Summary

Direction from TPW at the January 25, 2011 meeting recommended that Administration focus efforts on the planning and community consultation on the bridge itself, with the immediate access egress being the main focus, while still protecting future approaches to the bridge. The technical focus has therefore been directed to the bridge replacement and immediate vicinity roads and no further work has been completed for the south bank.

3.4 RIVER CROSSING ALIGNMENT EVALUATION

Further development and refinement of bridge crossing options was required to properly evaluate and select an appropriate alignment for implementation. Conceptual designs and cost estimates were prepared for the base option (replacement only) and a west side alignment option, and both were found to have similar costs if constructed using conventional embankment. An evaluation completed by the Project Team also indicated that the options scored similarly, but it was felt that the west side option was more favourable because it facilitated constructing the new bridge with the existing bridge in service. The base option provided superior geometrics, both on the south side approaches to the bridge as well as the River Valley Road/105 Street intersection. In addition, the west side option resulted in a loss of approximately 60 parking stall in the Kinsmen parking lot and created some challenges for access/egress from Walterdale Road/Queen Elizabeth Park Road to the parking lot. The advantages and disadvantages of each option are summarized in **Tables 3.1** and **3.2** below:

Table 3.1 – Advantages

BASE BRIDGE OPTION	WEST BRIDGE OPTION
<p>Somewhat better horizontal alignment (R 170, R 250) than west alignment.</p> <p>Option accommodates arch, extradosed and girder bridges.</p> <p>Access to Kinsmen improved.</p> <p>Minimal reconstruction on River Valley Road and 105 Street.</p> <p>Smooth horizontal geometry on both north and south banks; Walterdale Hill Road geometry is improved at the bottom of the hill.</p> <p>Kinsmen access provides plenty of storage and stacking; grades are more easily accommodated; a single access may reduce confusion and simplify circulation on site.</p>	<p>Allows bridge to stay open during bridge construction:</p> <ul style="list-style-type: none"> • Traffic accommodation during construction. • Access to Kinsmen parking lot is maintained. • Allows flexibility for when/if utilities need to be moved. <p>It may be possibly to retain the existing bridge as a pedestrian facility:</p> <ul style="list-style-type: none"> • Raise the south end of the bridge on the existing piers. • Protect the piers from scour. • Miscellaneous other improvements estimate total cost in \$10 Million range. • If new bridge width reduced by 10.0 m (no pedestrian facilities) = 2000 m² reduced area (possible \$20 Million in savings). • It was concluded by the Study Team that the existing bridge should not be retained as a pedestrian facility in its current location. <p>Lower fill:</p> <ul style="list-style-type: none"> • Road connections / access easier to achieve. • Not as pronounced physical barrier. <p>No impact on the monument site.</p> <p>Smaller foot print than base option on fill.</p> <p>Bridge can be constructed without taking the existing bridge out of service – commuting route will be less impacted than base option.</p> <p>Greater schedule flexibility for utility relocations.</p>

Table 3.2 – Disadvantages

BASE BRIDGE OPTION	WEST BRIDGE OPTION
<p>Higher fills, division of River Valley Park.</p> <p>Will likely impact on Monument Site.</p> <p>Bridge closure effects:</p> <ul style="list-style-type: none"> • Road network impact. • Need for alternative access to Kinsmen. • Pedestrian access from north to the park, south to Kinsmen. <p>Utilities – accommodation/relocation during construction – risk of longer construction period.</p> <p>Bridge removal prior to new bridge construction will result in longer construction duration.</p> <p>At-grade pedestrian crossing at Kinsmen intersection – steeper grades.</p> <p>Utilities on existing bridge must be taken out of service or relocated before existing bridge can be removed.</p> <p>Traffic must be re-routed to other bridge for most, if not all, of the construction period – this could be views as an advantage (little or no traffic to contend with during construction).</p> <p>Based on the current alignment for the base option, the north abutment and river pier may need to be removed prior to significant construction for the new bridge (on the north bank); could be a schedule challenge.</p> <p>Taking the bridge out of operation will eliminate a pedestrian/cyclist crossing during the construction period.</p> <p>Kinsmen has expressed concern about losing the bridge for any period of time, fearing loss of customer base during construction.</p>	<p>Impact on Kinsmen access/parking lot:</p> <ul style="list-style-type: none"> • Lose ~60 parking stalls, which can be replaced. • Traffic circulation may need to be altered. • Access to Kinsmen less desirable. <p>Limited bridge style – Arch bridge option only.</p> <p>More extensive modification of intersection at River Valley Road than in the base option, impacts existing retaining wall or River Valley Road.</p> <p>Horizontal geometry is not as desirable as base option alignment (but does meet criteria):</p> <ul style="list-style-type: none"> • Intersection at River Valley Road is not as desirable as base option. • The Queen Elizabeth Park Road alignment approaching the bridge consists of two curves with a relatively short tangent in between; consideration could be given to introducing a compound curve, but the radii would have to be reviewed as the current 250-130 violates TAC compound curve guidelines. • Walterdale Hill Road horizontal geometry is tighter than existing at the bottom of a 9% grade; sightlines, driver expectation and safety may suffer. <p>Kinsmen access is not as “clean” as base option – challenges with stacking circulation and grades (depending on which sub-option is reviewed).</p>

The main advantage of the west option was seen to be the ability to construct the new bridge with the existing bridge in service. However, the west option continued to create some concerns relative to the Kinsmen parking lot impacts, less desirable geometrics at the south approach roads and the River Valley Road / 105 Street intersection. As a result, the Design Team developed a variation of the base option, which provided a bridge alignment on the east side of the existing bridge, angled to facilitate construction

of the new with the existing bridge in service. The new bridge alignment was contingent on the following:

- The alignment would require relocation of the Interpretive Belvedere on the north bank.
- The space available would be adequate to accommodate only a three-lane bridge with pedestrian facilities cantilevered after initial construction (i.e. not able to accommodate a south bound lane across the bridge).
- The east side pedestrian facilities on the existing bridge, including a 406 mm watermain and 324 mm gas main would need to be removed, at least at the north end, prior to the new bridge.

Prior to proceeding with development of this new crossing alignment, the Design Team undertook a review of the requirements for a southbound lane on the bridge.

3.5 BRIDGE CROSS-SECTION EVALUATION (3 LANES VS. 4 LANES)

The Kinsmen Sports Centre (KSC) is Edmonton's premier multi-purpose sports facility. Access is currently provided via Walterdale Hill Road and Queen Elizabeth Park Road; both are one-way northbound routes. Existing access routes for KSC visitors from downtown and the north side of Edmonton include the High Level and Low Level bridges, James MacDonald bridge, Dawson bridge and others. More direct access, particularly from downtown is not available because the existing Walterdale Bridge is one-way northbound. Although the Project Team considers the issue of the southbound lane on the proposed Walterdale Bridge as a largely City of Edmonton corporate political decision, a number of items require consideration for deciding if a southbound lane to KSC should be included on the new Walterdale Bridge.

3.5.1 Cost

The additional southbound lane comes at a considerable cost. Based on conceptual estimates to date, the following calculation indicates the additional lane could cost over \$20 Million.

- Additional width = 6 m (single lane with appropriate separation from northbound 4.3 + 1.7m).
- Approximate length of bridge 240 m.
- Additional bridge area for southbound lane = 1440 sqm.
- Additional cost for southbound lane 1440 sqm x \$10,000/sqm = \$14,400,000.
- Plus contingency (30%) and engineering/administration (15%) = **\$21.5 Million.**

Other points of discussion related to costs:

- It is possible that there will be incremental "savings" if any width of the bridge is deleted (i.e. the full rate of \$10,000/sqm may not apply).
- What are the opportunity costs for the \$20+ Million?
- If Parks or Kinsmen had to pay the additional cost, would it be included?

3.5.2 Construction of the New Bridge

The Project Team is prepared to recommend an east side alignment for the new crossing and the bridge style as an arch. A three (3) lane structure (with the traffic lanes between the arches) and pedestrian facilities outside the arches has been reviewed for alignment and construction work space adjacent to existing bridge. Based on the information available, it appears the new bridge (three (3) northbound lanes only) can be constructed with little or no impact to the existing bridge. There are schedule and traffic management benefits to keeping the existing bridge in operation during the construction of the new bridge. If the 6 m required for the southbound lane is added to the bridge construction footprint, it appears that the existing north abutment will be impacted and therefore the existing bridge would need to be closed to all traffic and existing utilities on the bridge would need relocated before new construction could commence. Therefore, based on the current alignment, including the southbound lane could significantly impact the construction schedule.

3.5.3 Estimated Use of a Southbound Lane

Detailed data is not available to conduct a thorough investigation into estimated use of a southbound lane. The following methodology was used to determine an estimated volume of traffic to KSC via a southbound lane on the bridge:

Assumptions:

- Users of the facility at split 50%/50% - north of river and south of river.
- South side users would use existing routes (Walterdale Hill Road and Queen Elizabeth Park Road).
- The north of river users are estimated to be split in the following fashion:
 - 5% from NE Edmonton – further assume that 75% of those trips would use Gretzky/98 Avenue/Highlevel/Walterdale Hill Road.
 - 5% from Westend Edmonton – further assume that 75% of those trips would use Quesnell/Fox Drive/Belgravia/114 Street or 109 Street/Walterdale Hill Road.
 - 5% from NW Edmonton – further assume that 75% of those trips would use Groat Road/87 Avenue/109 St/Walterdale Hill Road.
 - 5% North Edmonton – further assume that 75% of those trips would use 109 Street (Highlevel)/Walterdale Hill Road.
 - 30% from downtown – further assume that 90% of those trips would use a southbound lane on the new Walterdale bridge if it were available.
- Therefore, approximately a third of average daily trips to Kinsmen might make use of a southbound lane on the new bridge.
- Hard data for the number of daily visits to Kinsmen is not available.

Table 3.3 – Rough Sensitivity Analysis (estimated daily volume on a southbound lane)

ASSUMED VISITORS PER DAY	PERCENT TRIPS THAT MIGHT USE A SB LANE ON THE NEW BRIDGE	ESTIMATED NUMBER OF VEHICLES USING THE SOUTHBOUND LANE (DAILY)
2000	33%	660
5000	33%	1650
10,000	33%	3300

3.5.4 Impact on the Existing Cemetery and Interpretive Belvedere

There is no planned impact on the existing Fort Edmonton Cemetery and Traditional Burial Ground; however, the proposed alignment encroaches into the recently created legal boundary of the historic cemetery site with or without the southbound lanes. The area of encroachment has been extensively disturbed and excavated during previous construction activities. The area of encroachment is located well away from the known cemetery site but an appropriate process to modify the cemetery legal boundary will be required prior to implementation of the project.

The existing Interpretive Belvedere is also impacted by the proposed alignment. Although there is no certainty around the reaction of key stakeholders to the relocation of the Belvedere, it is understood that many key stakeholders are not fond of the existing Interpretive Belvedere. Relocating the Belvedere should be viewed as an opportunity to update the current structure and enhance key stakeholder buy-in to the interpretive site.

The analysis indicates that it would be difficult to justify the additional cost of a southbound lane on the bridge in view of the relatively high construction cost, relatively low expected use, and the potential bridge constructability concerns. The recommended bridge replacement plan was therefore developed on the basis of three (3) lanes northbound crossing the river.

