17 Avenue SE

Charrette Report

June 2008

plan it calgary
integrate · grow · sustain

Design Centre for Sustainability

THE CITY OF CALGARY

CONTENTS

EXECUTIVE SUMMARY

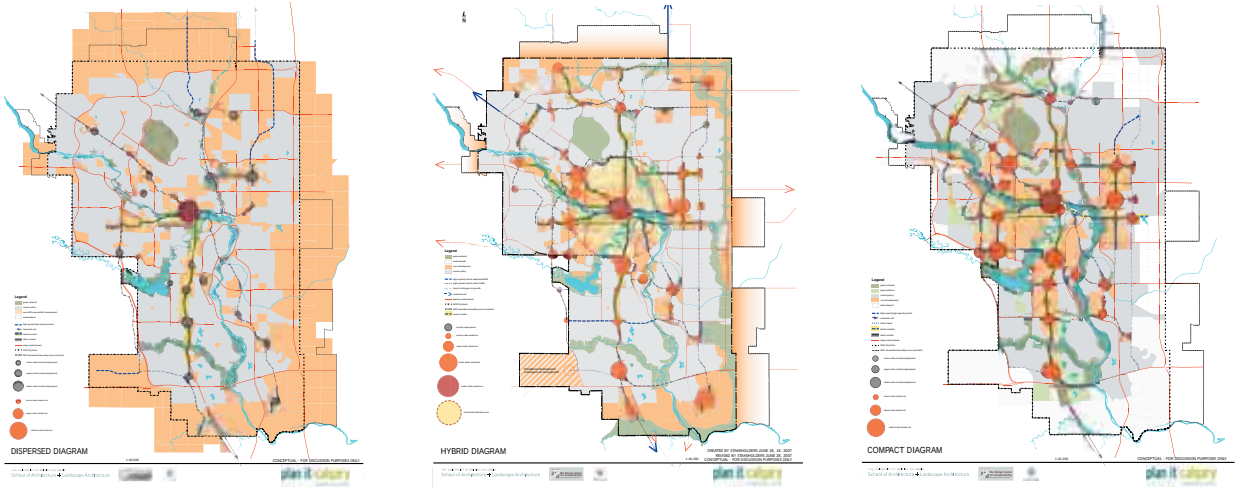
"Given the short time in which they were accomplished, no one should think of the designs produced at this charrette as complete. These designs are beginnings, not ends. They provide a point of departure for later contemplation and elaboration. In short, they provide the pictures of what a more sustainable future might be like – nothing more."

Sustainable Urban Landscapes: The Surrey Design Charrette
Patrick M. Condon, ed.

Introduction

In January 2005, the City of Calgary undertook the imagineCALGARY process to develop a collective, 100-year vision for the city. In January 2007, City Council convened the interdisciplinary Sustainable City Project team and approved 11 Sustainability Principles to guide the Plan It Calgary project. Plan It Calgary seeks to integrate land use and transportation planning in a way that achieves these principles. The project goal is to generate an integrated Land Use and Mobility Plan that can sustainably accommodate 2.5 million people and 1.3 million jobs within the city by 2075. This plan will provide an update of the Calgary Plan (Municipal Development Plan) and the Calgary Transportation Plan. As one element in a comprehensive process toward achieving this goal, the Sustainable City Project team (SCP) is working with the Design Centre for Sustainability at the University of British Columbia (DCS) to explore the potential outcomes of applying these principles to the planning and physical design of the city.

The first stage of the Plan It Calgary project explored the implications of applying the 11 Sustainability Principles to the physical design of the city at the 1:40,000 scale. Three city-wide scenarios were the result: Dispersed, Compact, and Hybrid. The scenarios represent alternative potential futures for the city under the 11 Sustainability Principles, and reveal the opportunities/ consequences of different approaches to the physical design of the city. The scenarios are one of many inputs into the generation of the integrated Land Use and Mobility Plan.



right:
The city-wide, 1:40 000 Plan It Calgary scenarios illustrate three of many possible development futures for the city. Each scenario accommodates the same number of people & jobs.

The current stage of the Plan It Calgary project uses case study charrettes to test the learning outcomes of the city-wide scenarios, and explore the physical design implications of the 11 Sustainability Principles in a site-specific context and more detailed 1:2000 scale. The 17 Avenue SE Case Study is one such charrette. The goal of the charrette is to illustrate a sustainable, liveable future for the study area. The 17 Avenue SE corridor is the subject of a current City of Calgary planning project - the *SE 17 Corridor Study*, which is planning for a twenty- to twenty-five year horizon. The *SE 17 Corridor Study* will produce a new Concept Plan in late 2008, and a multi-community Area Redevelopment Plan (ARP) in late 2009. The 17 Avenue SE Case Study charrette is one of many inputs informing the generation of these plans, providing the opportunity for Plan It Calgary to partner with and inform *current* initiatives.

Principle 1: Create a range of housing opportunities and choices.

Principle 2: Create walkable environments.

Principle 3: Foster distinctive, attractive communities with a strong sense of place.

Principle 4: Provide a variety of transportation options.

Principle 5: Preserve open space, agricultural land, natural beauty and critical environmental areas.

Principle 6: Mix land use.

Principle 7: Strategically direct and manage redevelopment opportunities within existing areas.

Principle 8: Support compact development.

Principle 9: Connect people, goods and services locally, regionally and globally.

Principle 10: Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens.

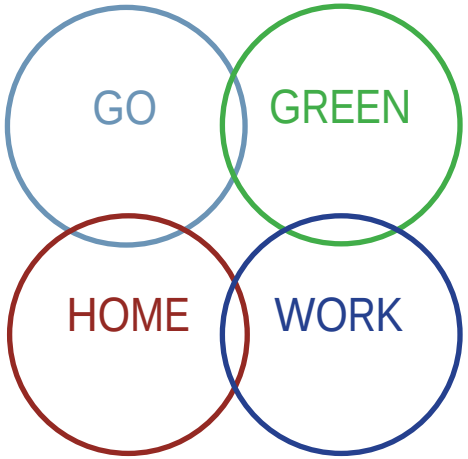
Principle 11: Utlize green infrastructure and buildings.

right:
In 2007, Calgary City Council approved 11 Sustainability Principles as part of the Terms of Reference for the Plan It Calgary project. Smart Growth Principles, current City of Calgary policy (including the Municipal Development Plan and the Calgary Transportation Plan), and the imagineCALGARY Long Range Urban Sustainability Plan all informed the 11 Sustainability Principles. The principles are a key input into the Decision Support Framework for the Plan It Calgary project.

above:
Graphic representation of the Decision Support Framework structure, which organizes and links the high-level vision through to specific strategies and actions. The Decision Support Framework guided charrette team discussions and decisions throughout the 17 Avenue SE charrette process.

Charrette Inputs & Process

The key charrette input was the Decision Support Framework, which guided the 17 Avenue SE Case Study charrette process. This framework organizes the project vision, principles, goals, objectives, indicators, and preliminary strategies. The imagineCALGARY report and 11 Sustainability Principles provide the high level sustainability vision, principles, goals and objectives that guide the Plan It Calgary project. The SCP and DCS teams developed charrette-specific indicators and preliminary strategies with input from City staff and ideas generated at the SE 17 Visioning Workshops, held January 2008. These indicators and strategies focus specifically on making 17 Avenue SE a more effective place to live, work, and shop, and to integrate it with the surrounding neighbourhoods and the City. The decision support framework guides decision-making at the charrette to ensure resulting outputs reflect community aspirations for the future of 17 Avenue SE, and the City of Calgary as a whole.



above:
The charrette team divided into three breakout groups that focused on different key physical design issue areas or themes: GO, focussing on transportation; GREEN/HOME, focussing on natural areas and parks, and housing; and, WORK, focussing on jobs.

The 17 Avenue SE charrette took place 10-13 March 2008. The charrette team worked together over four days to design an attractive, vibrant, pedestrian friendly neighbourhood that celebrates the character of the community. At the event mid-point, the team presented preliminary outputs to the community at large, who provided feedback as input to the development of the work over the following days. At the end of four days the design team presented the final charrette results to the community.

At key points, the charrette team divided into three breakout groups: GO, focusing on mobility networks in the study area; WORK, focusing on employment; GREEN/HOME focusing primarily on the residential uses in the study area, open space networks and green infrastructure. One breakout group explored GREEN and HOME topics in combination, given the close relationship and potential for synergies between the two issue areas within the 17 Avenue SE context. Each breakout group used their particular focus as a "lens" through which to examine the study area as a whole. In plenary sessions, the charrette team as a whole explored areas of connect/disconnect between the ideas generated by different breakout groups, and carried those discussions into following breakout group sessions. This iterative process allowed the charrette team to gradually develop one synthesized concept map that incorporates key strategies from each team.

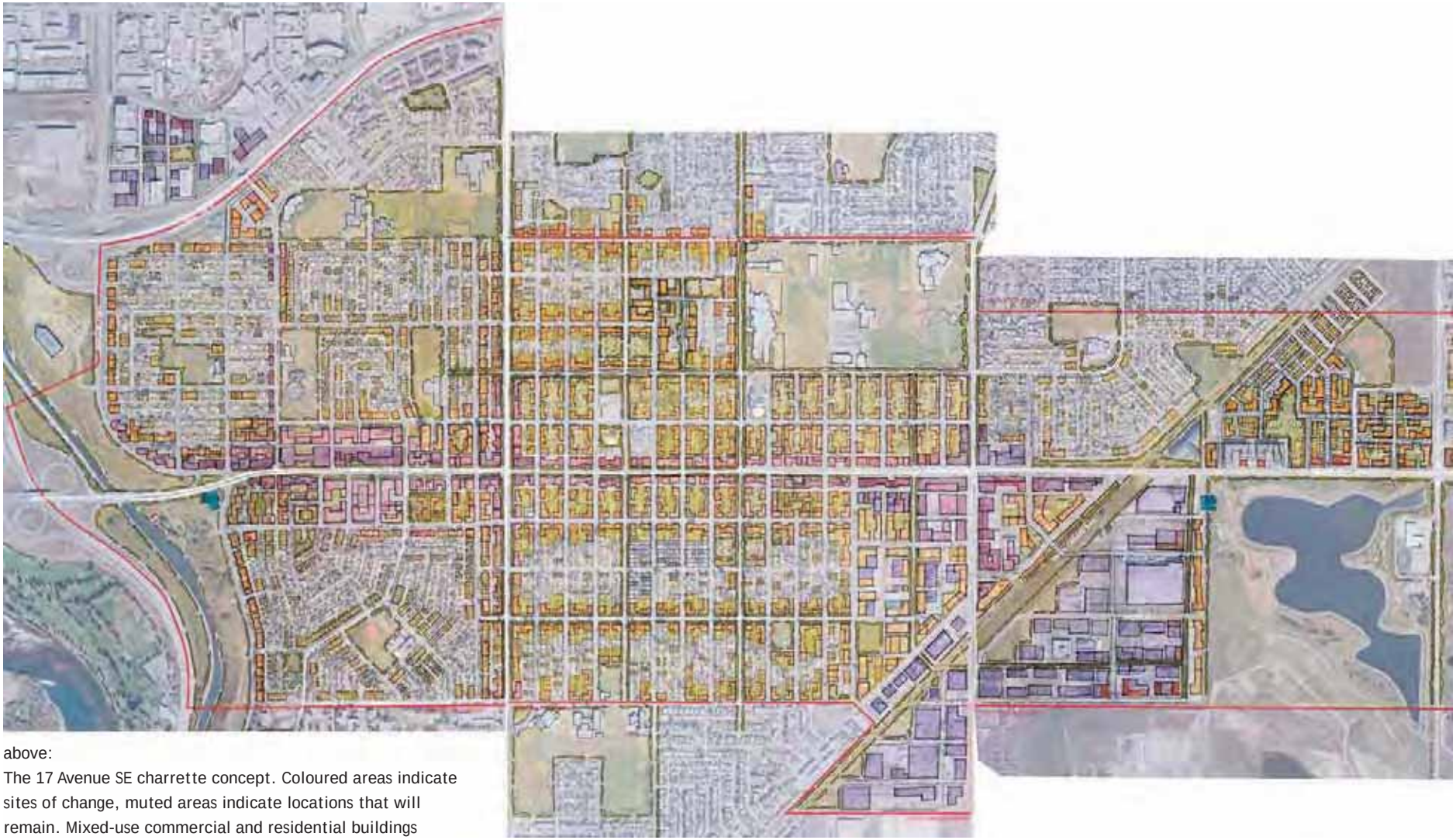
The 17 Avenue SE Charrette Concept

The charrette concept envisions 17 Avenue SE as a multi-modal urban boulevard. The corridor will be pedestrian- and bicycle-friendly, and feature local-oriented premium transit. Mixed-use commercial nodes at 52nd, 28th and 38th streets focus on at-grade retail with office above. The 52nd Street node is the largest, and 52nd Street is identified as the major north-south arterial, with additional north-south connections for pedestrians and bicycles along 17 Avenue SE. Between the nodes, mixed-use residential with at-grade retail and residential above front 17 Avenue SE. Less intensive commercial uses along 28th Street connect the smaller Franklin LRT Station job node with the larger node on 17 Avenue SE.

The 17 Avenue SE community accommodates double the current residential density within a range of single-family, townhouses and mid-rise buildings up to eight storeys. Much of the single-family character of surrounding neighbourhoods remains. Residential density strategically locates along key corridors and around greenways, green streets, and open space. Density transitions from higher- to lower-density areas. Large portions of single-family neighbourhoods remain, with some areas gradually densifying over time to maintain their character.

The Forest Lawn industrial area transforms into a light-industrial area with residential infill as the TUC and rail relocation attract heavy industry to the Foothills Industrial area. Larger industrial parcels remain at the south-east edge.

The community has a diversity of parks, open space, green streets, greenways, plazas and courtyards equitable distributed throughout. Existing parks and open space remain, and new plazas on 17 Avenue SE, neighbourhood parks, and semi-public green space contribute new amenity areas. The rail right-of-way transitions into a greenway and, together with the 17 Avenue SE urban boulevard and an interconnected green street network, connect Bow River, Elliston Park, and the schools, parks and open spaces in surrounding neighbourhoods. 17 Avenue SE could transition into a parkway between the rail corridor and the East Freeway where it fronts Elliston Park. The green street network emphasizes walking, cycling and storm water infiltration.



above:
The 17 Avenue SE charrette concept. Coloured areas indicate sites of change, muted areas indicate locations that will remain. Mixed-use commercial and residential buildings (dark and light red) front key corridors and cluster in nodes. Town houses and apartments (orange) sensitively integrate into residential neighbourhoods to transition between higher density corridors and single-family neighbourhoods. Surrounding single-family neighbourhoods remain virtually unchanged. Mixed-use industrial-residential (purple & orange) locate in the Forest Lawn industrial area, with larger light-industrial parcels (purple) remailing in the south-east. Preserved and new parks, open space, schools and street trees distribute throughout the community.

Design Strategies

Each of the three breakout groups developed a set of design strategies specific to their issue area: GO, focusing on mobility networks; WORK, focusing on employment; and, GREEN/HOME focusing on residential uses and the synergies with open space networks and green infrastructure. The charrette team applied these strategies collectively to the charrette study site to create the 17 Avenue SE Charrette Concept.

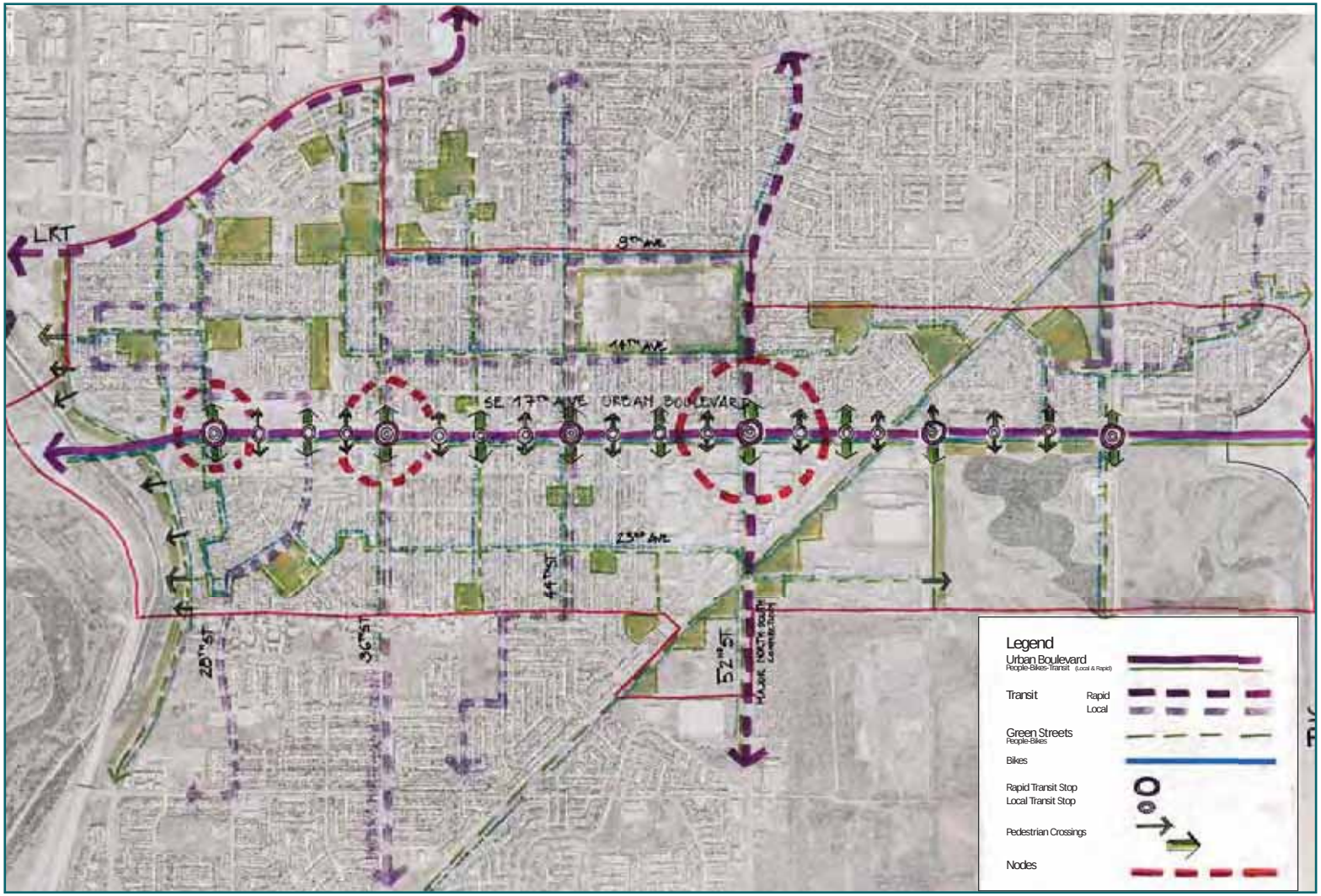
GO Team

The GO team had primary responsibility for the mobility networks: that is, how people and goods move into, out of, and within the study area. The team considered all modes of transportation, including walking, cycling, public transit, vehicles and, to a lesser extent, goods movement.

GO Strategy 1: Transform 17 Avenue SE into a multi-modal urban boulevard (Principles 2,3,4,9,10)

Seventeen Avenue SE is identified as an "Urban Boulevard" in the Plant It Calgary city-wide scenarios.The Urban Boulevard is a new road type in the hierarchy under development by the SCP team for the Plan It Calgary project. The Urban boulevard is a multi-modal street with a focus on walking, cycling, and transit that continues to accommodate a moderately high traffic volume (see details at left). Urban Boulevards are the future "high-streets" of Calgary, emphasizing a walkable pedestrian environment fronted by a complimentary mix of land uses while allowing the same volume of vehicle and transit traffic to travel through at a slower speed. Generally, the charrette team and community input favour this strategy, which will transform 17 Avenue SE into a locally-focused "high street." 17 Avenue SE could transition into a parkway between the rail corridor and the East Freeway where it fronts Elliston Park.

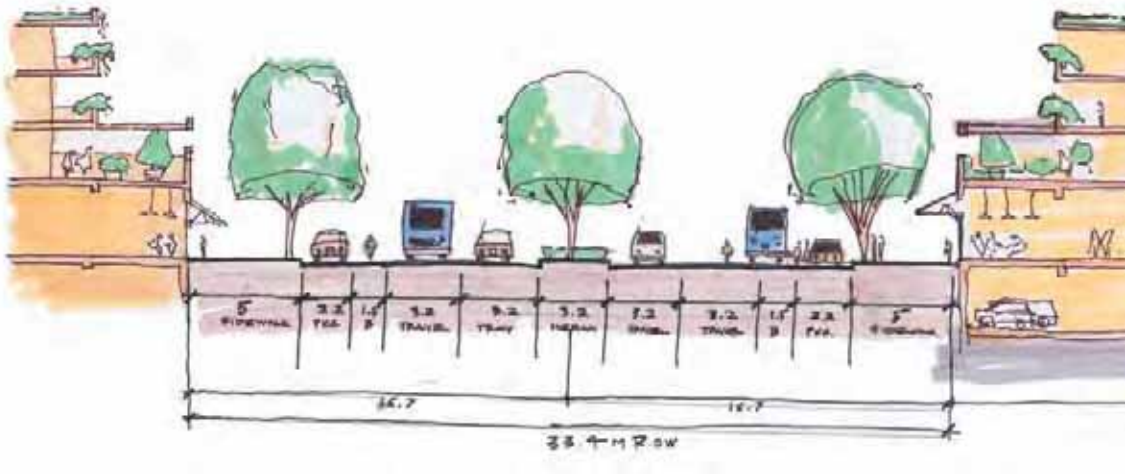
To facilitate the transition of 17 Avenue SE into an urban boulevard, goods movement shifts off of the corridor and on to Peigan Trail, once the latter completes a connection between Deerfoot Trail and the East Freeway. Delivery of goods to local businesses on and around 17th Avenue SE will continue to use 17 Avenue SE. The demand for east-west movement along this corridor for heavy vehicles will decline once the Forest Lawn industrial area transitions into a light-industrial area with residential infill (see WORK section).



above:
The GO team designed a mobility network with 17 Avenue SE as the multi-modal urban boulevard "backbone," 52nd Street as the major north-south arterial connection, and evenly distributed local north-south transit routes. The study area also incorporates local green streets and bicycle routes throughout.

GO Strategy 2: Introduce good transit
(Principles 4, 9,10)

Currently, 17 Avenue SE plays a key role in providing general east-west connectivity, including access to the Foothills industrial area in the southeast. TUc completion and the transition of Forest Lawn industrial area to mixed-use industrial/residential will divert heavy truck traffic away from 17 Avenue SE, providing an opportunity to revision the street as an Urban Boulevard that focuses on serving local businesses and residents. The GO team developed a local-focus transit strategy, and a regional-focus option. The local-focus strategy emphasizes a transit-friendly pedestrian environment. To increase efficiency, the curb lane may be dedicated to HOV with transit priority during peak periods. The optional regional-focus transit strategy recognizes that 17 Avenue SE may continue to be necessary for east-west connectivity across the city and into downtown. This option features a wider right-of-way with separated transit, which allows higher speeds and more efficient movement of transit and vehicles through the corridor. However, participants at the charrette mid-course correction preferred the local-focus strategy.



right:
The local-focus transit strategy accommodates transit in the curb lane, four travel lanes, dedicated bicycle lanes, and on-street parking within a 33.4 m right-of-way. Pedestrians load and unload directly onto sidewalk curb bulges. Community members at the mid-course correction favoured this strategy.

GO Strategy 3: Building height to street width ratio
(Principles 2, 3, 8, 10)

Streets that have a safe, comfortable and attractive pedestrian realm contribute to community walkability. The ideal building height to street width ratio for a pedestrian-scale street is 2:1. The 17 Avenue SE street section is quite wide with a relatively deep building setback, resulting in an uncomfortable street scale and formidable crossing distance. The charrette team propose new buildings of four- to eight-storeys front close on the sidewalk. Optionally, incorporate a setback to allow further width for the sidewalk in cases where the proposed street section is wider than the existing right-of-way. Include covered arcades (left), and sidewalk awnings to extend the reach of the building into the street. Ensure buildings create a continuous street wall. Together, these strategies contribute to a more pedestrian-scale environment, and effectively reduce the perceived crossing distance.

Image credit: The Co Design Group

GO Strategy 4: Develop a Pedestrian-Friendly Streetscape
(Principles 2, 3, 4, 9)

Streetscape design also contribute to creating an attractive, pedestrian-scale street. Street trees along the sidewalk or in centre boulevards contribute to creating pedestrian-scale street. A thick edge between the sidewalk and traffic - including trees, planters, seats, pedestrian-scale lighting and parked cars - buffer pedestrians and contribute to safety. Wide sidewalks provide ample space for walking and for cafe seating that enlivens the streetscape. Use as many of these elements as possible to create a pedestrian-friendly streetscape.

Image credit: The Co Design Group

GO Strategy 5: Urban Forest
(Principles 2, 3, 11)

Street trees also contribute to the urban forest. The urban forest is key to maintaining a comfortable microclimate by absorbing summer heat to reduce the urban “heat island” effect. Deciduous trees are best suited to streets and public open space, where they allow light penetration and passive solar gain in winter, and shade in summer. The urban forest also cleans the air and absorbs rainwater, reducing the demands on engineered infrastructure. All street sections in the charrette make extensive use of street trees.

GO Strategy 6: Designate 52nd Street as a major north-south arterial (Principles 4, 9, 10)

The Plan It Calgary city-wide scenarios identify 52nd Street as the major north-south arterial route to the Foothills industrial area in the southeast. The charrette team identified 52nd Street as a major north-south arterial with more travel lanes than 17 Avenue SE, and high speed, high capacity transit. While 17 Avenue SE is a local, pedestrian focussed "high street," 52nd Street is a key corridor for connectivity across the city.

GO Strategy 7: Create good north-south connections across 17 Avenue SE (Principles 2, 4, 9, 10)

17 Avenue SE currently acts as a barrier, separating the north and south neighbourhoods in the study area. The team attempted to remedy this through two key design measures: first, increase the frequency of pedestrian crossings on 17 Aveune SE to one every second block - to correspond with local transit stops; second, front buildings clost on the sidewalk to create a pedestrian-scale streetscape and reduce the "psycological" crossing distance.

GO team Strategy Summary:

The GO team envisions 17 Avenue SE as a multi-modal urban boulevard. the corridor will be pedestrian- and bicycle-friendly, and feature local-oriented transit. 52nd Street is the major north-south arterial. Both 17 Avenue SE and 52nd Street have rapid transit, with local transit connecting surrounding residents to these corridors. A continuous street wall of buildings fronting close on the sidewalk, 2:1 building height to street width ratio, and wide tree-lined sidewalks create an attractive, pedestrian-scale streetscape along both corridors. 17 Avenue SE could transition into a parkway between the rail corridor and the East Freeway where it fronts Elliston Park. Enhanced north-south crossings along the length of 17 Avenue SE make walking and biking safer and easier.

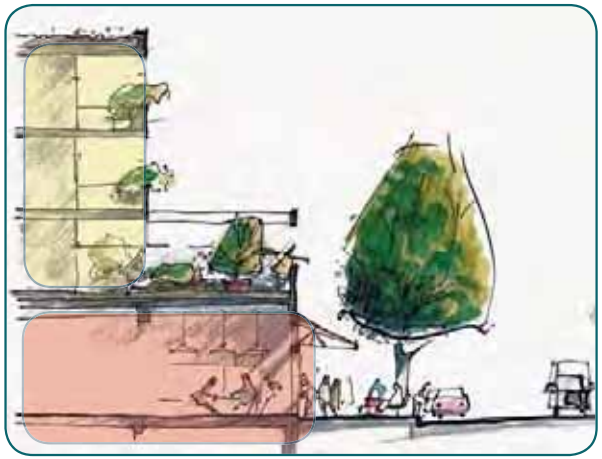
WORK team

The WORK team approached the design of the study area through the lens of employment. The team primarily focused on locations with the highest job potential - the 17 Avenue SE corridor between 28th and 52nd streets, and the Forest Lawn industrial area. The WORK team identified the unique small lot, affordable tenure of businesses along 17 Avenue SE as an asset, and exploring economically-viable redevelopment was a key challenge for the team. The team also explored the future of industrial work in the study site. The team generally concluded the TUC would become the most attractive goods movement route in the future, diverting truck traffic off 17 Avenue SE. There is the potential that CNRail will relocate the existing railway line to an alternate alignment outside of the study area. Given these considersation, heavy industrial uses will likely relocate south to the Foothills industrial area, which would be better served by both rail and the new ring road.

WORK Strategy 1: Jobs nodes along the corridor (Principles 3, 7, 8)

The team identified three jobs nodes along 17 Avenue SE at 52nd, 38th, and 28th streets. The high-capacity 52nd Street corridor supports the most intensive node, located on a topographical high-point that offers views towards downtown and the mountains. The 28th and 38th street nodes are minor. All nodes are commercial only, with at-grade retail uses and commercial office space above. A fourth, minor jobs node locates around Franklin Station on 28th Street.

right:
The team located three key jobs nodes along 17 Avenue SE: the 52nd Street major node; and, two minor nodes at 28th and 38th streets that merge along the avenue to create a “linear” node. The team also recognized the importance of Franklin Station to the north of the study area.



WORK Strategy 2: Continuous at-grade retail along 17 Avenue SE
(Principles 2, 3, 6, 7, 8)

The charrette team envisions 17 Avenue SE as the vibrant linear heart of this community. To achieve this, at-grade retail locates along both sides of the avenue between 28th and 68th streets. Larger stores locate in the nodes and smaller scale shops and services in between. Consultation with an economist confirmed that the study area population could generally support this amount of at-grade retail. To contribute to the vibrancy of the street, at-grade retail stretches between the 17 Avenue SE gateways.

WORK Strategy 3: Maintain parcel size diversity
(Principles 3, 6, 7)

The current parcelization along 17 Avenue SE includes a range of parcel sizes and shapes, with many small parcels fronting directly onto the avenue. This configuration is desirable for fostering small businesses and creating a fine-grained, pedestrian-scale streetwall, but not always economically viable. The team addressed this challenge by maintaining and creating larger parcels in the nodes, by preserving smaller parcels along the corridor outside nodes, and by proposing buildings with multiple boutique commercial units.