3.6 RECOMMENDED ROADWAY

The recommended alignment for the Walterdale Bridge and approach roads is illustrated on **Exhibit 3.11** and proposed profiles of Walterdale Hill Road and Queen Elizabeth Park Road, including the new bridge are illustrated on **Exhibits 3.12** and **3.13**. Typical cross-sections are shown on **Exhibit 3.14**. Approximately 300 m of Queen Elizabeth Park Road and 500 m of Walterdale Hill Road south of the river will require reconstruction to accommodate the new and realigned Walterdale Bridge. Minor road modifications will also be required on the north side of the river.

The realigned roadways will require significant modification of the access and egress to the Kinsmen parking lot, and may create an opportunity to enlarge the Kinsmen parking lot on reclaimed existing road right-of-way. Parking lot expansion could be further

examined during preliminary design; however, construction costs for this have not been included in the Study.

Traffic analysis indicated that to achieve proper operations at the intersection of Walterdale Hill Road and Queen Elizabeth Park Road would require three (3) traffic lanes on each approach and through the intersection. A two (2) phase traffic signal would be required at the intersection to meter traffic through the area. The stop conditions on Walterdale Hill Road would provide gaps for left turn traffic from Queen Elizabeth Park Road to access Kinsmen.

Opportunity for enhanced pedestrian circulation has been provided in the plan with pedestrian underpasses proposed under Walterdale Hill Road and Queen Elizabeth Park Road near the access to Kinsmen where the proposed road is considerably higher than the existing grade. In addition, a pedestrian underpass is proposed at the south end of the bridge to give existing trail continuity. A 4.2 m wide trail and 2.7 m wide sidewalk are provided on the east and west side of the bridge, respectively. Additional pedestrian opportunities should be explored at preliminary design, including a trail underpass at the north end of the bridge and the opportunity for rest areas on the bridge. A trail connection underneath the north end of the bridge can be provided based on the clearance available, but the trail would be located within the 100 year flood level of the river (5% chance of flooding in a given year).

Exhibit 3.15 illustrates the area impacted by the proposed road and bridge improvements and defines the zone for potential land form and planting to address the required grade change.

3.7 109 STREET / WALTERDALE HILL ROAD BUS LANE ELIMINATION

The Walterdale Hill Road cross-section currently exists as a three-lane roadway, where the right lane is an exclusive bus lane. A 2.5 m wide boulevard sidewalk exists along the north side of the roadway, beyond which the slope drops quickly into the river valley. The Walterdale Hill Road bus lane is a continuation of the exclusive bus lane northbound on 109 Street.

It was determined, in view of the south LRT extension, that an exclusive bus lane was no longer required on Walterdale Hill Road, provided a transit “queue jump” was implemented on 109 Street prior to the Walterdale Hill Road intersection. Several options for the queue jump and intersection reconfiguration were evaluated as follows:

3.7.1 Option 1

The 109 Street bus lane continues through the 87 Avenue signal to Saskatchewan Drive, where the lane terminates as a forced right turn onto Saskatchewan Drive. Buses proceeding north past 87 Ave have the option of changing into the centre lane from which they would then proceed through to Walterdale Hill. Alternatively, they can continue to Saskatchewan Drive and receive a transit-only advanced green phase to allow them to jump ahead of traffic onto Walterdale Hill Road.

In order to facilitate movement of 109 Street traffic onto the two southerly lanes on Walterdale Hill Road, a radius adjustment must be carried out at the southeast corner of 109 Street/Saskatchewan Drive. This corner radius adjustment is needed a) to ensure that traffic proceeding north does not cut off the right turning traffic, b) to ensure good sight lines around the corner and c) to ensure good storage and refuge space for pedestrians.

This intersection has high pedestrian volumes consisting of people accessing the University campus area, as well as the High Level Bridge. Anecdotal evidence suggests that the southeast corner often has high numbers of pedestrians waiting for the pedestrian light; this indicates a need to ensure a generous refuge and storage area. At this corner. To protect for this requirement the radius adjustment will require a small corner property cut off the adjacent property. An on-site visit (see attached photo) indicates that this corner cut could be accomplished through the elimination of what appears to be a concrete planter box.

This option provides direct and seamless flow of traffic from 109 Street onto the south 2 lanes on Walterdale Hill. However, there are two negative characteristics of this option, the first negative being the requirement for some property at the southeast corner. The second negative is that it offers no improvement to the very small nose-shaped pedestrian refuge area that separates Saskatchewan Drive from Walterdale Hill Road. This refuge area is very important because it serves the north sidewalk on along Saskatchewan Drive which is part of the Heritage Trail, and is a very busy feeder to the High Level Bridge and University campus area. The importance of this refuge area increases when the bus lane on Walterdale is removed because pedestrians will be much closer to a large amount of vehicular traffic that is now one lane closer when the bus lane is eliminated. When pedestrians are placed close to large volumes of traffic their tendency is to shy away from the edge of curb and hence the need for a larger more comfortable refuge and storage area; Option 1 does not provide this.

3.7.2 Option 2

The 109 street bus curb lane proceeds through the 87 Avenue intersection to Saskatchewan Drive where it terminates as a forced right onto Saskatchewan Drive. Buses in the curb-lane will need to change into the centre lane which continues through the Saskatchewan Drive intersection onto the south lane on Walterdale Hill. In this option, a slender island is placed at the intersection of 109 Street/Saskatchewan Drive to provide explicit, positive guidance for the northbound to eastbound right turning traffic. As with Option 1, the movement of traffic from 109 Street onto the southerly 2 lanes on Walterdale Hill is accommodated seamlessly and there is good positive guidance for the right turners at Saskatchewan Drive.

There are however several negatives:

- Property is needed at southeast corner of the intersection
- No improvement to the pedestrian refuge area between Sask. Drive and Walterdale Hill
- Pedestrian crossing time/distance from the southeast corner to the west side of 109 Street is increased.
- Splitter island is too small to act as a refuge, and if used by pedestrians, will place them in some jeopardy

3.7.3 Option 3

The 109 street curb lane proceeds through the 87 Avenue intersection to Saskatchewan Drive where it terminates as a forced right onto Saskatchewan Drive. In this option buses using the curb lane will need to change into the centre lane in order to continue north onto Walterdale Hill; or they can be given a transit only green advance at Saskatchewan Drive to allow them to proceed onto Walterdale Hill in advance of other traffic.

In this option, the two (northbound) west lanes on 109 Street are initially directed into the north two lanes on Walterdale and then transitioned back towards the southern two lanes over a distance of approximately 100 m. This is done deliberately to provide high quality pedestrian refuge areas in all the important areas on the east side of this complex intersection. As noted above, the two areas where a high quality pedestrian refuge is necessary, is the southeast corner and on the area between Saskatchewan Drive and Walterdale Hill Road.

This option address the need to direct traffic from 109 Street onto the southerly two lanes on Walterdale Hill Road and ensures high quality pedestrian refuge areas on the east side of the Saskatchewan Drive/109 Street intersection, both north and south of Saskatchewan Drive.

The only negative aspect of this option is that the sidewalk along the north side of Walterdale Hill Road will need to be at or near the north curb-lane for a short distance at the west end of Walterdale Hill due to limited space that is available in this area.

3.7.4 Recommendation

Options 1 through 3 all enable the elimination of the 109 Street bus lane in a similar manner and enable traffic on 109 Street to connect with the southerly two lanes on Walterdale Hill directly. It is ISL's recommendation that the City adopt Option 3, with Option 1 deemed to be our recommended second choice. Option 2 is not recommended due to the negative characteristics listed in the discussion above.

Our preference for Option 3 over Option 1 is driven mainly by the importance we place on ensuring high quality refuge areas for pedestrians; Option 3 improves the situation for pedestrians who are waiting on the east side of 109 Street between Walterdale Hill

and Saskatchewan Drive, while Option 1 does not; we believe that this location out of all the pedestrian refuge areas at this intersection is where pedestrian are most at risk and where they will become more vulnerable when the 109 Street traffic is fed into the south lanes on Walterdale Hill Road.

The options are illustrated on **Exhibits 3.16, 3.17, and 3.18.**

OPTION 1 FEATURES

South of Kinsmen Sports Centre (Old Strathcona)

- No direct impacts
- Proposed Bridge and Kinsmen Sports Centre Access**
 - 3 northbound lanes, 1 southbound lane, 1 cyclist/pedestrian trail
 - No significant change to existing Kinsmen Sports Centre access
 - Construction of new bridge will require closure of river crossing for an extended period

North of River

- Minor modification to the River Valley Road intersection
- Replace 104 Street access to River Valley Road with 103 St. widening
- Burial grounds not impacted by bridge project; historical monument adjacent to existing bridge not impacted

LEGEND

Proposed Roadway

Proposed Bridge

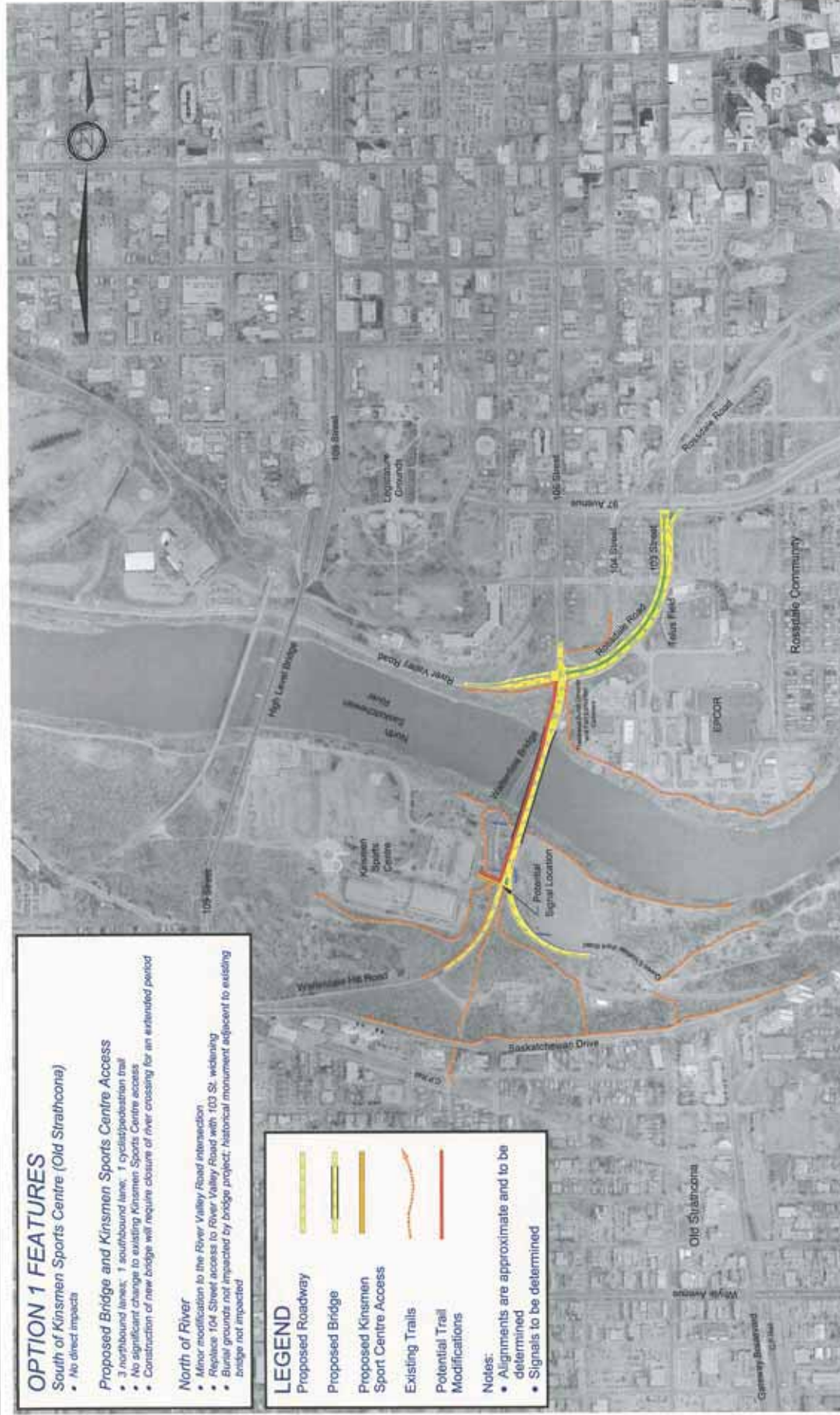
Proposed Kinsmen Sport Centre Access

Existing Trails

Potential Trail Modifications

Notes:

- Alignments are approximate and to be determined
- Signals to be determined



OPTION 2 FEATURES

South of Kinsmen Sports Centre (Old Strathcona)

- Create a separation between Bus Barns and Gateway Boulevard
- Relocate Gateway Boulevard to 102 Street location, south of 83 Avenue
- Gateway Boulevard underpasses Saskatchewan Drive (Impacts End of Steel Park)
- New Southbound Access from Downtown

Proposed Bridge and Kinsmen Sports Centre Access

- 3 northbound lanes: 1 southbound lane, 1 cycle/pedestrian trail
- New Kinsmen Sports Centre access from north of the river via southbound lane
- Construction of new bridge may require closure of river crossing for an extended period

North of River

- Minor modification to the River Valley Road intersection to provide southbound lane
- Replace 104 Street access to River Valley Road with 103 Street widening
- Burial grounds not impacted by bridge project; historical monument adjacent to existing bridge is impacted

LEGEND

Proposed Roadway

Proposed Bridge

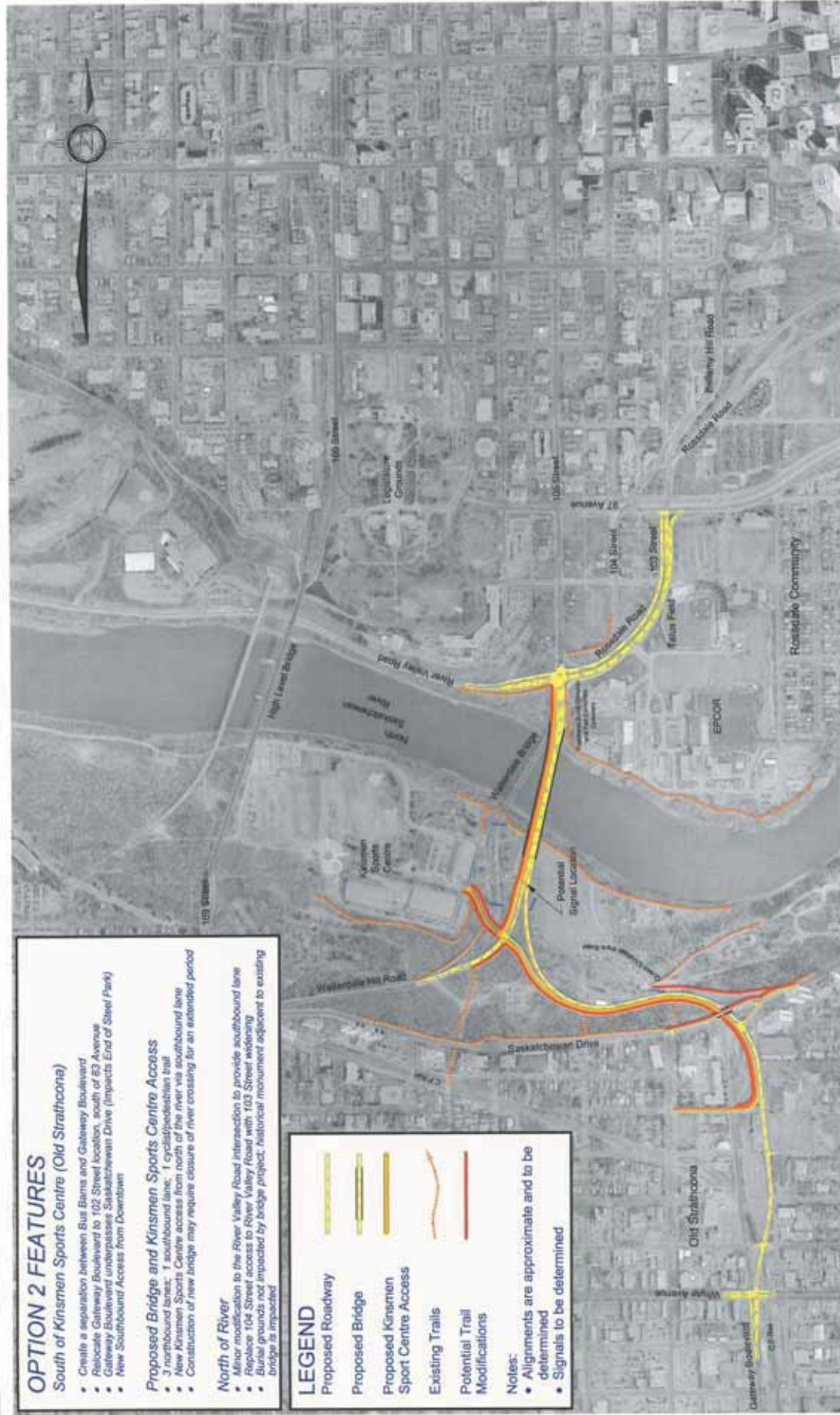
Proposed Kinsmen Sports Centre Access

Existing Trails

Potential Trail Modifications

Notes:

- Alignments are approximate and to be determined
- Signals to be determined



OPTION 2

WALTERDALE BRIDGE REPLACEMENT CONCEPT PLANNING STUDY

NTS:

DECEMBER, 2010

EXHIBIT 3.2



Exceptional people. Shared values.



OPTION 3 FEATURES

South of Kinsmen Sports Centre (Old Strathcona)

- Realign Gateway Boulevard to 102 Street location, south of Saskatchewan Drive (Impacts End of Steel Park)
- New Saskatchewan Drive intersection eliminates 'hairpin' curve access to river valley

Proposed Bridge and Kinsmen Sports Centre Access

- 3 northbound lanes; 1 southbound lane; 1 cyclist/pedestrian trail
- New Kinsmen Sports Centre access from north of the river via southbound lane
- Construction of new bridge may not require closure of river crossing for an extended period

North of River

- Reconfigure River Valley Road intersection to provide southbound lane and northbound lane. No River Valley Road access from new bridge
- Replace 104 Street access to River Valley Road with 103 Street widening
- New bridge overpasses burial grounds and historical monument

LEGEND

Proposed Roadway

Proposed Bridge

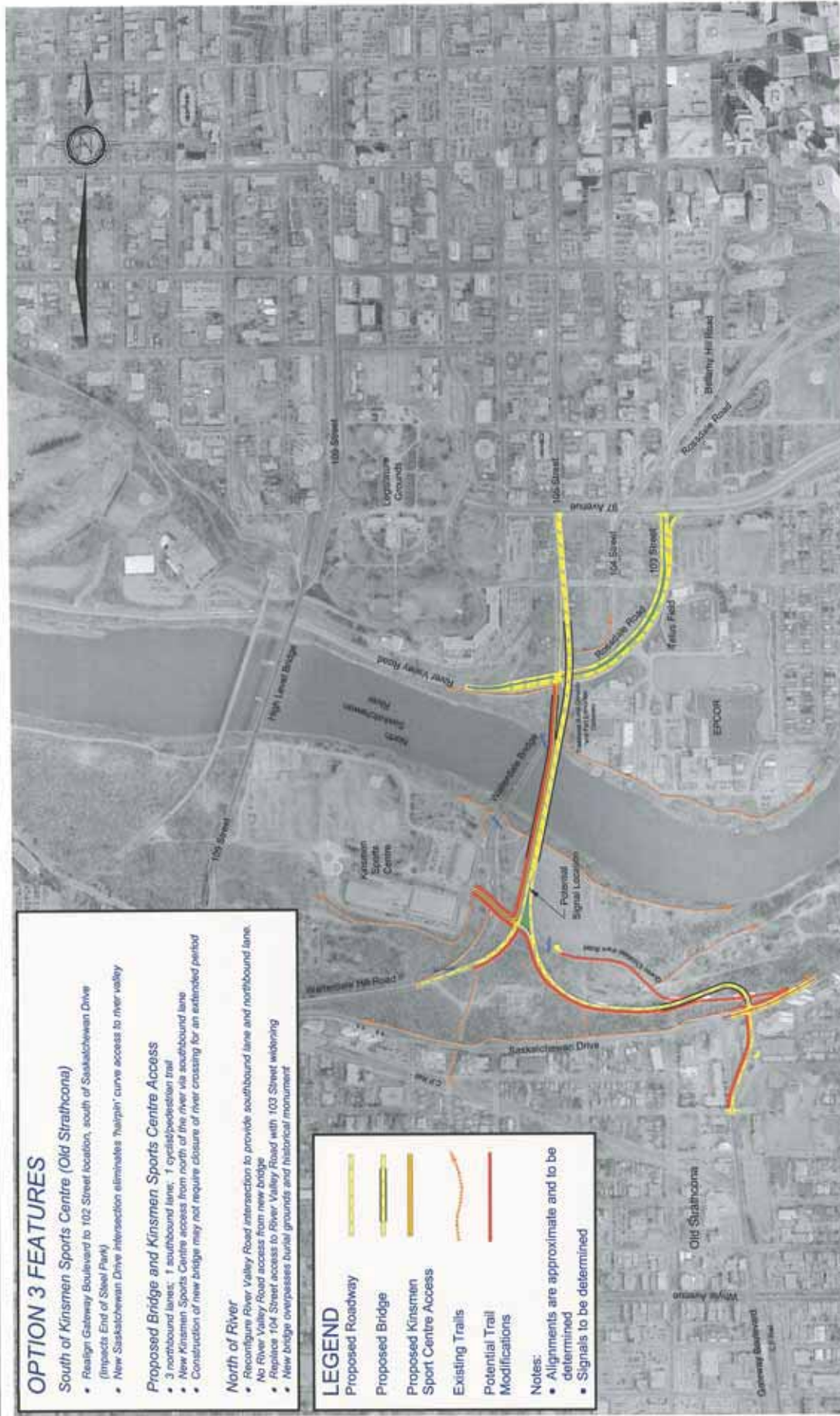
Proposed Kinsmen Sports Centre Access

Existing Trails

Potential Trail Modifications

Notes:

- Alignments are approximate and to be determined
- Signals to be determined



OPTION 4 FEATURES

South of Kinsmen Sports Centre (Old Strathcona)

- Moves Gateway Boulevard close to the Yardbird Suite building
- Gateway Boulevard underpasses Saskatchewan Drive (Impacts End of Steel Park)