WORK Strategy 4: Two types of mixed-use building
(Principles 1, 3, 6, 7, 8)

The team identified two types of mixed-use buildings appropriate to the 17 Avenue SE corridor: ground-floor retail with office above; and, ground-floor retail with residential above. No mixed-use buildings will include all three uses. Larger commercial mixed-use buildings generally cluster at the nodes. Smaller residential mixed-use buildings generally front the corridor between nodes to provide eyes on the street outside of business hours. Some commercial mixed-use can also locate along the corridor outside nodes.

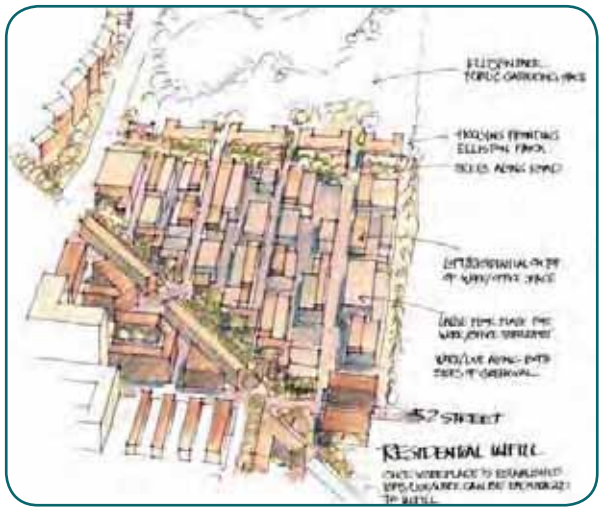
WORK Strategy 5: Articulate residential mixed-use buildings (Principle 3)

Maintain a continuous, pedestrian-scale streetscape and provide residential privacy by articulating residential mixed-use buildings from the second level. Bringing the at-grade facade contributes to pedestrian-scale and also ensures smaller lots have enough square footage for at-grade retail. Stepped buildings also and allow better light penetration to the street.

WORK Strategy 6: Service lanes parallel 17 Avenue SE (Principle 9, 2)

A number of commercial blocks along 17 Avenue SE are currently serviced from rear lanes. The team built on this pattern, adding lanes on blocks where they are absent. The lane network is primarily for servicing and underground parking access, and does not provide a continuous through-route, thus making alignment unnecessary. Servicing and parking access from the lane allows for a higher quality pedestrian environment on the street.

right:
The team built on the existing pattern of rear service lanes by adding lanes to blocks where they are currently absent. All buildings fronting on 17 Avenue SE are serviced from rear lanes (yellow).



WORK strategy 7: Industrial Infill
(Principles 1, 3, 6, 7, 8)

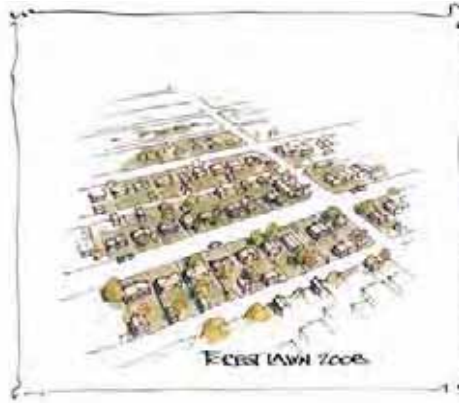
The Forest Lawn industrial area begins to offer residential opportunities as heavy industry shifts to cleaner, quieter activities. Existing industrial floorplates remain as repurposed light-industrial and artisan spaces. New townhouses locate along Elliston park and barnacle onto existing industrial buildings. The new mix of uses creates an area with activity throughout the day and night, reducing safety concerns. The industrial infill strategy will require careful planning and phasing, given current buffers around the landfill prohibiting residential or food-based activities.

WORK Strategy 8: Commercial gateways at 28th and 60th streets
(Principle 3)

The team identified gateway locations at either end of 17th Avenue SE. The 28th street node serves as the western gateway. This node is the start of commercial activity on the avenue when approaching eastward from downtown, or southward from Franklin Station. The 28th street node sits at the top edge of the escarpment, making it an ideal location for signature architecture. Sixtieth Street serves as the eastern gateway to the avenue where commercial uses begin after Elliston Park. The team did not detail the specific appearance of the gateway sites, but identified them as places for further exploration.

WORK team Strategy Summary:

The WORK team envisions the 17 Avenue SE corridor as a pedestrian-friendly, mixed-use urban boulevard with jobs nodes at 52nd, 28th, and 38th streets. Commercial mixed-use buildings with at-grade retail and office above locate on larger parcels in the jobs nodes. Residential mixed-use buildings with at-grade retail and residential above create a continuouse street wall along 17 Avenue SE between the nodes, and take advantage of medium- and smaller-sized parcels. All buildings fronting on 17 Avenue SE are serviced by rear lanes. Less intensive commercial uses along 28th street link the smaller jobs node at Franklin Station. The Forest Lawn industrial area becomes a residential and light-industrial mixed-use area as the TUC and rail realignment attracts heavy industry to the Foothills industrial area. Gateways at 28th and 60th streets mark the entrance to the corridor.



HOME team

Residential neighbourhoods around 17 Avenue SE provide much potential for green initiatives. The HOME/GREEN team jointly explored these issues. The primary challenge for the team was accommodating a more than doubled residential density in the central site area - between 28th and 68th streets. The team developed two key strategies to successfully integrate density: locate density along corridors and around significant open space, leaving the bulk of existing residential neighbourhoods virtually untouched; and, create new building forms to transition between new density and existing single-family residential areas. New building forms, including three- and four-storey residential buildings with ground-oriented, family housing and large, semi-private courtyards, enabled increased density while maintaining high-quality, family-oriented options.

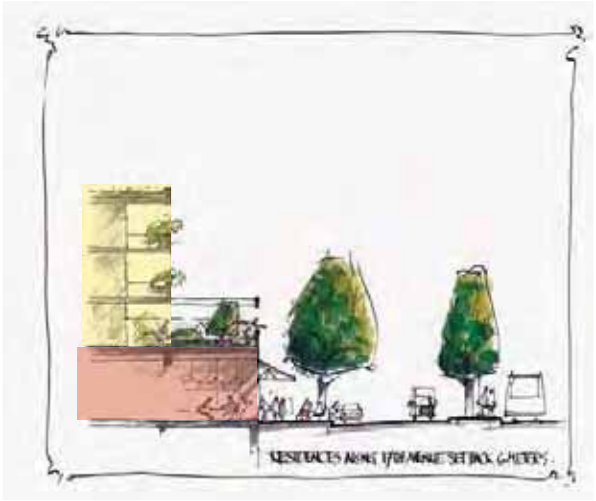
HOME Strategy 1: Locate density strategically (Principles 1, 3, 7, 8)

Currently, lower-density, primarily single-family neighbourhoods generally surround 17 Avenue SE. The team identified three key strategies to implement densification into neighbourhoods sensitively:

Densify in Strategic Locations that can accommodate more density than others - those adjacent to corridors and open space. Stacked townhouses or rowhouses fronting openspace, greenways, or green streets increase activity and sense of security in these public spaces. Such visual amenities also benefit residents of these units, who have smaller areas of private outdoor space.

Transition from High to Low Density uses from the corridor to surrounding single-family neighbourhoods. Mid-rise building forms, such as low-rise apartment and townhomes gradually step density down from higher-intensity corridors to single family areas.

Gradually Densify in existing single-family neighbourhoods. While the final plan saw many single-family neighbourhoods remain virtually unchanged, several others will infill slightly over time, while maintaining their single-family character. New duplexes, rowhouses, stached townhouses and carriage houses are all forms suited to creating a higher-density neighbourhood with lower-density character.

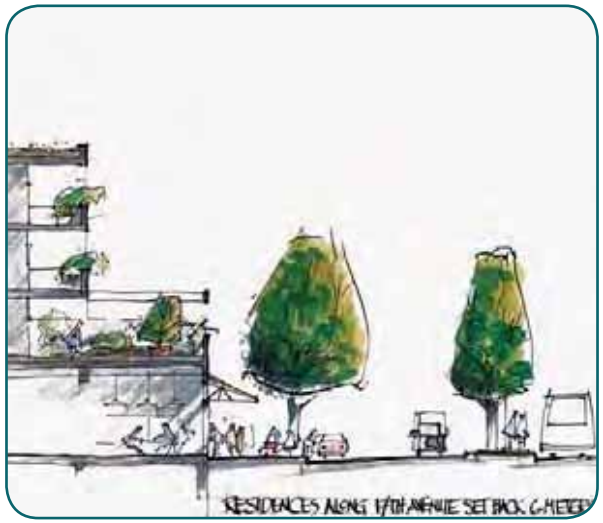


HOME Strategy 2: Residential mixed-use buildings along the corridor
(Principles 1, 2, 6, 8)

The 17 Avenue SE corridor has great potential for increased residential density. Two- to four-storey residential townhouses and apartments set back above ground floor retail provide housing options and contribute to the lively, pedestrian-friendly 17 Avenue SE corridor. These residential mixed-use buildings locate along the avenue between the commercial nodes.

HOME Strategy 3: Industrial residential infill
(Principles 2, 6, 7, 8)

As the Forest Lawn industrial area transforms to light-industrial it will become more compatible with residential uses. Residential uses in these areas contribute to crime reduction and safety by providing eyes on the street during non-business hours. The large, flat structures of warehouses and low-density commercial are ideal platforms for townhouses or apartment additions. Rooftop semi-private green courtyards provide residential open space. Live/work units are ideally suited to such areas. This strategy transforms a previously single-use area into a vibrant neighbourhood.



HOME Strategy 4: Take advantage of solar opportunities (Principle 11)

Calgary has abundant solar resources. Solar-sensitive design can reduce the need for heating and cooling, reducing energy costs and increasing sustainability. The sun plays a key role in the success of public spaces through all seasons. The team identified two key strategies to maximize solar benefits:

Step Buildings back above the first floor allow sunlight to penetrate to the street. Stepping of taller buildings is particularly key. Setbacks at upper levels also create open space for residential units, which can serve as a patio or other private green space. On smaller parcels along 17 Avenue SE, setbacks also maintain the small-building "feel" from the street.

Locate Higher Buildings to the North side of the 17 Avenue SE so sunlight reaches the street. Locate shorter buildings on the south side to minimize the area impacted by shadows. The resulting sunny spaces and streets will be more well-used and vibrant. Although the charrette concept accommodates the target numbers of jobs and people within the mid-rise buildings, the larger seven– to eight-storey buildings locate according to this strategy to minimize shadowing.

HOME team Strategy Summary:

The HOME team envisions 17 Avenue SE as a community that accommodates double the density, while maintaining much of the current single-family character. Residential density strategically locates along the corridor and around greenways, green streets, and open space. Density transitions from higher- to lower-density areas. Single-family neighbourhoods maintain their character, with some gradually densifying over time. Residential mixed-use buildings with at-grade retail and residential above front along the length of 17 Avenue SE between the jobs nodes. The Forest Lawn industrial area transitions to light-industrial with residential infill to create a more vibrant and safe neighbourhood. Buildings step back to provide outdoor space for upper-storey residential, commercial or retail acitivities, and to allow light penetration to the street. Taller buildings locate on the north-side of the street to minimize shadows.

GREEN team

Residential neighbourhoods around 17 Avenue SE provide much potential for green initiatives. One breakout group explored GREEN issues jointly with HOME issues to capitalized on the synergies between these components of the site. The primary challenge for the GREEN team was to provide enough high-quality, multi-functional green space within an existing community and a more than doubled population. Generally, the GREEN team strategies group into a three-tiered approach:

1) preserve all existing open space including school sites and publicly owned land;
2) provide additional open space, either new or reclaimed; and,
3) connect open space.

right:
One breakout group worked to eplore HOME and GREEN issues jointly to capitalize on the opportunities of these issue areas. In the new green neighbourhoods, new single-family detached and low-rise residential buildings have green roofs. Taller buildings provide residential density while allowing much of the parcel to remain as private open space (left edge). This strategy applied to a whole block allows for buildings to cluster around semi-public open space (centre, right edge). Green streets with bioswales connect open space throughout the site.

GREEN Strategy 1: Preserve existing open space (Principles 3, 5)

Identify and preserve the existing open space assets in the study site, including parks, schools, publicly owned land, environmentally sensitive areas, and other open space.

Green Strategy 2: Connect east and west green anchors (Principles 2, 3, 5)

Two large green spaces anchor the study site at the extreme east and west ends. The Bow River escarpment in the west offers views of downtown Calgary and the Rocky Mountains, and includes recreation paths that link into the regional recreation network. Elliston Park in the east is a large regional open space with a stormwater retention pond. The 17 Avenue SE urban boulevard is the grand "High Street" connection between the river and the park. Wide, tree-lined sidewalks, and a continuous, pedestrian-scale street wall with at-grade retail create an attractive streetscape. The avenue includes pedestrians, bicycles, transit, and vehicles. Two key east-west green street corridors - along 23rd and 14th avenues - connect the parks through the south and north areas of the community.

Green Strategy 3: Interconnected grid of green streets (Principles 2, 4, 9, 10, 11)

An interconnected grid of green streets that prioritize walking and cycling connect the community to parks and open space throughout the site. These streets feature tree-lined sidewalks and bike lanes, and one vehicle travel lane in each direction. On-street parking with permeable pavement locates on one side, with a planted storm water bioswale on the other. Two key east-west green street corridors connect Bow River and Elliston Park, generally along 23rd and 14th avenues. A segment of 8 Avenue SE is also a green street. Seven north-south streets - 26th, 28th, 36th, 40th, 44th, 68th, and the north portion of 34th - become greened to create strong connectivity between the residential neighbourhoods and the community parks and open space. The major arterial corridors, 52nd Street and Barlow Trail SE, also incorporate green street elements, as does the new rail greenway.

GREEN Strategy 4: Increase amount of open space (Principles 2, 3, 5, 9, 11)

The team developed four strategies to increase the total amount of community open space in addition to preserving and connecting existing areas:

Incorporate Public Plazas on 17 Avenue SE, particularly mid-block, south-facing, urban plazas along the north side. South-facing open space is well-used and will enliven the street. Mid-block spaces wrapped by buildings have a comfortable sense of enclosure.

Add New Passive Open Space in the portions of the study area that are currently poorly served with parks and open space. Locate unprogrammed, naturalized space in these areas, connected by the green street network.

Incorporate Semi-Public Green Space in newly densified areas as an amenity for residents. New three- and four-storey buildings wrap around internal semi-private courtyards. Courtyards can also contribute to walkability and green storm water management. Rooftop open space provides additional accessible or visual amenities.

Create the Rail Greenway once the rail line relocates. The right-of-way transitions into a greenway, with bioswales, trees, and more dense development. The tracks remain in place for optional future use in goods or people movement.

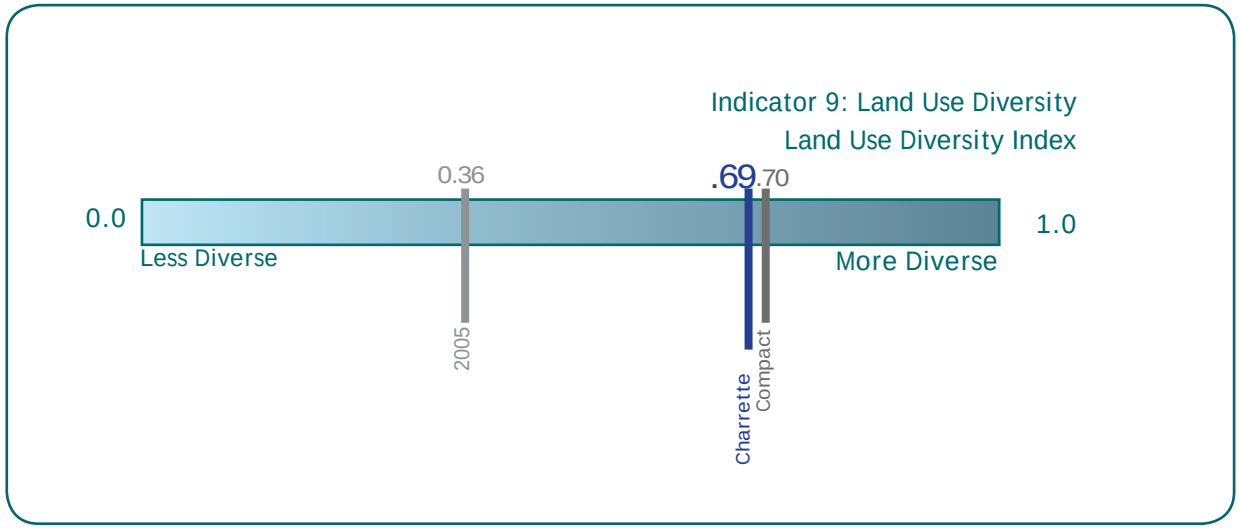
GREEN team Strategy Summary:

The GREEN team envisions 17 Avenue SE as having a diversity of parks, open space, green streets, greenways, plazas and courtyards equitably distributed throughout the community. Existing parks, school sites and open space remain, enhanced by new passive open space in areas that are currently poorly served by parks. The 17 Avenue SE urban boulevard and two key green street corridors along 14th and 28th avenues connect the Bow River escarpment, Elliston Park, and the Forest Lawn Athletic Park. The rail line transforms into a bicycle and pedestrian greenway to serve the new surrounding residential infill neighbourhood. All residential neighbourhoods include more open space, including green roofs, green streets, and semi-public courtyard open space wrapped by new low-rise residential buildings. An interconnected network of green streets emphasize walking, cycling and stormwater infiltration and connect residents to parks and open space amenities throughout the neighbourhood.

Performance Measurement

The SCP and DCS teams developed fourteen charrette-specific indicators - tools that reveal the magnitude of attributes explicitly linked to physical urban design variables, and provide the means through which to compare alternative scenario performance against the 11 Sustainability Principles. Each of the 11 Sustainability Principles relates to at least one of the fourteen 17 Avenue SE Case Study indicators. Evaluating charrette outputs against the indicators provides a means of measuring how well that scenario achieves the 11 Sustainability Principles. The Compact Scenario and existing (2005) conditions provided indicator performance benchmarks for the 17 Avenue SE Case Study. Performance measurements for charrette outputs are comparable to the benchmarks as a relative "order of magnitude."

Generally, the charrette concept performs similarly or better than the Compact Scenario benchmark for all sustainability indicators. Both the Compact Scenario and charrette concept generally achieve much higher performance than the 2005 Scenario benchmark.



right:
Example of an indicator performance scale, with Compact and 2005 scenario benchmarks, and measurement for the charrette concept.

Concluding Remarks

The charrette concept illustrates one vision of what the 17 Avenue SE community could look like if developed toward achieving the 11 Sustainability Principles. In this concept, 17 Avenue SE is a local-serving, multi-modal urban boulevard that acts as a community "High Street." Density clusters along the corridor, with three jobs nodes located at key intersections, and a fourth jobs node located on 28 Street SE at Franklin Station. Surrounding residential neighbourhoods remain virtually unchanged, with a more than tripled population residing in buildings of maximum eight-storeys. An interconnected network of green streets with walking and biking priority and storm water bioswales connects to parks and open space throughout the community. Bow River, Elliston Park and two new 17 Avenue SE gateways frame the community.

The multi-day charrette process included a range of stakeholders whose participation and expertise were key in testing current outcomes of the Plan It Calgary project within the context of a real Calgary community. The charrette outcomes will inform the next stages of Plan It Calgary, as well as the development of a Concept Plan for the 17 Avenue SE community.

Introduction

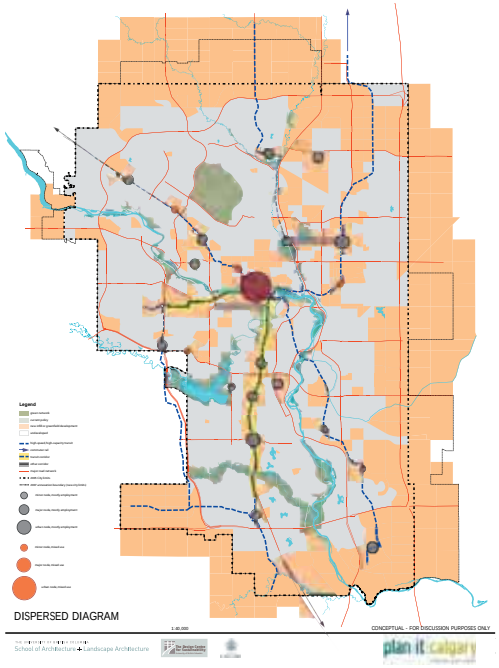
In January 2005, the City of Calgary undertook the imagineCALGARY process to develop a collective, 100-year vision for the city. In January 2007, City Council convened the interdisciplinary Sustainable City Project team and approved 11 Sustainability Principles to guide the Plan It Calgary project. Plan It Calgary seeks to integrate land use and transportation planning in a way that achieves these principles. The project goal is to generate an integrated Land Use and Mobility Plan that can sustainably accommodate 2.5 million people and 1.3 million jobs within the city by 2075. This plan will provide an update of the Calgary Plan (Municipal Development Plan) and the Calgary Transportation Plan. As one element in a comprehensive process toward achieving this goal, the Sustainable City Project team (SCP) is working with the Design Centre for Sustainability at the University of British Columbia (DCS) to explore the potential outcomes of applying these principles to the planning and physical design of the city.

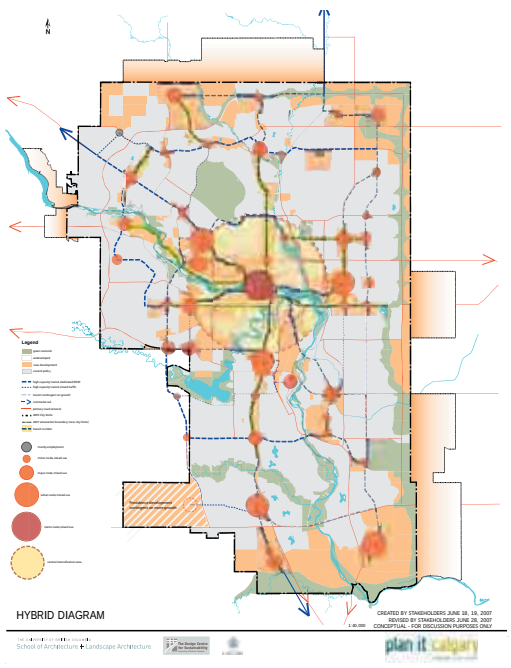
The Plan It Calgary City-Wide Scenarios

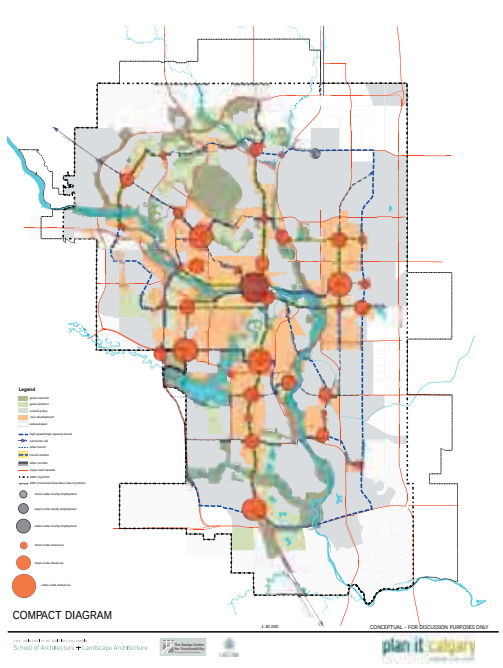
The first stage of the Plan It Calgary explored the implications of applying the 11 Sustainability Principles to the physical design of the city at the 1:40,000 scale. The SCP and DCS teams, together with invited stakeholders, developed three city-wide scenarios. Scenarios illustrate speculative, rather than predictive, potential futures that describe the opportunities and limitations that might result under different sets of assumptions. Scenario generation provides stakeholders with opportunities to explore their design expectations and learn about what might result from other unfamiliar, but instructive, approaches.

The team measured each scenario against a set of indicators that reveal the magnitide of attributes explicitly linked to physical urban design variables related to achieving the 11 Sustainability Principles. The physical organization of the City and relative performance embodied by each scenario reveal the opportunities/consequences of different approaches to the design of the city, and inform the generation of the integrated Land Use and Mobility Plan.

below:
The city-wide, 1:40 000 Plan It Calgary scenarios illustrate three of many possible development futures for the city. Each scenario accommodates the same number of people & jobs. The team measured each scenario against a set of indicators to inform participants about the relative performance that might be achieved through different approaches.



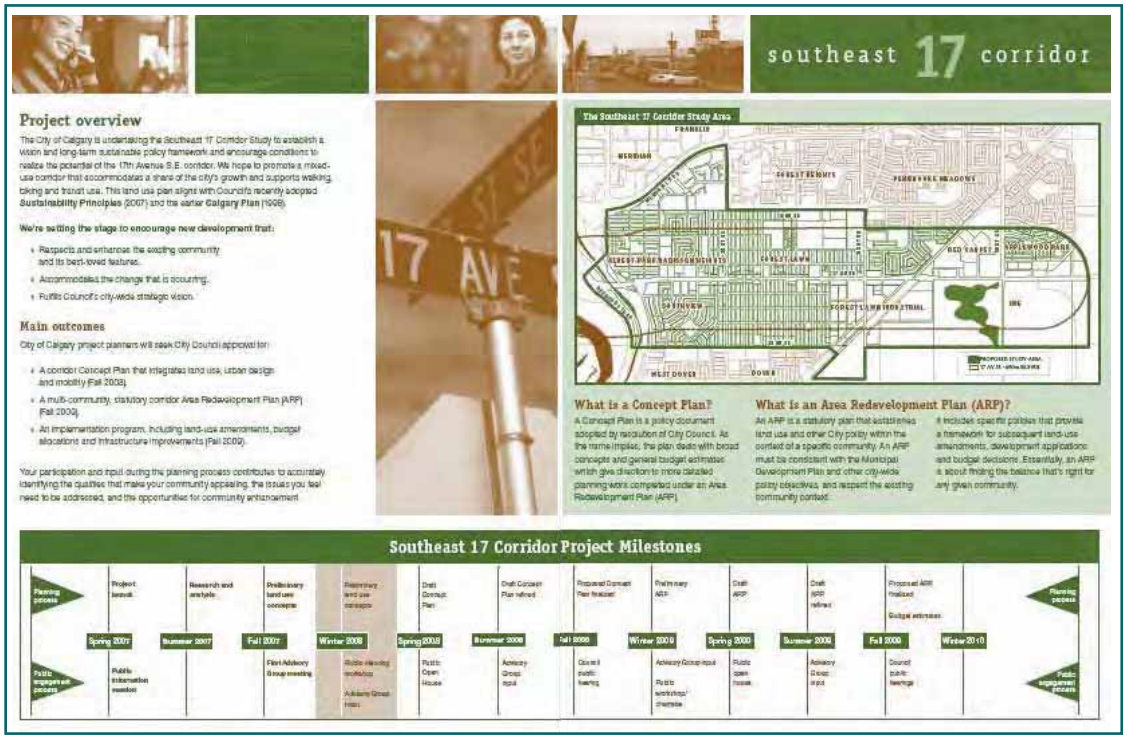




The Plan It Calgary Case Study Charrettes

The current stage of the Plan It Calgary project uses case study charrettes to test the learning outcomes of the city-wide scenarios, and explore the physical design implications of the 11 Sustainability Principles in a site-specific context and more detailed 1:2000 scale. A charrette is an intensely visual, collaborative event closely choreographed to productively engage diverse stakeholders in the processes of urban design. The charrette outputs will inform development of the integrated Land Use and Mobility Plan.

The 17 Avenue SE Case Study is one such charrette. The goal of the charrette is to illustrate a sustainable, liveable future for the study area. The 17 Avenue SE corridor is the subject of a current City of Calgary planning project - the *SE 17 Corridor Study*, which is planning for a twenty- to twenty-five year horizon. The *SE 17 Corridor Study* will produce a new Concept Plan in late 2008, and a multi-community Area Redevelopment Plan (ARP) in late 2009. The 17 Avenue SE Case Study charrette is one of many inputs informing the generation of these plans, providing the opportunity for Plan It Calgary to partner with and inform *current* initiatives.



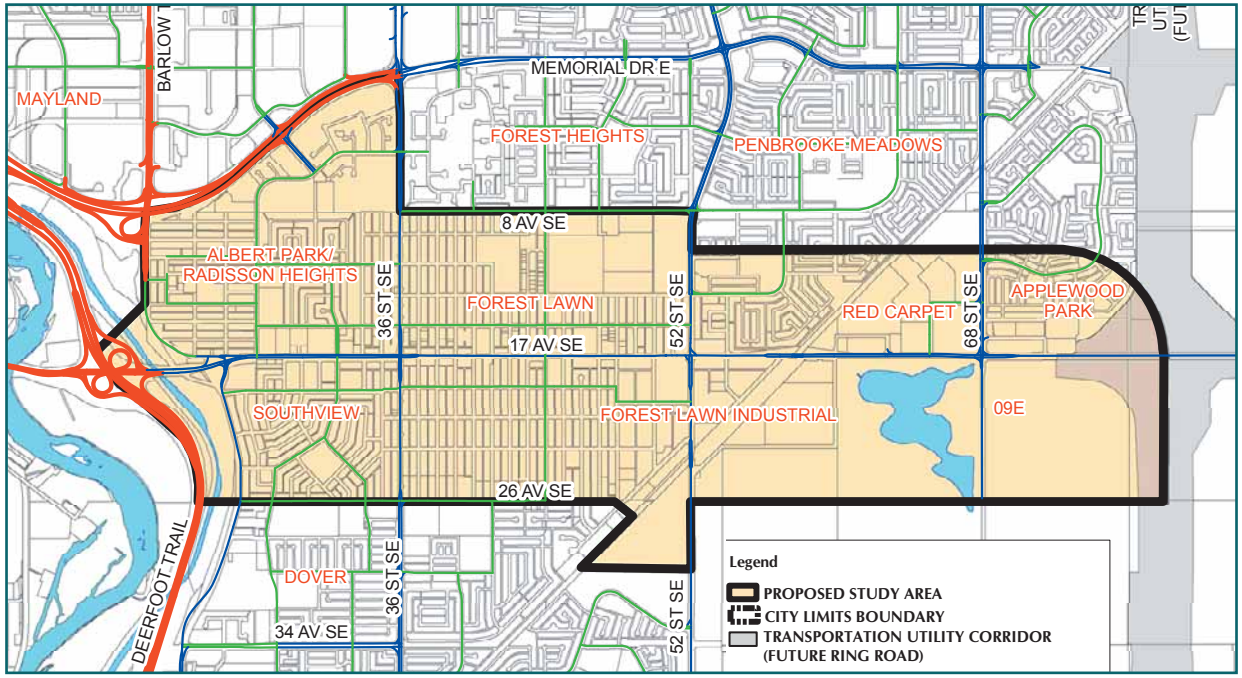
right:
The *SE17 Corridor Study* is a current initiative of the City of Calgary, which the Plan It Calgary project seeks to inform. The corridor study is a separate planning process that aims to produce a new, multi-community Area Redevelopment Plan in late 2009.