Proposed Bridge and Kinsmen Sports Centre Access

- 3 northbound lanes; 1 southbound lane; 1 cycle/bicyclist trail
- New bridge location approximately 250m downstream from existing bridge
- A new Kinsmen Sports Centre access from north of the river via the new southbound lane
- Construction of new bridge has no direct impact on the existing river crossing

North of River

- 105 Street/River Valley Road intersection is modified to eliminate lanes from the existing bridge
- Replaces 104 Street access to River Valley Road with 103 Street widening and extend River Valley Road to 103 Street
- Build grounds and historical monument not directly impacted by bridge project

LEGEND

Proposed Roadway

Proposed Bridge

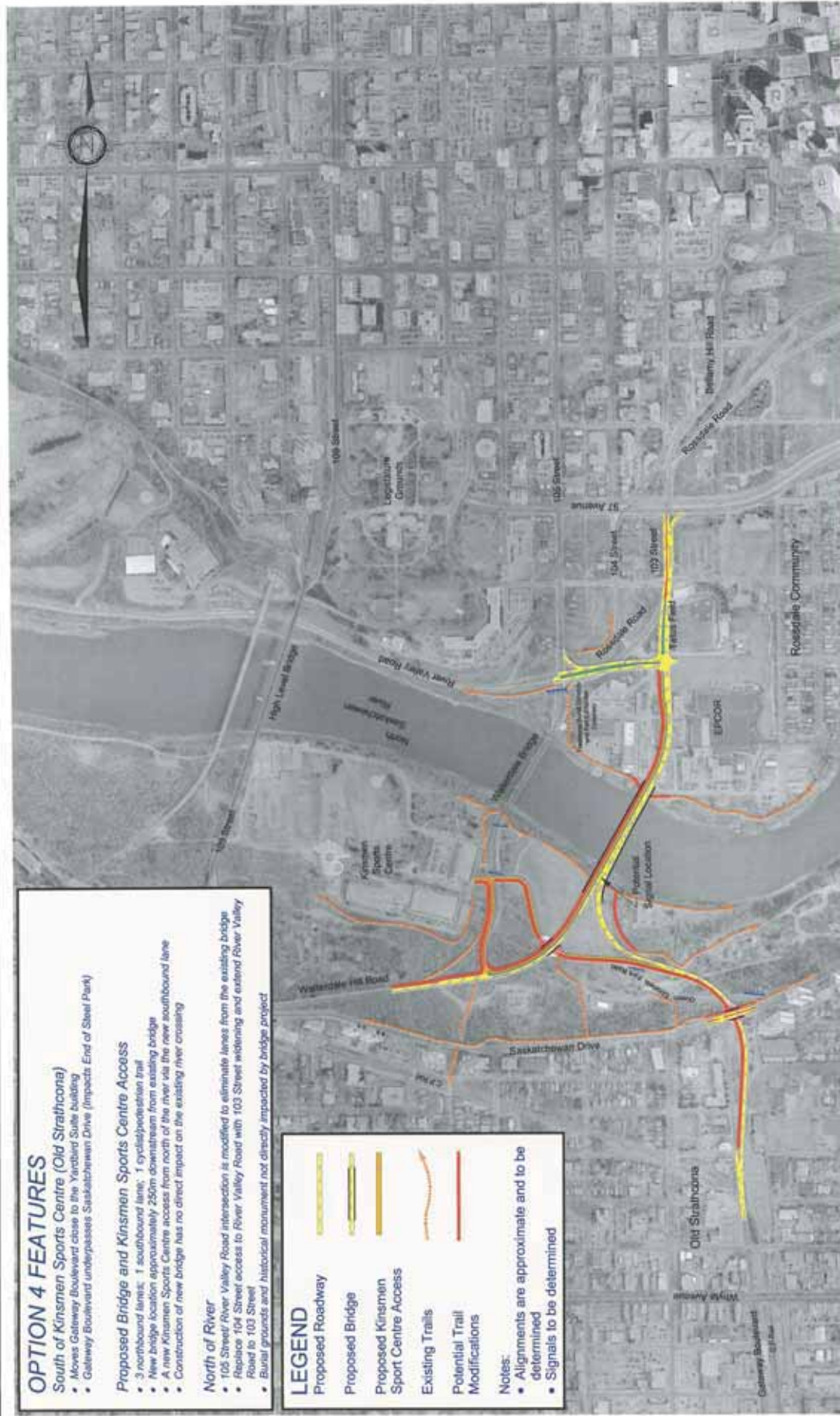
Proposed Kinsmen Sports Centre Access

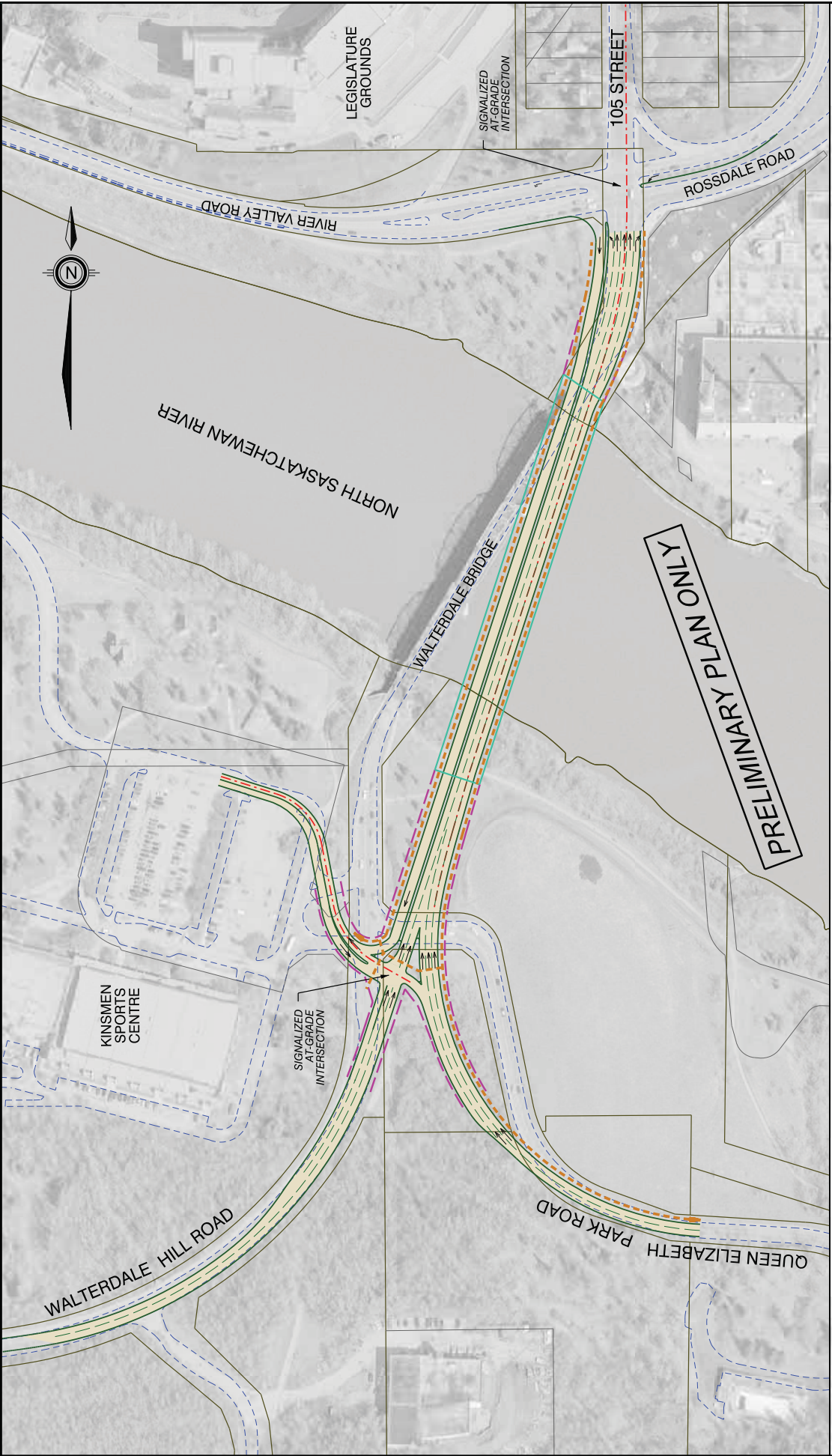
Existing Trails

Potential Trail Modifications

Notes:

- Alignments are approximate and to be determined
- Signals to be determined







Trails

Retaining Wall

Bridge

Direction of Traffic

Base Bridge Option

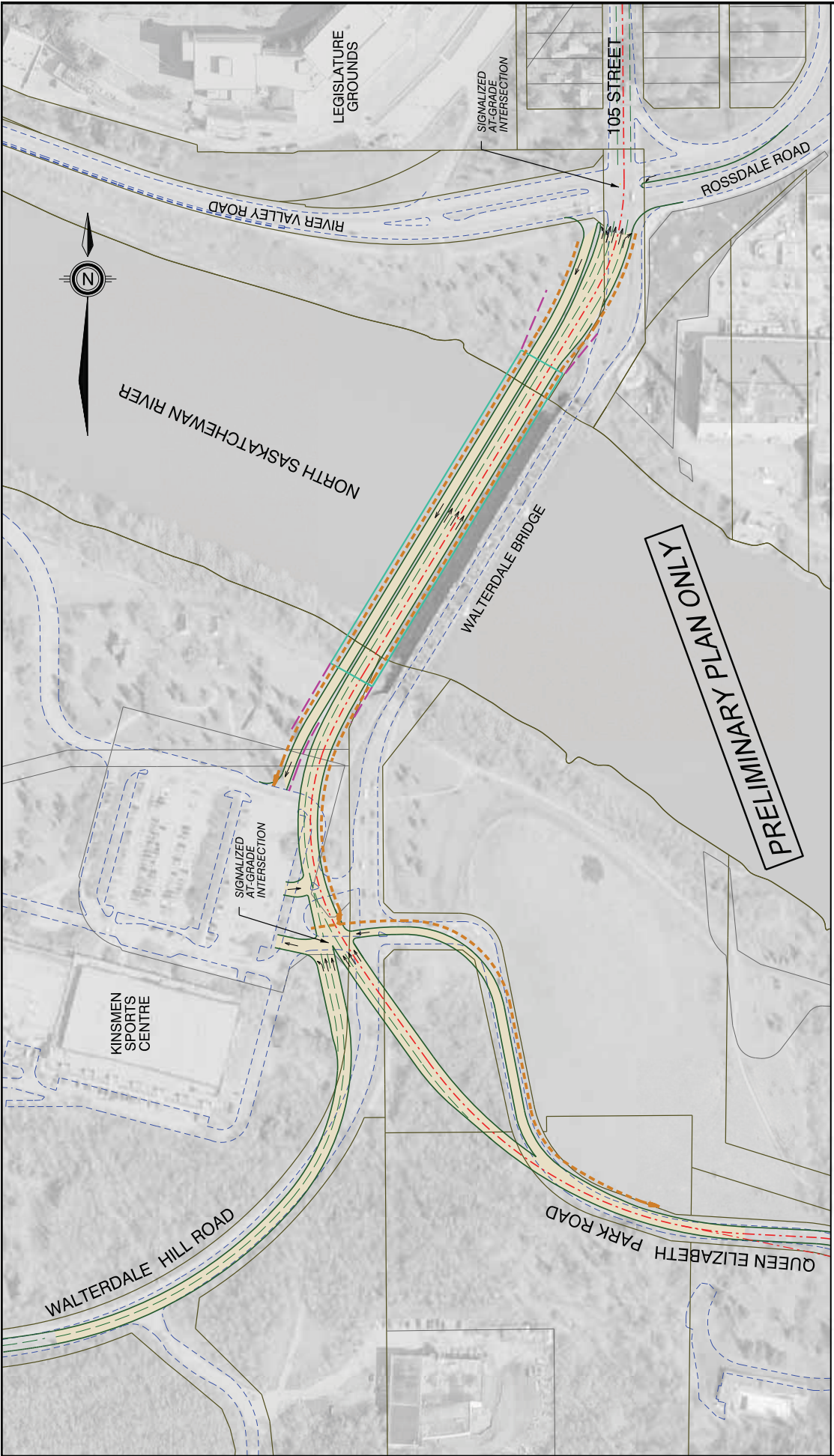
WALTERDALE BRIDGE REPLACEMENT

CONCEPT PLANNING STUDY

NTS.