The 17 Avenue SE Case Study Site

The study area includes portions of the following communities: Albert Park/Radisson Heights, Southview, Forest Lawn, Forest Heights, Penbroke Meadows, Applewood Park, and Forest Lawn Industrial. The community of Forest Lawn makes up the central portion of the study area, and was one of the first communities to develop. The town of Forest Lawn was incorporated in 1953 and annexed into the City of Calgary in 1960 (Federation of Calgary Communities, 2008. http://www.calgarycommunities.com/communities/forestlawn.php). Original settlement began in 1910 and the area includes a variety of building styles as a result of this long history. Albert Park/Radisson Heights also developed at this time, and shares the gridiron street pattern of Forest Lawn.

The later developing neighbourhoods of Southview (1950), Penbrooke Meadows (1969), and Applewood Park (1982), all feature the curvilinear street networks characteristic of later suburban development. The study area also includes the Red Carpet mobile home park and the Forest Lawn industrial area.

The 17 Avenue SE corridor is a main east-west commercial throughfare. The area has a diverse ethnic mix, and is known as International Avenue.



Source: City of Calgary

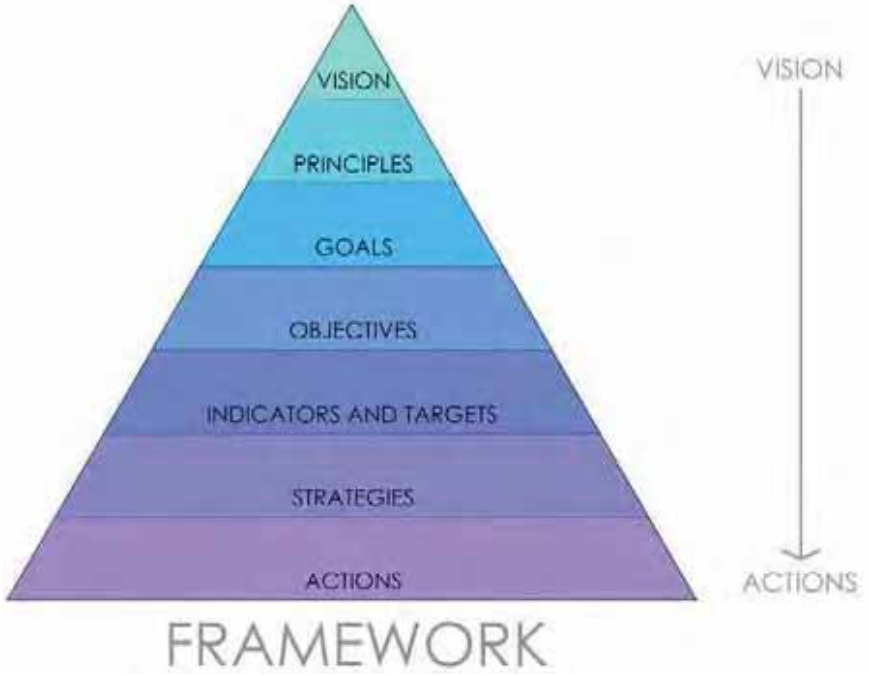
right:
The charrette considers the same area as the *SE17 Cooridor Study* area, generally bounded by: Deerfoot Trail in the west; the TUC in the east; 8 Ave SE in the north; and, 26 Ave SE in the south. It includes portions of several existing communities.

above:
Existing residential neighbourhoods in the study area: a mix of densities.

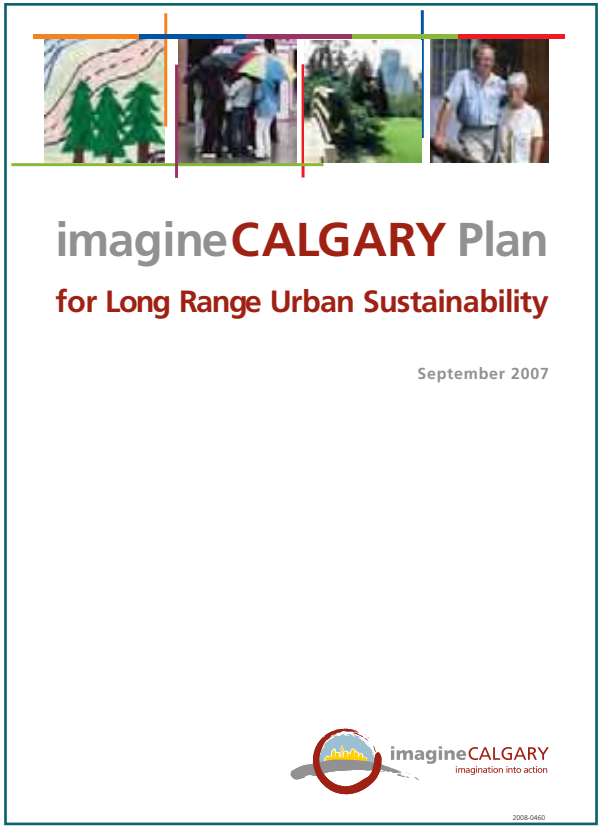
above, right:
Although 17 Avenue SE is currently auto-oriented, the wide right-of-way offers many opportunities to create a safe and attractive environment for pedestrians, bikes, and vehicles.

Decision Support Framework

The Decision Support Framework guided the 17 Avenue SE Case Study charrette process. This framework organizes the project vision, principles, goals, objectives, indicators, and preliminary strategies. The imagineCALGARY report and 11 Sustainability Principles provide the high level sustainability vision, principles, goals and objectives that guide the Plan It Calgary project. The SCP and DCS teams developed charrette-specific indicators and preliminary strategies with input from City staff and ideas generated at the SE 17 Visioning Workshops, held January 2008. These indicators and strategies focus specifically on making 17 Avenue SE a more effective place to live, work, and shop, and to integrate it with the surrounding neighbourhoods and the City. The decision support framework guides decision-making at the charrette to ensure resulting outputs reflect community aspirations for the future of 17 Avenue SE, and the City of Calgary as a whole.



right:
The Decision Support Framework guided charrette team discussions and decisions throughout the 17 Avenue SE charrette process.



imagineCALGARY 100-Year Vision.

For thousands of years, people have met at the confluence of two vital rivers to imagine and realize their futures. Together, we have built a city of energy, born of a powerful convergence of people, ideas and place. Together, we continue to imagine Calgary, making a community in which

We are each connected to one another. Our diverse skills and heritage interweave to create a resilient communal fabric, while our collective spirit generates opportunity, prosperity and choice for us all.

We are each connected to our places. We treasure and protect our natural environment. Magnificent mountain vistas and boundless prairie skies inspire each of us to build spaces worthy of their surroundings.

We are each connected to our communities. Whether social, cultural or physical, these communities are mixed, safe and just. They welcome meaningful participation from everyone and people move freely between them.

We are each connected beyond our boundaries. We understand our impacts upon and responsibilities to others. Our talent and caring, combined with a truly Canadian sense of citizenship, make positive change across Alberta, throughout Canada and around the world.

above & right:
The imagineCALGARY report provides the vision that guides the Plan It Calgary project.

Principle 1: Create a range of housing opportunities and choices.

Provide a mix of housing types and ownerships in the same neighbourhood to allow residents to live affordably in the same community throughout their lives. A mix of housing creates a more adaptable and resilient community fabric as it is able to respond to demographic changes such as aging populations, empty nesters and smaller households.

Principle 2: Create walkable environments.

Create pedestrian-friendly environments with an interconnected street network to ensure walkable access to commercial and public services and amenities. Streets and arterials are designed for walking, cycling, transit access and cars. Neighbourhoods are sufficiently compact with mixed uses to provide sustained transit service.

Principle 3: Foster distinctive, attractive communities with a strong sense of place.

Create distinctive, high-quality communities designed with architectural and natural elements that reflect local conditions and the values of residents.

Principle 4: Provide a variety of transportation options.

Couple a multi-modal approach to transportation with supportive development patterns to create a variety of transportation options. This principle includes increasing the availability of high-quality transit service, creating resiliency and connectivity within the road networks, and ensuring connectivity between pedestrian, bike, transit and road facilities.

Principle 5: Preserve open space, agricultural land, natural beauty and critical environmental areas.

Maintain and restore ecosystem functions. Respect the natural functions of the landscape, particularly working agricultural land, watersheds and aquatic habitats. Design communities to integrate natural systems with human activities while placing high value on community access to natural systems and parks.

right & far right:
In 2007, Calgary City Council approved 11 Sustainability Principles as part of the Terms of Reference for the Plan It Calgary project. Smart Growth Principles, current City of Calgary policy (including the Municipal Development Plan and the Calgary Transportation Plan), and the imagineCALGARY Long Range Urban Sustainability Plan all informed the 11 Sustainability Principles. The principles are a key input into the Decision Support Framework for the Plan It Calgary project.

Principle 6: Mix land uses.

Mix land uses by having homes, businesses, schools and recreational opportunities in closer proximity. Mixed land use will provide alternatives to driving such as walking and biking while increasing transit viability. The resulting increased number of people on the street can enhance the vitality and perceived security of an area. Mixed land use is key to achieving more complete communities.

Principle 7: Strategically direct and manage redevelopment opportunities within existing areas.

Direct redevelopment towards and within existing areas to create and enhance places in existing communities. Stable areas will be preserved and the existing community context will be valued. Strategic intensification makes more efficient use of existing infrastructure and increases transit efficiency.

Principle 8: Support compact development.

Compact development supports transit viability and modes of travel other than the automobile. It also allows for the preservation of open space and more efficient use of infrastructure.

Principle 9: Connect people, goods and services locally, regionally and globally.

Connectivity of all modes of transportation locally, regionally and globally ensures a more effective and efficient transportation system for people, goods and services.

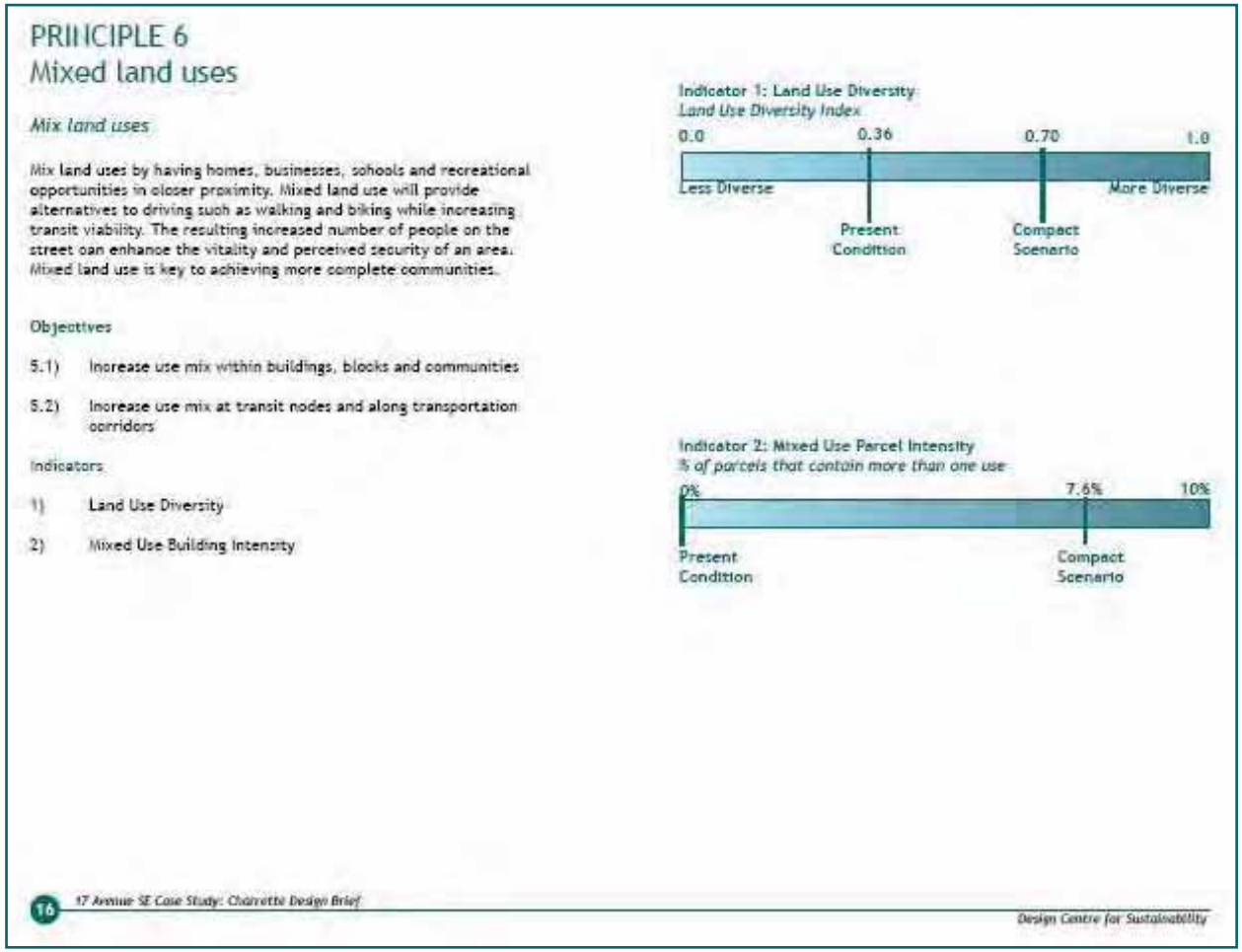
Principle 10: Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens.

Transportation services and infrastructure should be delivered in a cost-effective and energy-efficient manner. The transportation system should provide citizens with safe, barrier-free access to services that supply reasonable access to all areas of the city. Optimally designed and operated transportation systems help to improve the quality of life for citizens, support economic development and protect environmental health.

Principle 11: Utilize green infrastructure and buildings.

Utilizing ecological services provided by the environment will reduce community and environmental impacts as well as private, public and taxpayer costs of development and infrastructure. Green infrastructure can include energy solutions such as co-generation or renewable energy and water solutions such as stormwater retention and recharge. Green buildings include but aren't limited to externally certified standards such as LEED (Leading in Energy and Environmental Design), BOMA Go Green for commercial buildings and Built GreenTM for residential applications.

Indicator 1: Housing Diversity
Indicator 2: Proximity to Activity Centres
Indicator 3: Amenity Distribution
Indicator 4: Transportation Diversity
Indicator 5: Cycling Network Intensity
Indicator 6: Proximity to Transit
Indicator 7: Open Space Intensity
Indicator 8: Open Space Proximity
Indicator 9: Land Use Diversity
Indicator 10: Mixed-Use Parcel Intensity
Indicator 11: Redevelopment Intensity
Indicator 12: Development Intensity
Indicator 13: External Community Connectivity
Indicator 14: Green Infrastructure Intensity


PRINCIPLE 6
Mixed land uses

Mix land uses

Mix land uses by having homes, businesses, schools and recreational opportunities in closer proximity. Mixed land use will provide alternatives to driving such as walking and biking while increasing transit viability. The resulting increased number of people on the street can enhance the vitality and perceived security of an area. Mixed land use is key to achieving more complete communities.

Objectives

5.1) Increase use mix within buildings, blocks and communities

5.2) Increase use mix at transit nodes and along transportation corridors

Indicators

1) Land Use Diversity

2) Mixed Use Building Intensity

Indicator 1: Land Use Diversity
Land Use Diversity Index
0.0 0.36 0.70 1.0
Less Diverse
More Diverse
Present Condition
Compact Scenario

Indicator 2: Mixed Use Parcel Intensity
% of parcels that contain more than one use
0% 7.6% 10%
Present Condition
Compact Scenario

16 17 Avenue SE Case Study: Charrette Design Brief
Design Centre for Sustainability

above:
The fourteen 17 Avenue SE Case Study indicators.

right:
The SCP and DCS teams developed fourteen indicators - tools for evaluation of the charrette outputs against the 11 Sustainability Principles - and measured the charrette site under the 2005 condition and Compact Scenario to create benchmarks for each indicator (sample, right). Benchmarks provide the charrette team with a frame for discussing the desired performance for the 17 Avenue SE corridor.

Possible Strategies	Appropriate Design Measures
Mix uses at neighbourhood, block and parcel scales	Concentrate retail, service and commercial uses on the corridor, with residential behind
	Include civic uses (e.g. libraries, community centres, cultural centres, recreation facilities etc.)
	Locate mixed-use buildings on the corridor
	Retrofit existing large format retail with residential above

Buildings with a mix of uses (commercial/office below residential) enliven the corridor and support transit.

Existing large-format retail stores have potential to be "podiums" for new residential development.

Design Centre for Sustainability

17 Avenue SE Case Study: Charrette Design Brief 17

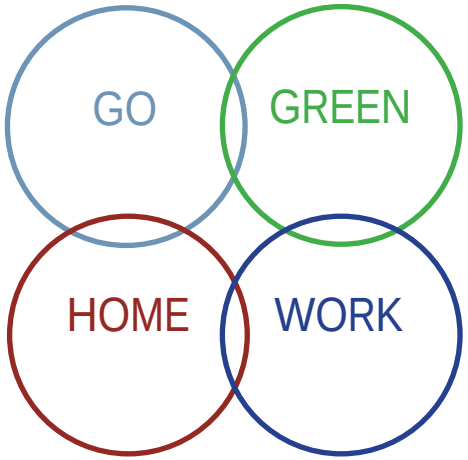
right:
The SCP and DCS teams synthesized the ideas generated at the SE17 Corridor Visioning Workshops to develop preliminary charrette-specific strategies for each of the 11 Sustainability Principles as part of the decision support framework.

above:
The workshops paired local residents with artists from the Co-Design Group to generate sketches of participants' vision of the corridor in a fourty-year horizon (above). Additional strategies are one of the charrette outputs.

Charrette Process

A charrette is an intense, collaborative design event where that productively engages diverse stakeholders in the process of urban design within a closely choreographed time-frame. Members of the School of Architecture at the Ecole des Beaux-Arts in Paris coined the word at the end of the last century. The faculty in that school would issue problems that were so difficult few students could successfully complete them. When the allotted time had elapsed, a pushcart - in French, a charrette - trundled past the drafting stations. Students would throw their drawings into the cart in various states of completion, as to miss it meant an automatic grade of zero.

The 17 Avenue SE charrette took place 10-13 March 2008. The charrette team worked together over four days to design an attractive, vibrant, pedestrian friendly neighbourhood that celebrates the character of the community. At the event mid-point, the team presented preliminary outputs to the community at large, who provided feedback as input to the development of the work over the following days. At the end of four days the design team presented the final charrette results to the community. Appendix 4 includes comments from both presentations.



above:
The charrette team divided into three breakout groups that focused on different key physical design issue areas or *themes*: GO, focussing on transportation; GREEN/HOME, focussing on natural areas and parks, and housing; and, WORK, focussing on jobs.

At key points, the charrette team divided into three breakout groups: GO, focusing on mobility networks in the study area; WORK, focusing on employment; GREEN/HOME focusing primarily on the residential uses in the study area, open space networks and green infrastructure. One breakout group explored GREEN and HOME topics in combination, given the close relationship and potential for synergies between the two issue areas within the 17 Avenue SE context. Each breakout group used their particular focus as a "lens" through which to examine the study area as a whole. In plenary sessions, the charrette team as a whole explored areas of connect/disconnect between the ideas generated by different breakout groups, and carried those discussions into following breakout group sessions. This iterative process allowed the charrette team to gradually develop one synthesized concept map that incorporates key strategies from each team.

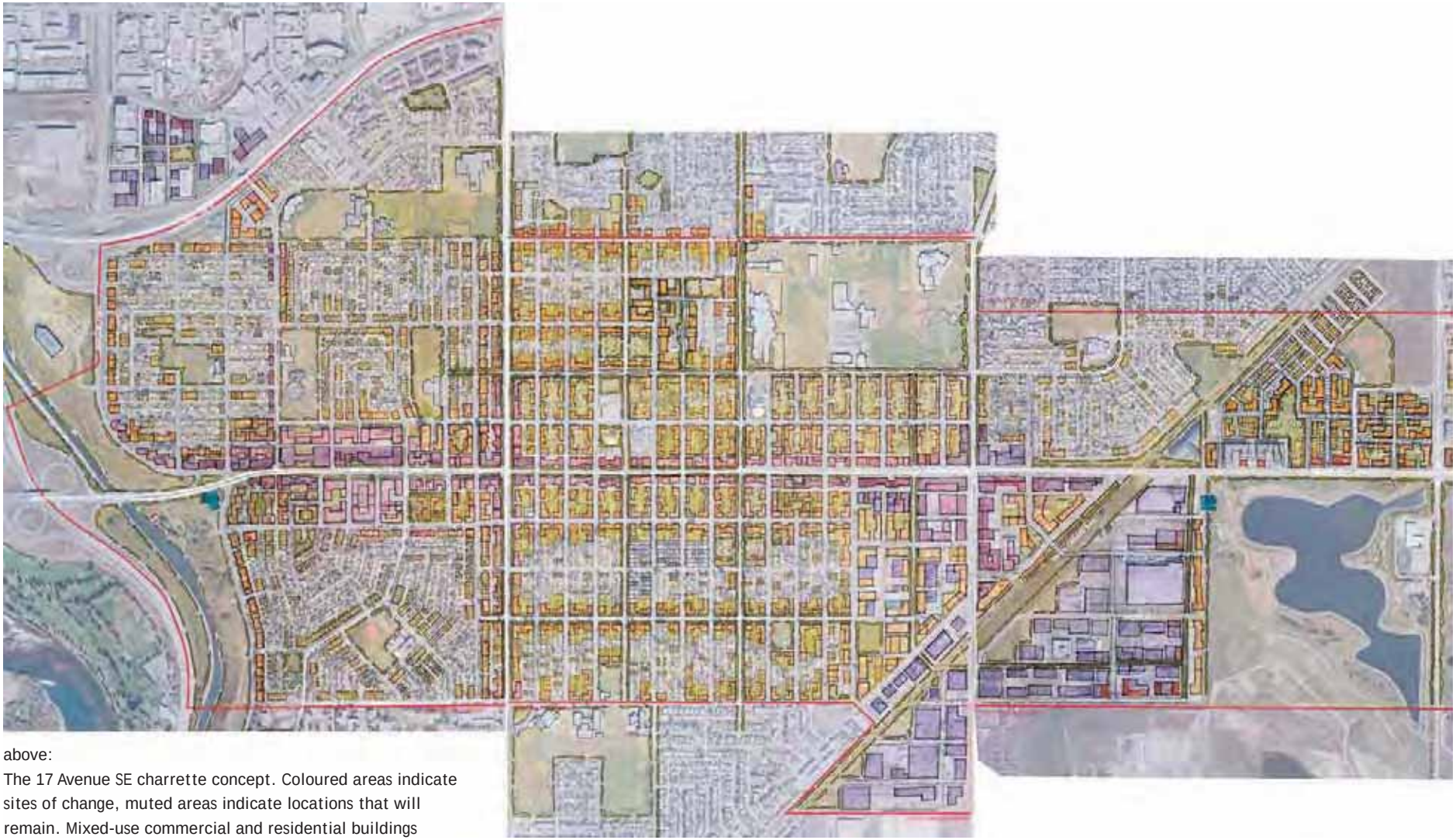
The 17 Avenue SE Charrette Concept

The charrette concept envisions 17 Avenue SE as a multi-modal urban boulevard. The corridor will be pedestrian- and bicycle-friendly, and feature local-oriented premium transit. Mixed-use commercial nodes at 52nd, 28th and 38th streets focus on at-grade retail with office above. The 52nd Street node is the largest, and 52nd Street is identified as the major north-south arterial, with additional north-south connections for pedestrians and bicycles along 17 Avenue SE. Between the nodes, mixed-use residential with at-grade retail and residential above front 17 Avenue SE. Less intensive commercial uses along 28th Street connect the smaller Franklin LRT Station job node with the larger node on 17 Avenue SE.

The 17 Avenue SE community accommodates double the current residential density within a range of single-family, townhouses and mid-rise buildings up to eight storeys. Much of the single-family character of surrounding neighbourhoods remains. Residential density strategically locates along key corridors and around greenways, green streets, and open space. Density transitions from higher- to lower-density areas. Large portions of single-family neighbourhoods remain, with some areas gradually densifying over time to maintain their character.

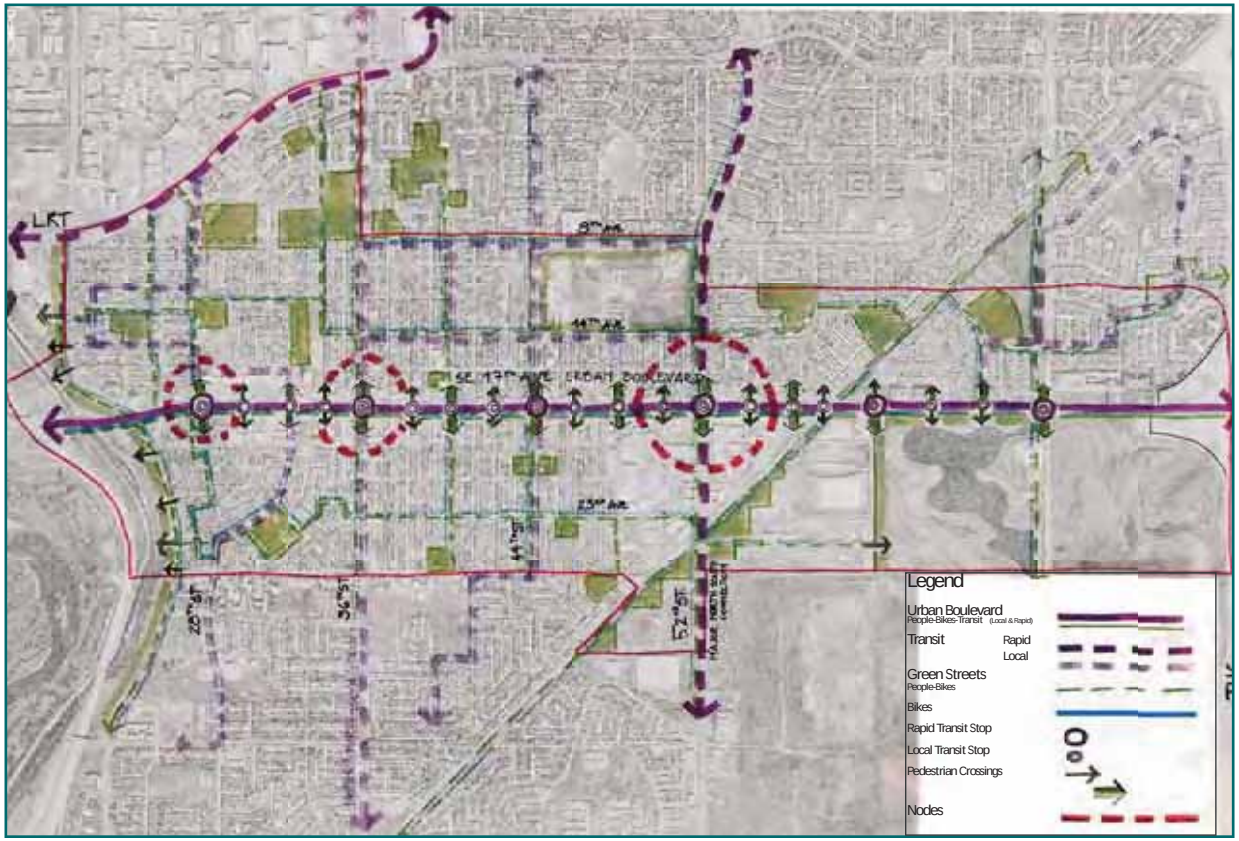
The Forest Lawn industrial area transforms into a light-industrial area with residential infill as the TUC and rail relocation attract heavy industry to the Foothills Industrial area. Larger industrial parcels remain at the south-east edge.

The community has a diversity of parks, open space, green streets, greenways, plazas and courtyards equitable distributed throughout. Existing parks and open space remain, and new plazas on 17 Avenue SE, neighbourhood parks, and semi-public green space contribute new amenity areas. The rail right-of-way transitions into a greenway and, together with the 17 Avenue SE urban boulevard and an interconnected green street network, connect Bow River, Elliston Park, and the schools, parks and open spaces in surrounding neighbourhoods. 17 Avenue SE could transition into a parkway between the rail corridor and the East Freeway where it fronts Elliston Park. The green street network emphasizes walking, cycling and storm water infiltration.