DECEMBER, 2010

EXHIBIT 3.5



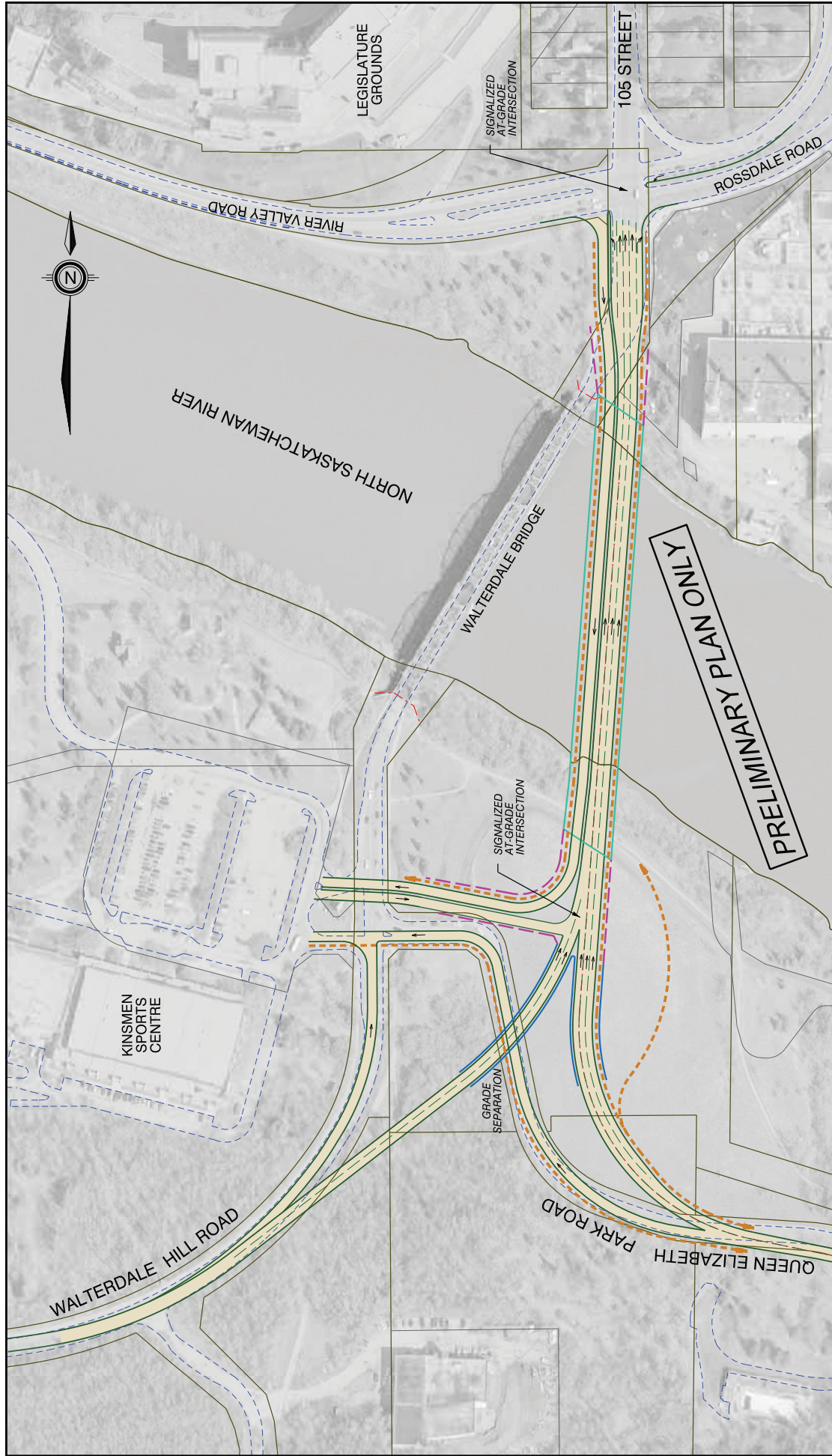
West Bridge Alignment Option
WALTERDALE BRIDGE REPLACEMENT
CONCEPT PLANNING STUDY

NTS.
DECEMBER, 2010
EXHIBIT 3.6

Trails
Retaining Wall
Bridge
Direction of Traffic



PRELIMINARY PLAN ONLY



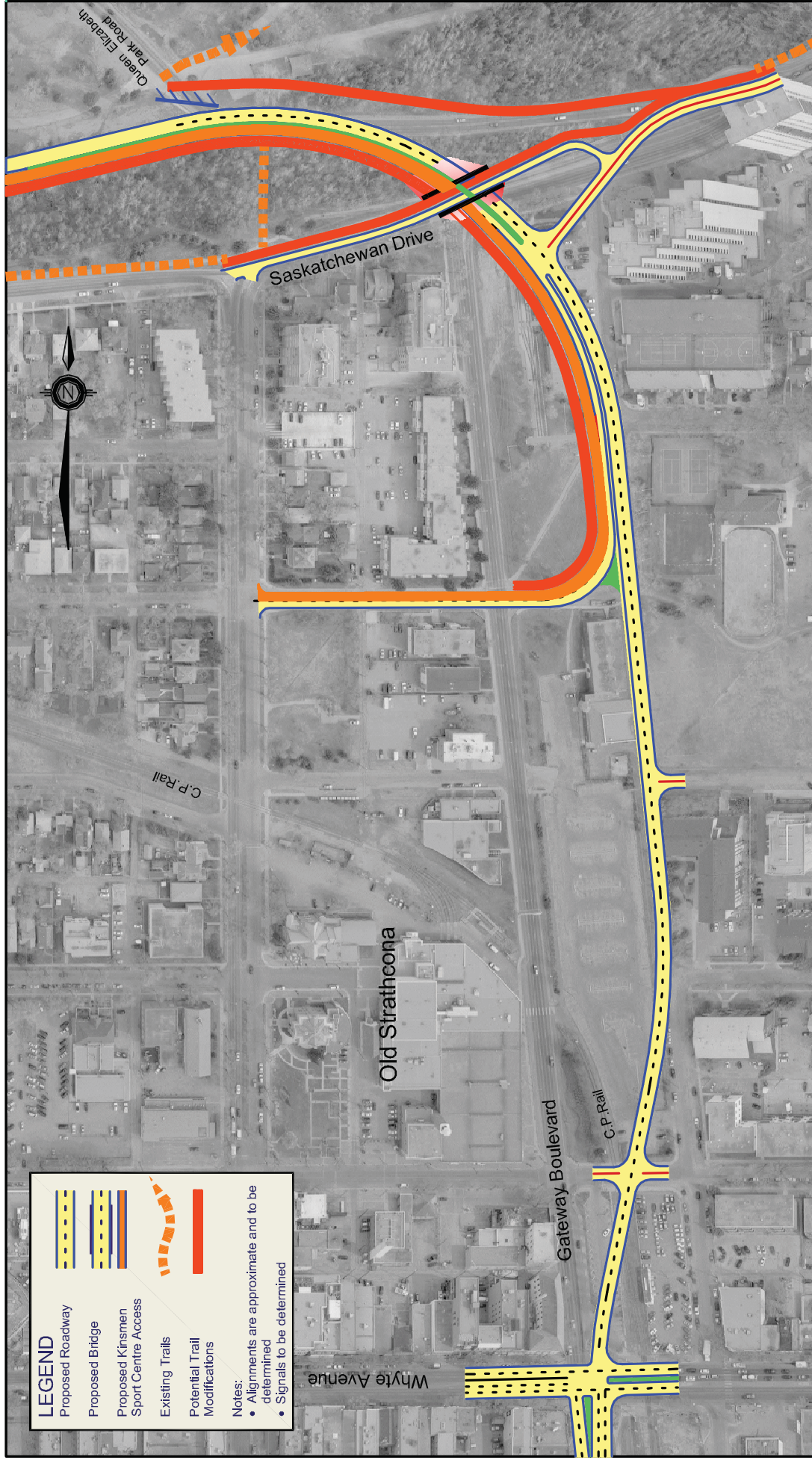
East Bridge Alignment Option
WALTERDALE BRIDGE REPLACEMENT
CONCEPT PLANNING STUDY

NTS. DECEMBER, 2010 EXHIBIT 3.7

LEGEND: Trails Retaining Wall Bridge Direction of Traffic



PRELIMINARY PLAN ONLY



PROPOSED IMPROVEMENT AT SASKATCHEWAN DRIVE DETAIL

OPTION 2

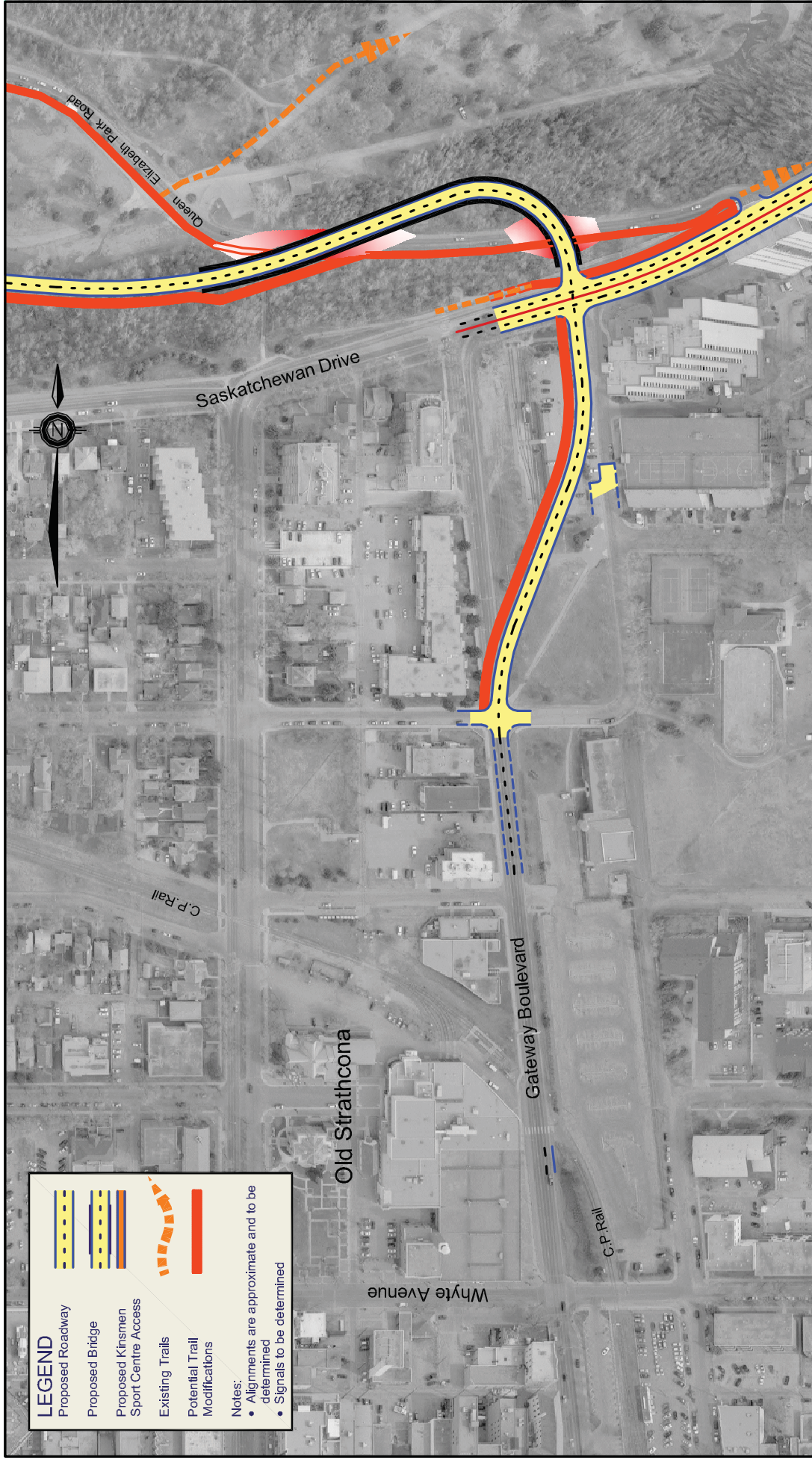
WALTERDALE BRIDGE REPLACEMENT CONCEPT PLANNING STUDY

NTS.

DECEMBER, 2010

EXHIBIT 3.8





LEGEND

- Proposed Roadway
- Proposed Bridge
- Proposed Kinsmen Sport Centre Access
- Existing Trails
- Potential Trail Modifications

Notes:

- Alignments are approximate and to be determined
- Signals to be determined

PROPOSED IMPROVEMENT AT SASKATCHEWAN DRIVE DETAIL

OPTION 3

WALTERDALE BRIDGE REPLACEMENT

CONCEPT PLANNING STUDY

NTS.

DECEMBER, 2010

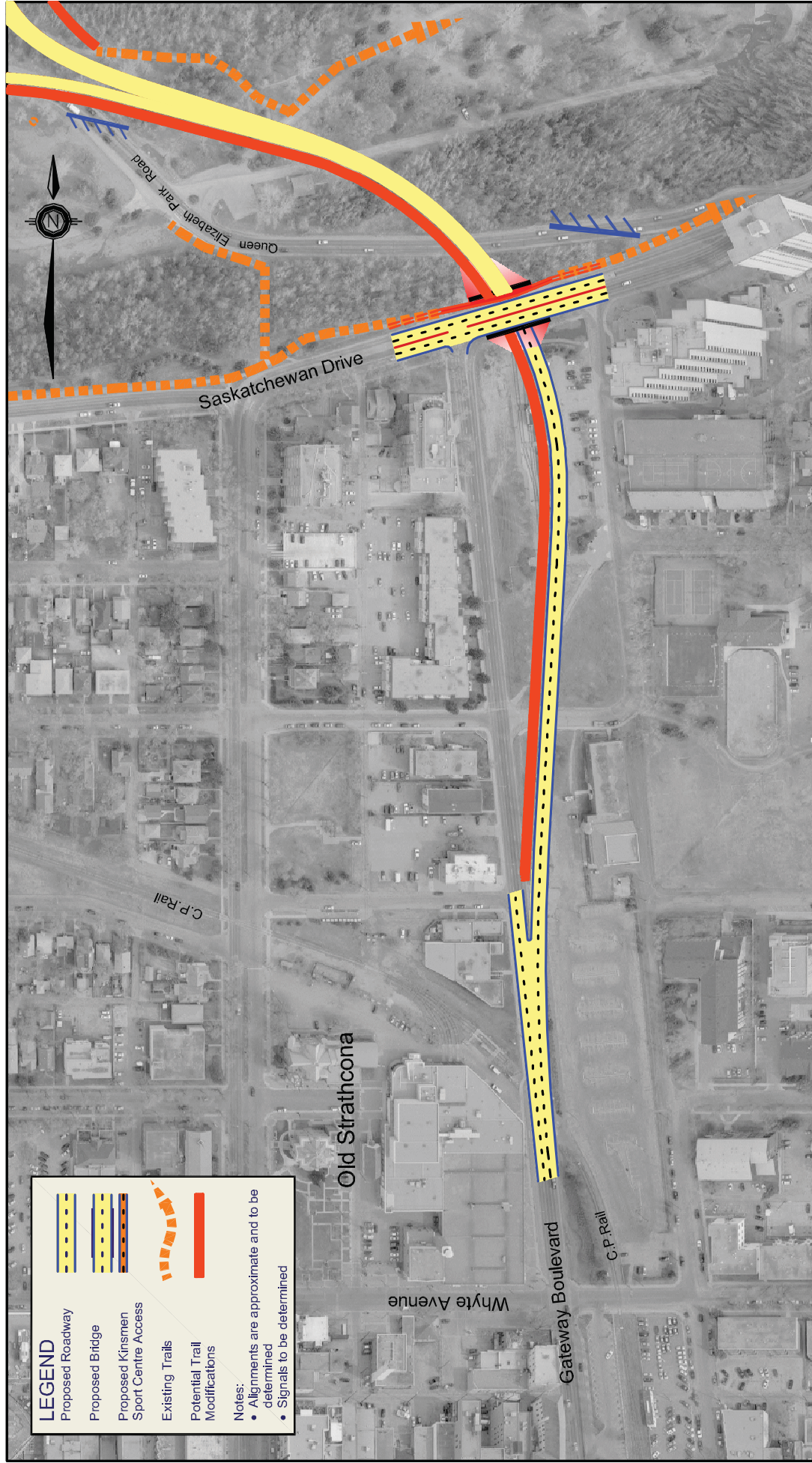
EXHIBIT 3.9

BUCKLAND & TAYLOR Ltd.
Bridge Engineering

DIALOG

AL-TERRA ENGINEERING

ISL Engineering and Land Services
Learn our tools. Love our work.



PROPOSED IMPROVEMENT AT SASKATCHEWAN DRIVE DETAIL

OPTION 4

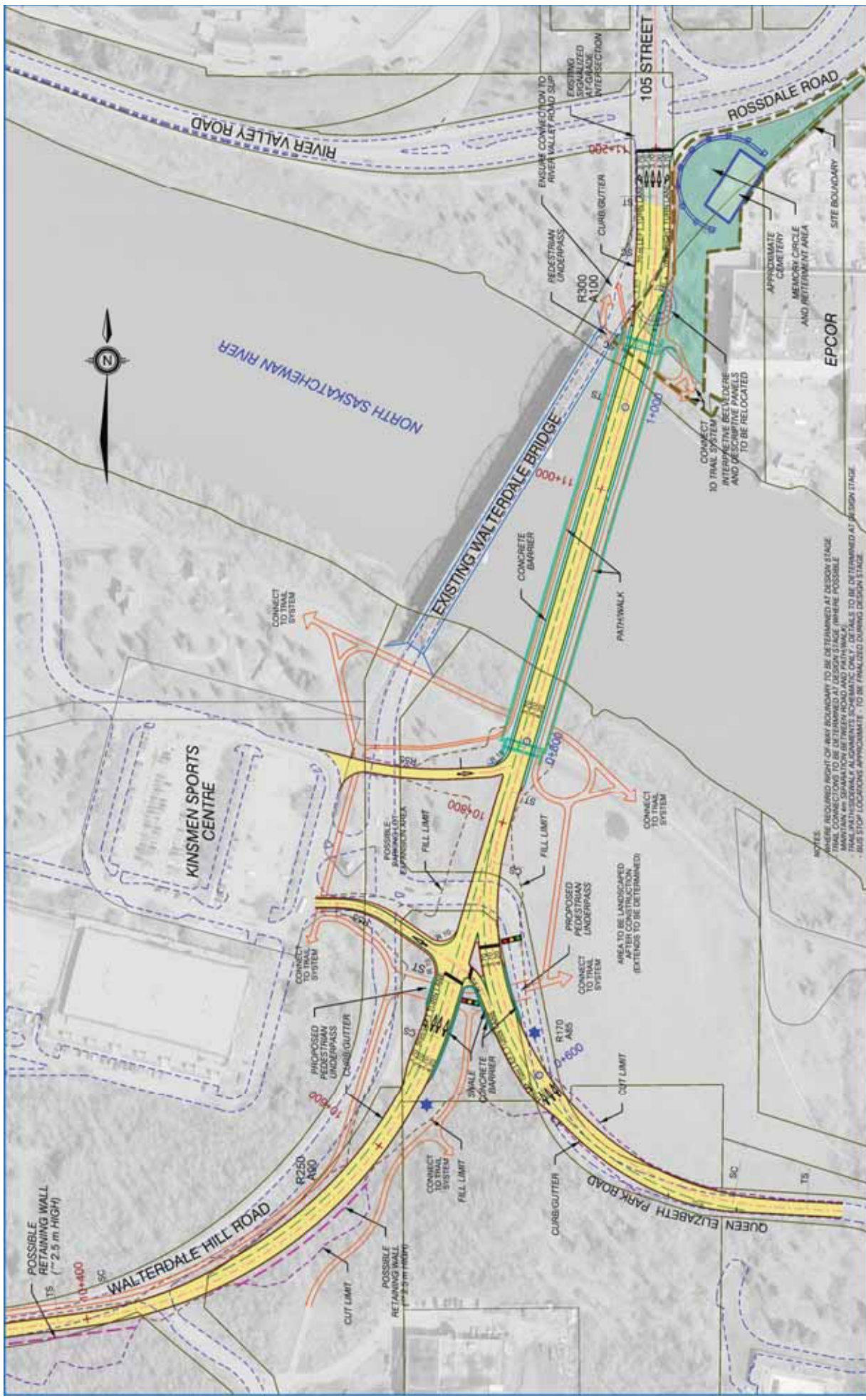
WALTERDALE BRIDGE REPLACEMENT
CONCEPT PLANNING STUDY

NTS.