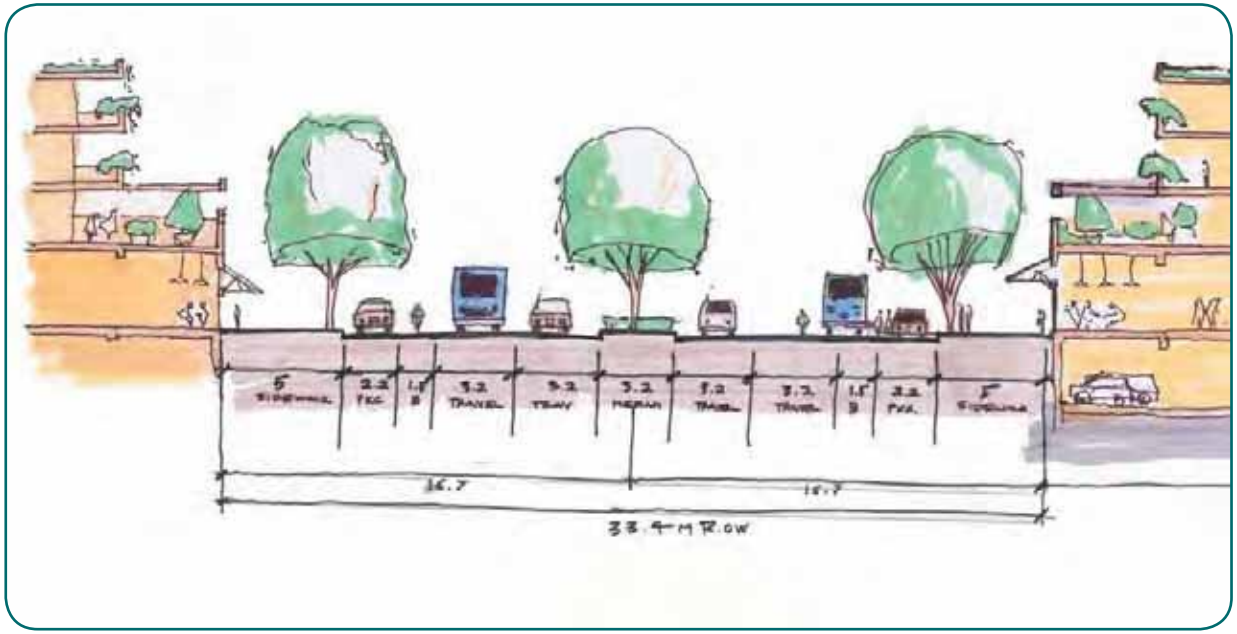


above:
The 17 Avenue SE charrette concept. Coloured areas indicate sites of change, muted areas indicate locations that will remain. Mixed-use commercial and residential buildings (dark and light red) front key corridors and cluster in nodes. Town houses and apartments (orange) sensitively integrate into residential neighbourhoods to transition between higher density corridors and single-family neighbourhoods. Surrounding single-family neighbourhoods remain virtually unchanged. Mixed-use industrial-residential (purple & orange) locate in the Forest Lawn industrial area, with larger light-industrial parcels (purple) remailing in the south-east. Preserved and new parks, open space, schools and street trees distribute throughout the community.

right:
17 Avenue SE is a multi-modal urban boulevard with local-oriented transit. Local transit (light purple dash) connects surrounding residents to the 17 Avenue SE rapid transit corridor. Jobs nodes locate at 52nd, 28th, and 38th streets (red dash circles). 52nd Street is the major north-south arterial corridor (purple dash), with enhanced pedestrian/bike crossings along 17 Avenue SE (green arrows).



GO team Design Strategies



GO team participants

Jone Belausteguigoitia, Denise Carbol, Pat Churchman, Dave Colquhoun, Patrick Condon, Sara Fryer, Nora Kajdy, Neil Mckendrick, Dennis Ogle, Ron Smith

see appendix 3 for full affiliations

URBAN BOULEVARD

KEY DATA

Right of Way:	40-60 meters
Lanes:	2 - 6 lanes
Speed:	50 - 60 kph
Daily Traffic:	20,000 -45,000 veh/day
Travel lanes:	yes*
Bus/HOV lane:	yes
Parking:	parallel only, site specific
Bike lane:	yes
Median:	yes, site specific
Boulevard and sidewalk:	yes, wide sidewalks
Multi-use pathways:	yes, site specific
Stormwater infiltration:	yes, site specific

* lane widths are approximately 3.35m, but could be reduced to minimum 3.2m if lower speeds desired

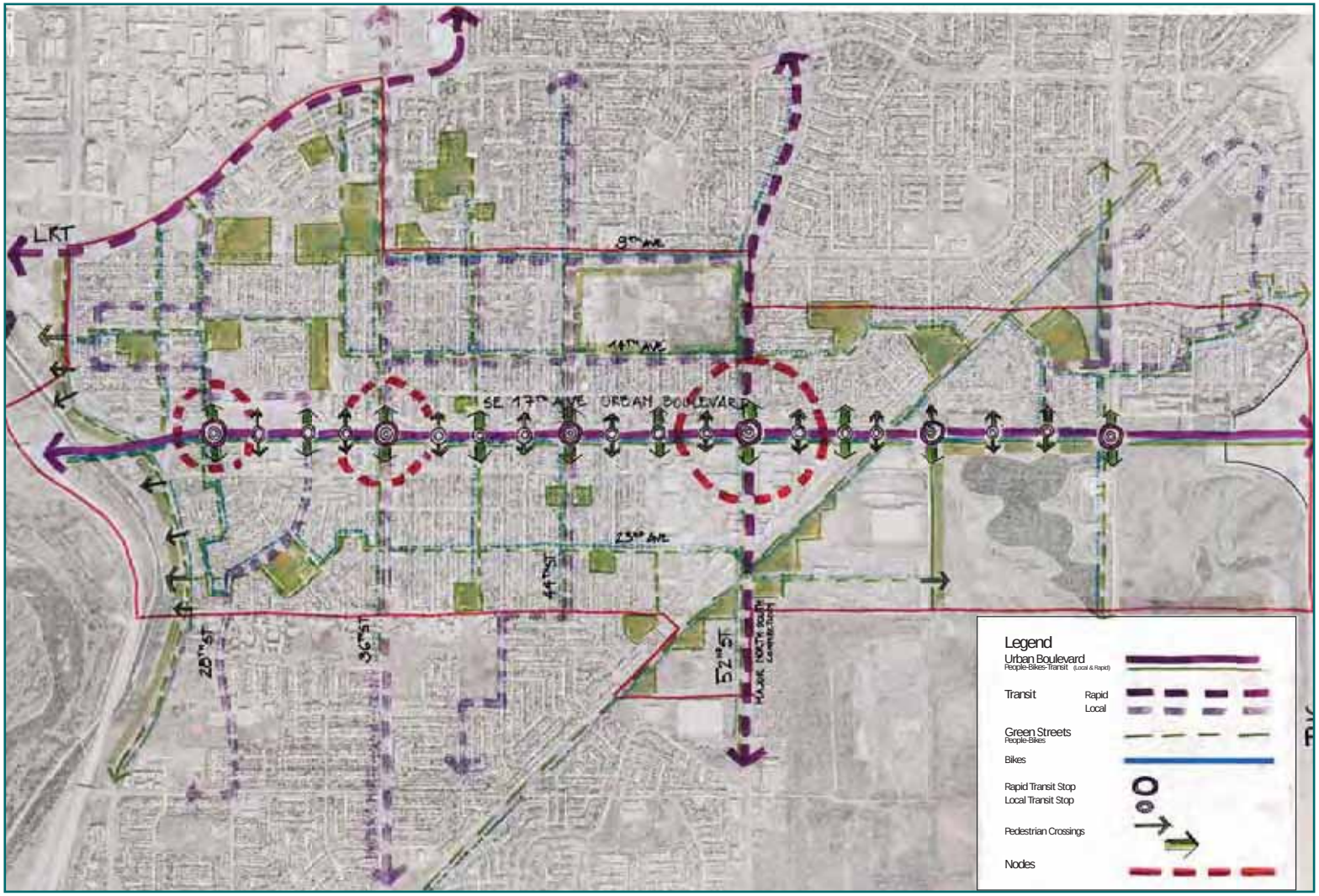
GO Team

The GO team had primary responsibility for the mobility networks: that is, how people and goods move into, out of, and within the study area. The team considered all modes of transportation, including walking, cycling, public transit, vehicles and, to a lesser extent, goods movement. The GO team examined the possible strategies and design measures outlined in the charrette design brief to inform their explorations and resulting strategies.

GO Strategy 1: Transform 17 Avenue SE into a multi-modal urban boulevard (Principles 2,3,4,9,10)

Seventeen Avenue SE is identified as an "Urban Boulevard" in the Plant It Calgary city-wide scenarios.The Urban Boulevard is a new road type in the hierarchy under development by the SCP team for the Plan It Calgary project. The Urban boulevard is a multi-modal street with a focus on walking, cycling, and transit that continues to accommodate a moderately high traffic volume (see details at left). Urban Boulevards are the future "high-streets" of Calgary, emphasizing a walkable pedestrian environment fronted by a complimentary mix of land uses while allowing the same volume of vehicle and transit traffic to travel through at a slower speed. Generally, the charrette team and community input favour this strategy, which will transform 17 Avenue SE into a locally-focused "high street." 17 Avenue SE could transition into a parkway between the rail corridor and the East Freeway where it fronts Elliston Park.

To facilitate the transition of 17 Avenue SE into an urban boulevard, goods movement shifts off of the corridor and on to Peigan Trail, once the latter completes a connection between Deerfoot Trail and the East Freeway. Delivery of goods to local businesses on and around 17th Avenue SE will continue to use 17 Avenue SE. The demand for east-west movement along this corridor for heavy vehicles will decline once the Forest Lawn industrial area transitions into a light-industrial area with residential infill (see WORK section).



right:
The GO team designed a mobility network with 17 Avenue SE as the multi-modal urban boulevard "backbone," 52nd Street as the major north-south arterial connection, and evenly distributed local north-south transit routes. The study area also incorporates local green streets and bicycle routes throughout.

GO Strategy 2: Introduce good transit
(Principles 4, 9,10)

Currently, 17 Avenue SE plays a key role in providing general east-west connectivity, including access to the Foothills industrial area in the southeast. TUc completion and the transition of Forest Lawn industrial area to mixed-use industrial/residential will divert heavy truck traffic away from 17 Avenue SE, providing an opportunity to revision the street as an Urban Boulevard that focuses on serving local businesses and residents. The GO team developed a local-focus transit strategy, and a regional-focus option.

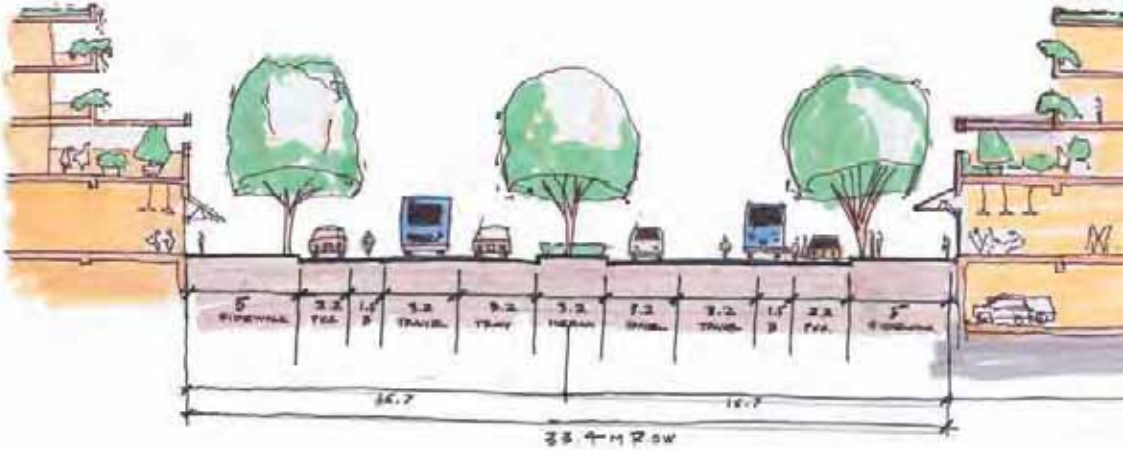
a. Local Focus

The local-focus transit strategy emphasizes a transit-friendly pedestrian environment. The 33.4 meter right-of-way accommodates transit in the curb lane, two travel lanes, a dedicated bicycle lane, and on-street parking in each direction. Transit passengers load and unload directly onto sidewalk curb bulges. Curb bulges effectively decrease travel lane width at intersections, reducing crossing distance and traffic speed. Buildings at the sidewalk edge front on the street to create an attractive pedestrian-scale streetscape. To increase efficiency, the curb lane may be dedicated to HOV with transit priority during peak periods.

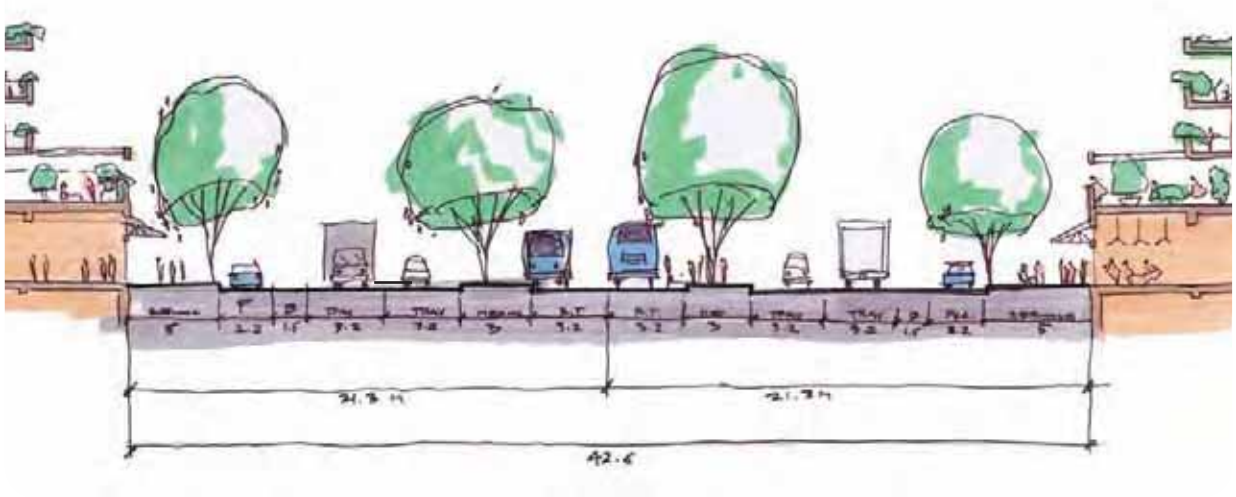
b. Optional Regional Focus

The optional regional-focus transit strategy recognizes that 17 Avenue SE may continue to be necessary for east-west connectivity across the city and into downtown. The 42.6 meter right-of-way includes a central dedicated transit median, two travel lanes, a dedicated bicycle lane, and on-street parking in each direction. Transit passengers must cross the street to load and unload. The wider right-of-way means a longer crossing distance for pedestrians, although the median provides some relief. Buildings at the sidewalk edge front on the street to create a pedestrian-scale sidewalk. Separated transit allows higher speeds and more efficient movement of transit and vehicles through the corridor. However, participants at the charrette mid-course correction preferred the local-focus strategy.

above:
Curb bulges are one strategy to create a safer pedestrian streetscape. Curb bulges extend the sidewalk into the street, reducing crossing distance and traffic speed by effectively decreasing travel land width. Visibility between vehicles and pedestrians also increases as there is no parked car to block sightlines.



top right:
The local-focus transit strategy accommodates transit in the curb lane, four travel lanes, dedicated bicycle lanes, and on-street parking within a 33.4 m right-of-way. Pedestrians load and unload directly onto sidewalk curb bulges. Community members at the mid-course correction favoured this strategy.



bottom right:
The optional regional-focus transit strategy accommodates a central dedicated transit median, four travel lanes, dedicated bike lanes and on-street parking in a 42.6m right-of-way. Transit passengers must cross the street to load and unload.