DECEMBER, 2010

EXHIBIT 3.10





LEGEND

- TRAIL LANE EDGE
- CURB AND GUTTER
- CONCRETE BARRIER
- CONCRETE BARRIER
- FINAL PROPOSED ROAD

APPROXIMATE LOCATION OF FULL STOP

- FILL LIMIT
- CUT LIMIT
- RETAINING WALL
- WATER FILL ONLY
- NOT APPLICABLE MARKING
- APPROXIMATE LOCATION OF FUTURE CHANGE
- SHARED USE ALSO

TS, SC, CS, ST, SUP

NOTES

WHERE ACQUIRED RIGHT OF WAY BOUNDARY TO BE DETERMINED AT DESIGN STAGE

MAINTAIN 4m SEPARATION BETWEEN ROAD AND PATHWAYS

TRAIL PATHWAYS ALIGNED SCHEMATIC ONLY / DETAILS TO BE DETERMINED AT DESIGN STAGE

BUS STOP LOCATIONS APPROXIMATE - TO BE FINALIZED DURING DESIGN STAGE

QUEEN ELIZABETH PARK ROAD AND WALTERDALE HILL ROAD

DESIGN SPEED - 40 km/h

POSTED SPEED - 40 km/h

SCALE

0 10 20 30 40 50 60m

ISL Engineering

AL-TERRA ENGINEERING

CONCEPT PLAN - SUBJECT TO PRELIMINARY DESIGN

WALTERDALE BRIDGE REPLACEMENT

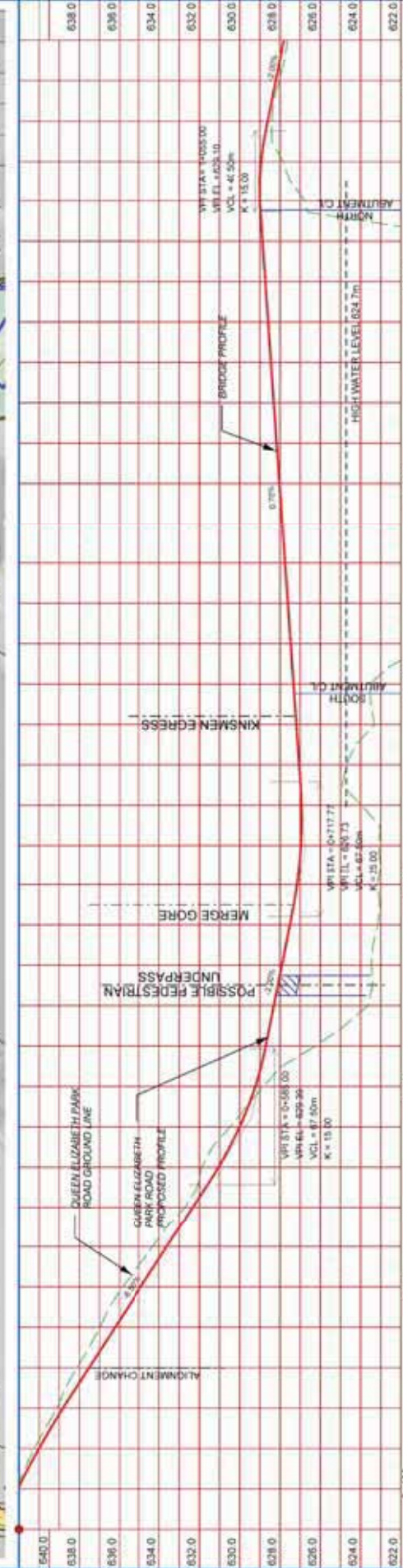
CONCEPT PLANNING STUDY

RECOMMENDED ROADWAY IMPROVEMENTS

EPCOR

Edmonton

EXHIBIT 3.11



LEGEND

- THRAIL LINE EDGE
- CURB AND GUTTER
- CONCRETE BARRIER
- TRAIL DEPENDENT TO TRAIL PROPOSED
- REPAIRING INCL.
- ALIGNMENT CONTROL LINE
- PROPOSED PROFILE
- GROUND LINE
- FILL LIMIT
- CUT LIMIT
- TRAIL ALIGN ON T
- NOT A PRESENT BARRIER
- INDICATE LOCATION OF CURB/LINE CHANGE
- TS, SC, CS, ST

DIALOG

Engineering and Land Services

ISL

AL-TERRA

ENGINEERING

CONCEPT PLAN - SUBJECT TO PRELIMINARY DESIGN

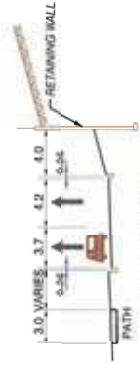
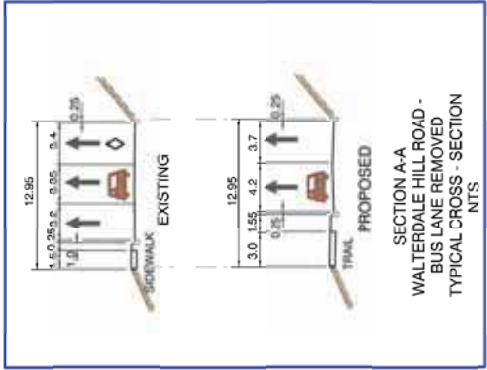
WALTERDALE BRIDGE REPLACEMENT

CONCEPT PLANNING STUDY

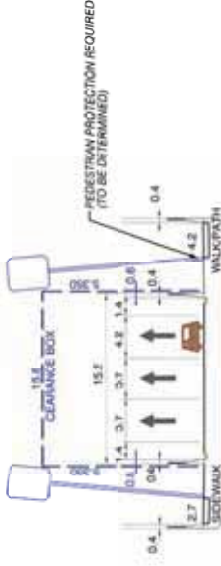
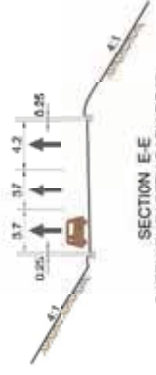
QUEEN ELIZABETH PARK ROAD PLAN/PROFILE

Edmonton

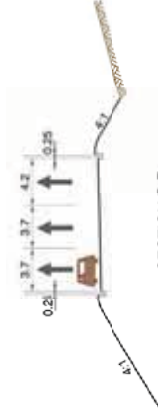
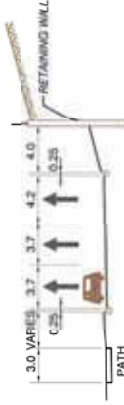
EXHIBIT 3.13



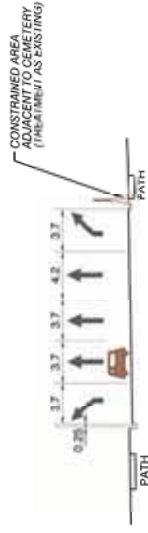
SECTION E-E
CLIFFEN ELIZABETH PARK ROAD
TYPICAL CROSS-SECTION
NTS



SECTION F-F
WALTERDALE THREE LANE BRIDGE
TYPICAL CROSS-SECTION
NTS



SECTION G-G
105 STREET
TYPICAL CROSS-SECTION
NTS

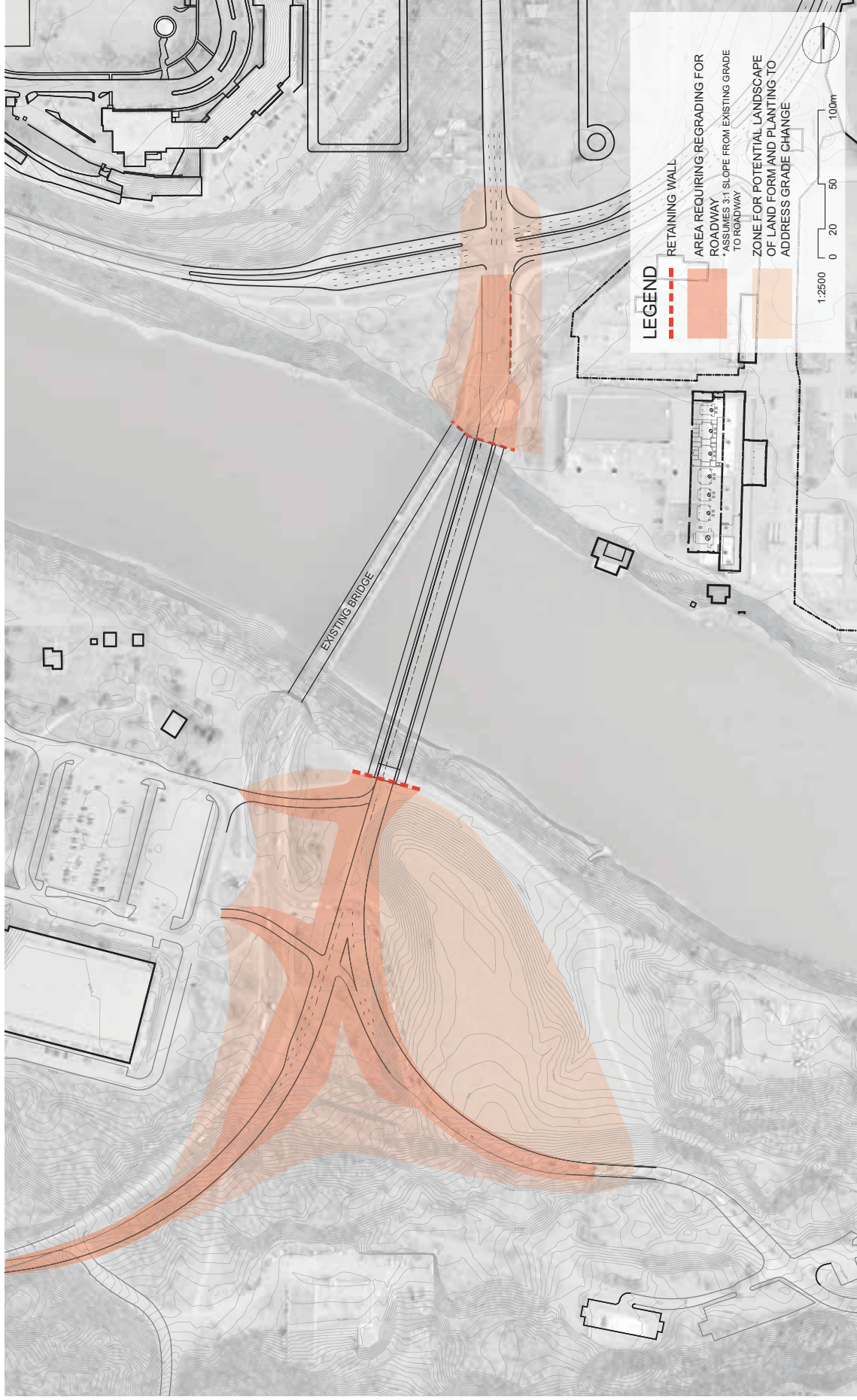



NOTE:
MAINTAIN MINIMUM 4m BOULEVARD IF POSSIBLE.

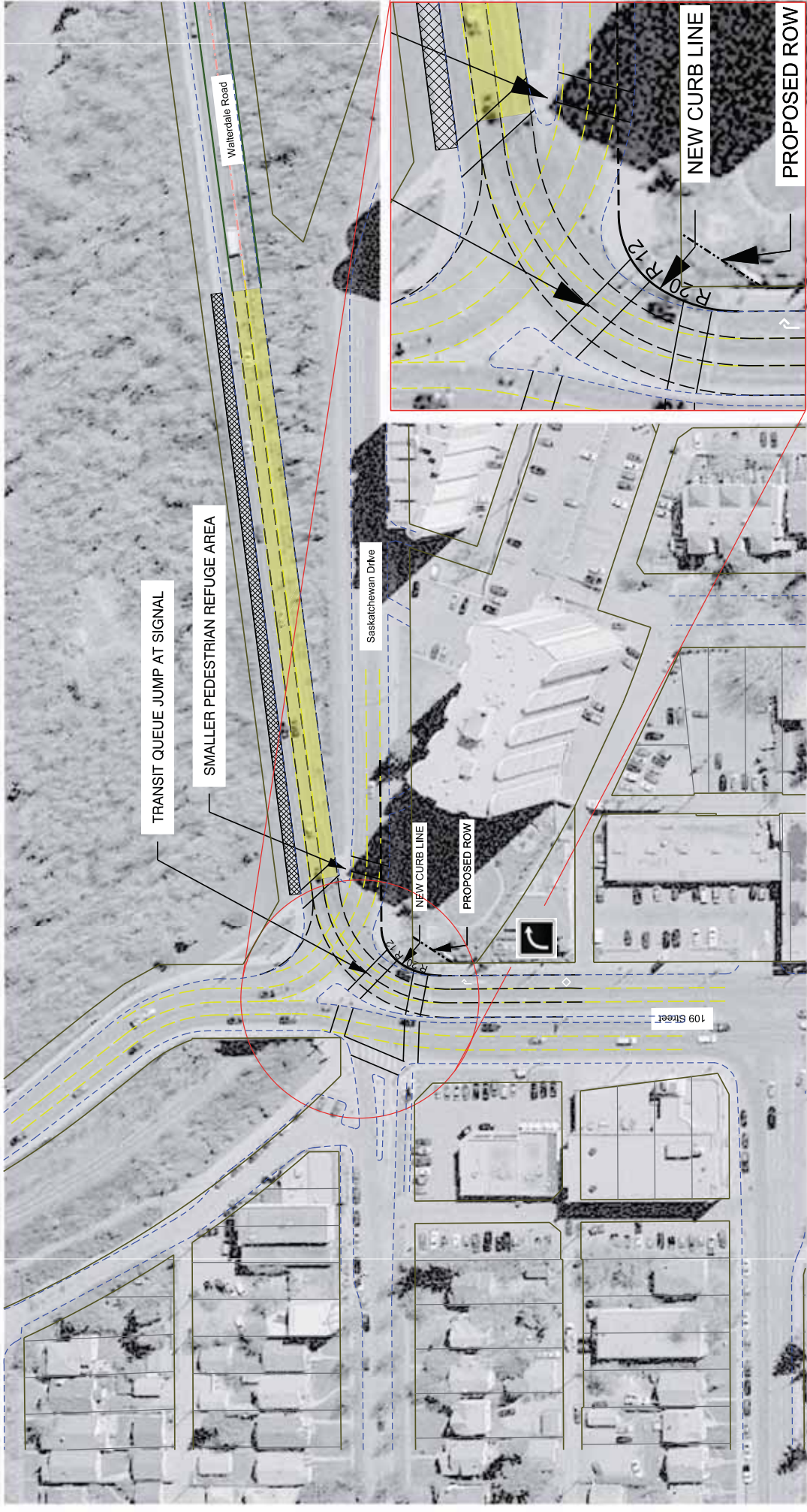


CONCEPT PLAN - SUBJECT TO PRELIMINARY DESIGN
WALTERDALE BRIDGE REPLACEMENT
CONCEPT PLANNING STUDY
TYPICAL CROSS-SECTIONS

EXHIBIT 3.14

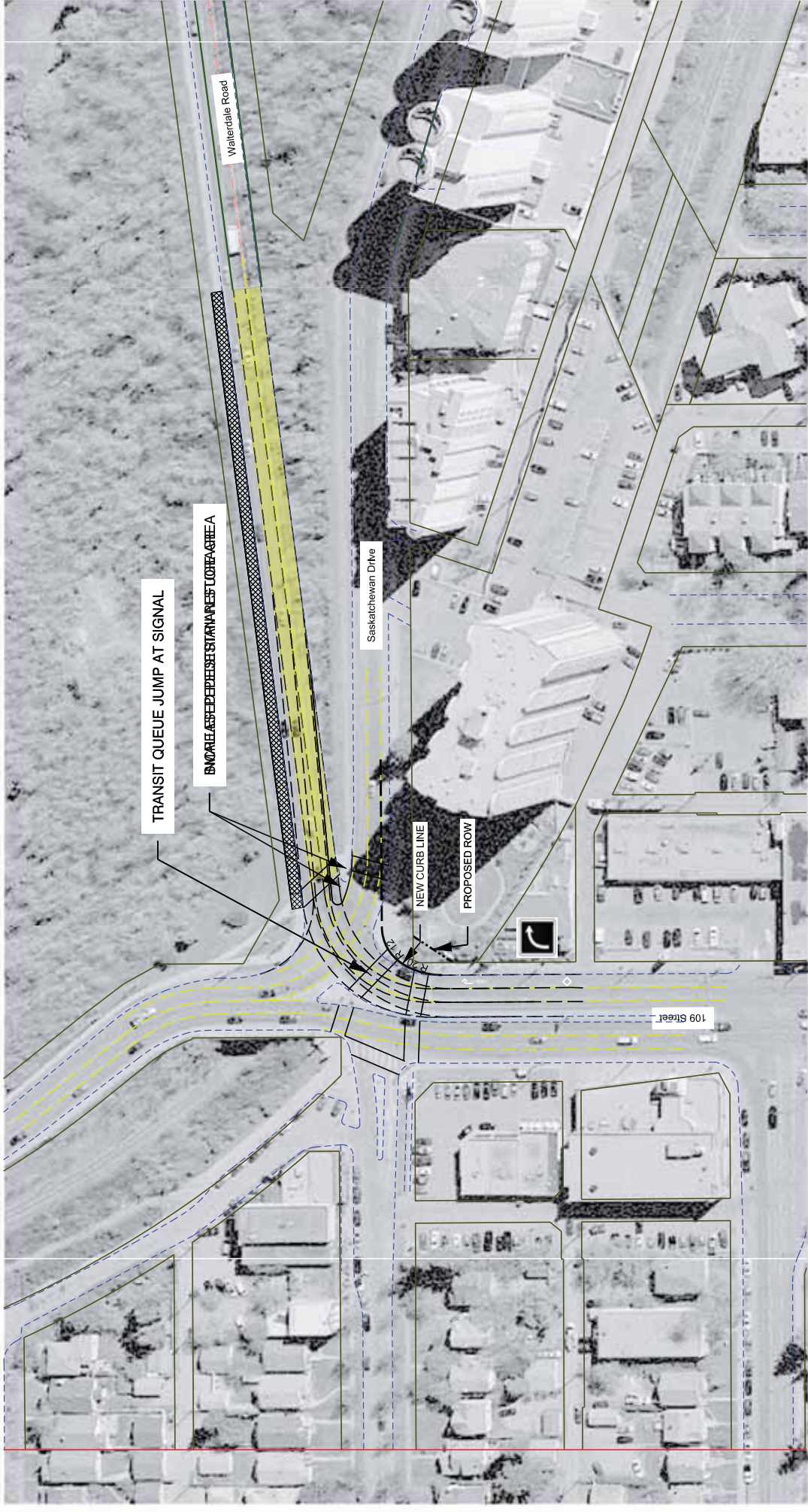


   	PROJECT: CONCEPT PLAN - SUBJECT TO PRELIMINARY DESIGN	
	WALTERDALE BRIDGE REPLACEMENT	
	ROADWAY APPROACH SITE IMPACT	
	EXHIBIT 3.15	

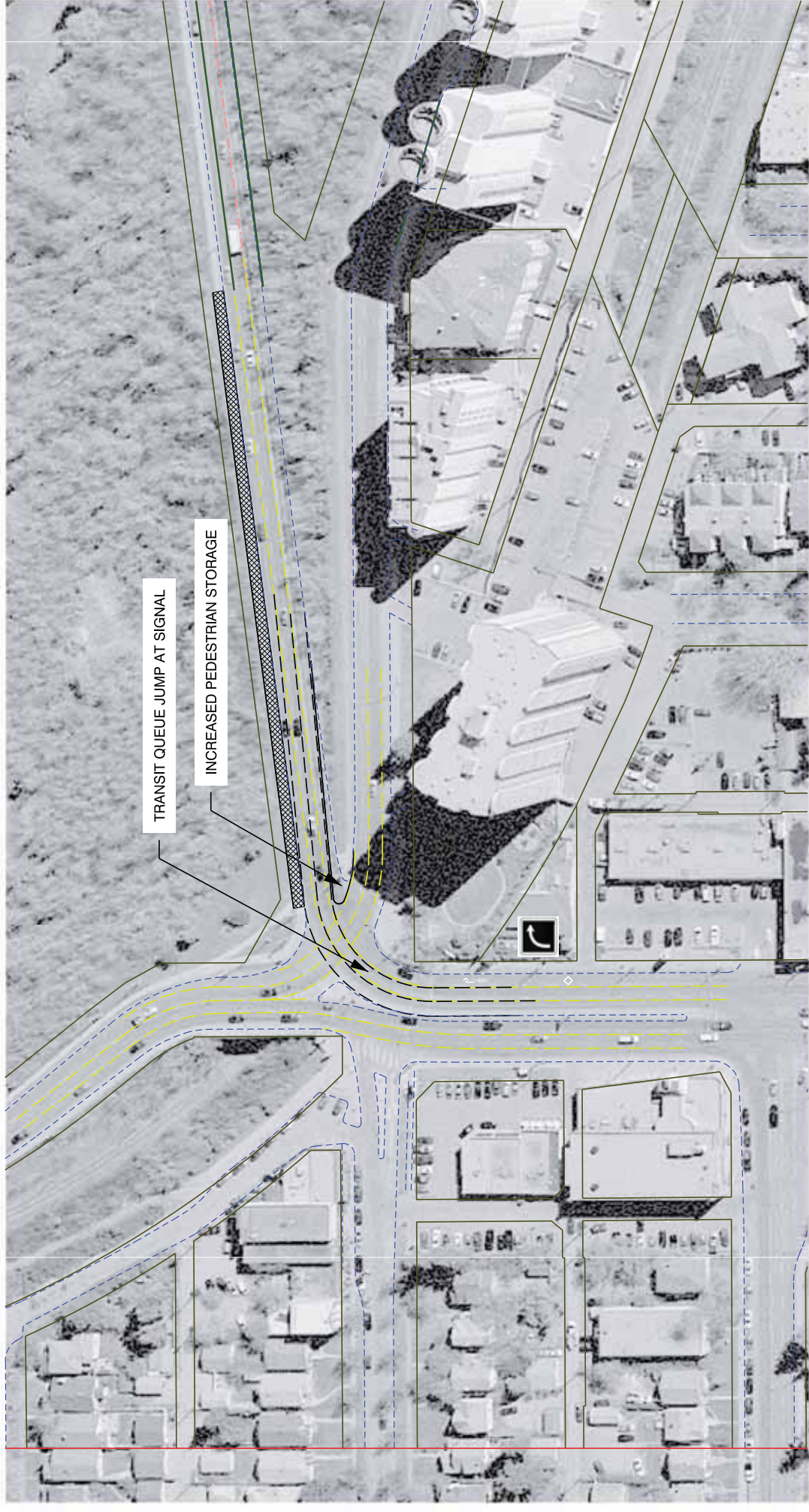


105 Street (Walterdale) Bridge Study

Option 1



105 Street (Walterdale) Bridge Study Option 2



105 Street (Walterdale) Bridge Study Option 3