Existing Condition

2015

2050

2075

clockwise from top:
The local-focus transit strategy: The 17 Avenue SE corridor would develop gradually over a 75-year time period. Within the next 15 years (top, right) the curb oriented transit establishes a narrower street section with slower traffic speeds and a more pedestrian-scale streetscape. Gradually, infill development along the corridor brings enough ridership to support a rapid bus. By 2050 (middle, right), density increases in neighbourhoods around the corridor, supporting local-focus light rail development. In the final 25 years (bottom, right) more density develops along the corridor, attracted by the light rail amenity.

Existing Condition

2015

2050

2075

clockwise from top:
Optional regional-focus transit strategy: A regional-focus transit strategy would see the 17 Avenue SE corridor develop over a similar timeframe. Within the next 15 years (top, right) the central dedicated transit corridor establishes. Gradually, infill development along the corridor brings enough ridership to support a rapid bus. By 2050 (middle, right), density increases in neighbourhoods around the corridor, supporting light rail development. In the final 25 years (bottom, right) more density develops along the corridor, attracted by the light rail amenity.

GO Strategy 3: Building height to street width ratio
(Principles 2, 3, 8, 10)

Streets that have a safe, comfortable and attractive pedestrian realm contribute to community walkability. The ideal building height to street width ratio for a pedestrian-scale street is 2:1. Although the 17 Avenue SE right-of-way is quite wide, carefully-designed buildings can contribute to moving the corridor toward achieving this ratio. The 17 Avenue SE street section is quite wide with a relatively deep building setback, resulting in an uncomfortable street scale and formidable crossing distance. The charrette team propose new buildings of four- to eight-storeys front close on the sidewalk. Optionally, incorporate a setback to allow further width for the sidewalk in cases where the proposed street section is wider than the existing right-of-way. Include covered arcades (left), and sidewalk awnings to extend the reach of the building into the street. Ensure buildings create a continuous street wall. Together, these strategies contribute to a more pedestrian-scale environment, and effectively reduce the perceived crossing distance.

Image credit: The Co Design Group

GO Strategy 4: Develop a Pedestrian-Friendly Streetscape
(Principles 2, 3, 4, 9)

Streetscape design also contribute to creating an attractive, pedestrian-scale street. Street trees along the sidewalk or in centre boulevards contribute to creating pedestrian-scale street. A thick edge between the sidewalk and traffic - including trees, planters, seats, pedestrian-scale lighting and parked cars - buffer pedestrians and contribute to safety. Wide sidewalks provide ample space for walking and for cafe seating that enlivens the streetscape. Use as many of these elements as possible to create a pedestrian-friendly streetscape.

Image credit: The Co Design Group

GO Strategy 5: Urban Forest
(Principles 2, 3, 11)

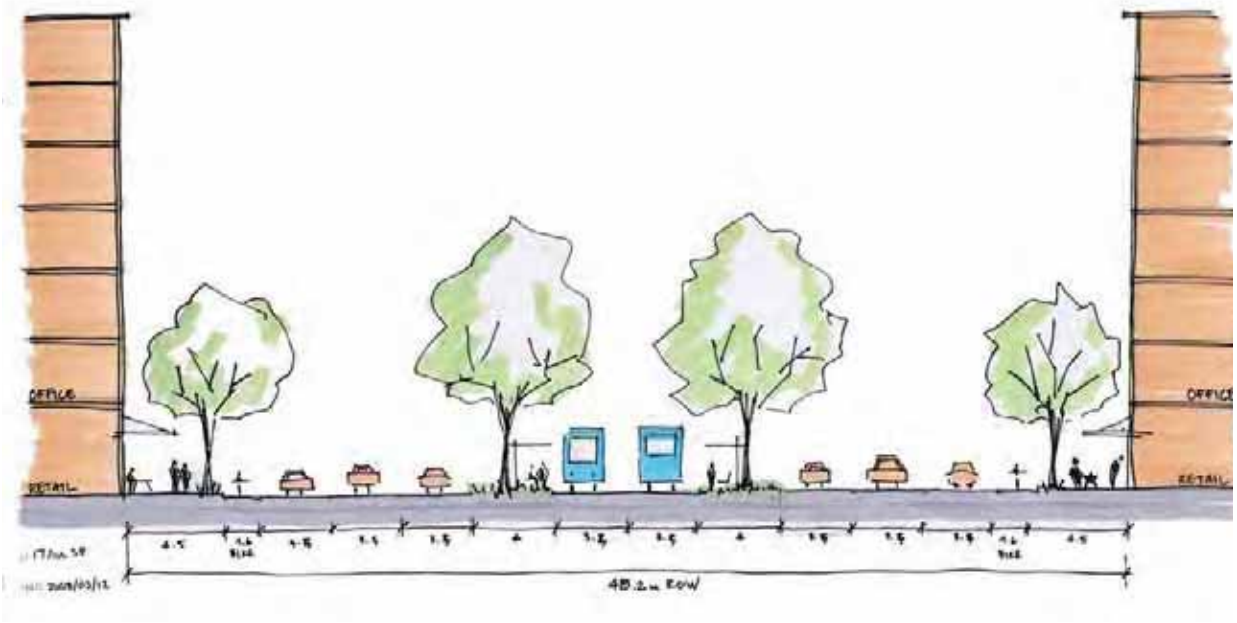
Street trees also contribute to the urban forest. The urban forest is key to maintaining a comfortable microclimate by absorbing summer heat to reduce the urban “heat island” effect. Deciduous trees are best suited to streets and public open space, where they allow light penetration and passive solar gain in winter, and shade in summer. The urban forest also cleans the air and absorbs rainwater, reducing the demands on engineered infrastructure. All street sections in the charrette make extensive use of street trees.

above: 52nd Street is the major north-south connection in the study area.

right: 52nd Street includes a central dedicated transit median, six travel lanes, dedicated bike lanes, and wide sidewalks. Seven-storey buildings with awnings and street trees mitigate the width of this corridor.

GO Strategy 6: Designate 52nd Street as a major north-south arterial (Principles 4, 9, 10)

The Plan It Calgary city-wide scenarios identify 52nd Street as the major north-south arterial route to the Foothills industrial area in the southeast. The charrette team identified 52nd Street as a major north-south arterial with more travel lanes than 17 Avenue SE, and high speed, high capacity transit. While 17 Avenue SE is a local, pedestrian focussed “high street,” 52nd Street is a key corridor for connectivity across the city.



GO Strategy 7: Create good north-south connections across 17 Avenue SE (Principles 2, 4, 9, 10)

17 Avenue SE currently acts as a barrier, separating the north and south neighbourhoods in the study area. The team attempted to remedy this through two key design measures:

a) Increase the number of pedestrian crossings on 17 Avenue SE

Increase the frequency of pedestrian crossings to one every second block - to correspond with local transit stops. This means pedestrians can always safely cross 17 Avenue SE within a couple-minute walk.

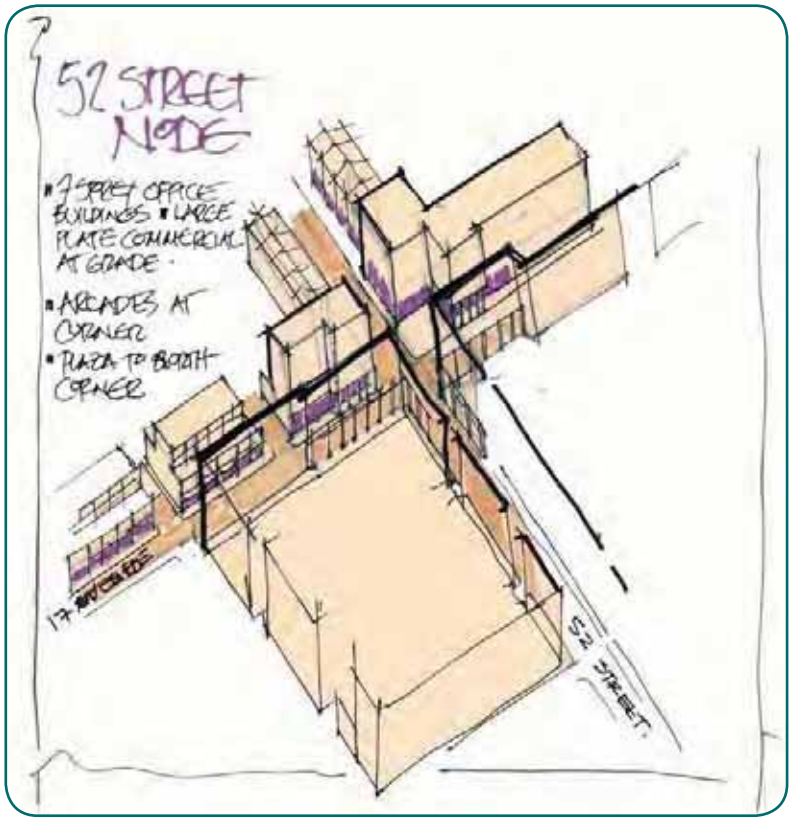
b) Front buildings directly on the street

Buildings front close on the sidewalk to create a pedestrian-scale streetscape and reduce the "psychological" crossing distance. This means a strong street wall is particularly important at pedestrian crossing intersections.

below:
Increasing the number of pedestrian crossings on 17 Avenue SE to correspond with local transit stops (green arrows, approximately every second block) helps make the corridor easier to cross.

Summary:
The GO team envisions 17 Avenue SE as a multi-modal urban boulevard. the corridor will be pedestrian- and bicycle-friendly, and feature local-oriented transit. 52nd Street is the major north-south arterial. Both 17 Avenue SE and 52nd Street have rapid transit, with local transit connecting surrounding residents to these corridors. A continuous street wall of buildings fronting close on the sidewalk, 2:1 building height to street width ratio, and wide tree-lined sidewalks create an attractive, pedestrian-scale streetscape along both corridors. 17 Avenue SE could transition into a parkway between the rail corridor and the East Freeway where it fronts Elliston Park. Enhanced north-south crossings along the length of 17 Avenue SE make walking and biking safer and easier.

WORK team Design Strategies



Commercial node at 52nd St. and 17 Avenue SE

WORK team participants

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see appendix 3 for full affiliations

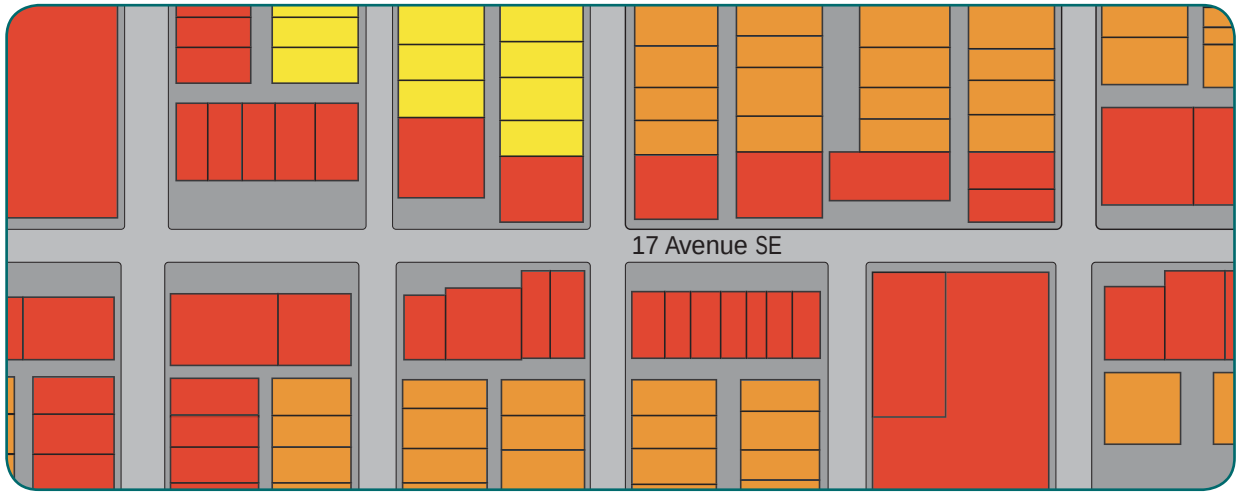
WORK team

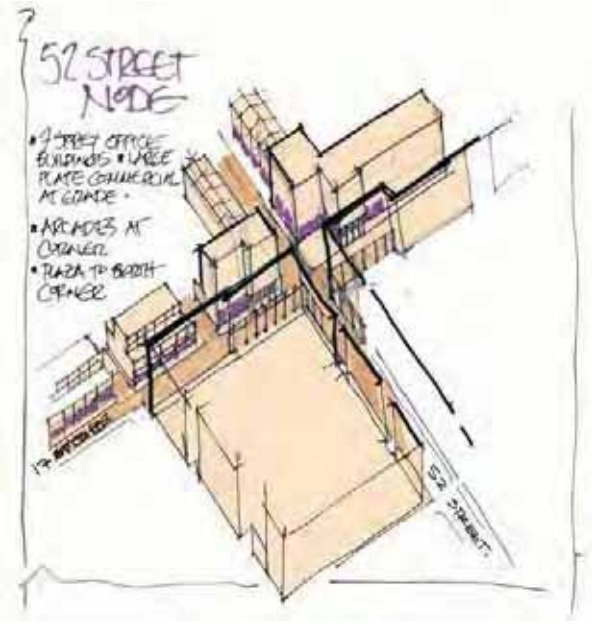
The WORK team approached the design of the study area through the lens of employment. The team primarily focused on locations with the highest job potential - the 17 Avenue SE corridor between 28th and 52nd streets, and the Forest Lawn industrial area. The WORK team identified the unique small lot, affordable tenure of businesses along 17 Avenue SE as an asset. Affordability and the multi-ethnic nature of surrounding neighbourhoods mean 17 Avenue SE is a popular place for new immigrants to establish businesses. Maintaining the diversity of "International Avenue" through economically-viable redevelopment was a key challenge for the team.

The team also explored the future of industrial work in the study site. The team generally concluded the TUC would become the most attractive goods movement route in the future, diverting truck traffic off 17 Avenue SE. There is the potential that CNRail will relocate the existing railway line to an alternate alignment outside of the study area. Given these considersation, heavy industrial uses will likely relocate south to the Foothills industrial area, which would be better served by both rail and the new ring road. As these heavy industrial uses relocate, space will become available for the emerging industries - biotechnology, research, technology, and artisans. The team considered these lighter industrial uses to be appropriate for the study area, in combination with residential uses along the newly "greened" rail right-of-way.

above:
17 Avenue SE is currently a multi-ethnic area, known as International Avenue. The relative affordability of commercial rents and the availability of small lots make 17 Avenue SE a good place for new businesses. The team identified this diversity as a key characteristic, and sought creative ways to redevelop while maintaining this unique attribute.

right:
17 Avenue SE currently has a mix of parcel sizes, including many small lots.

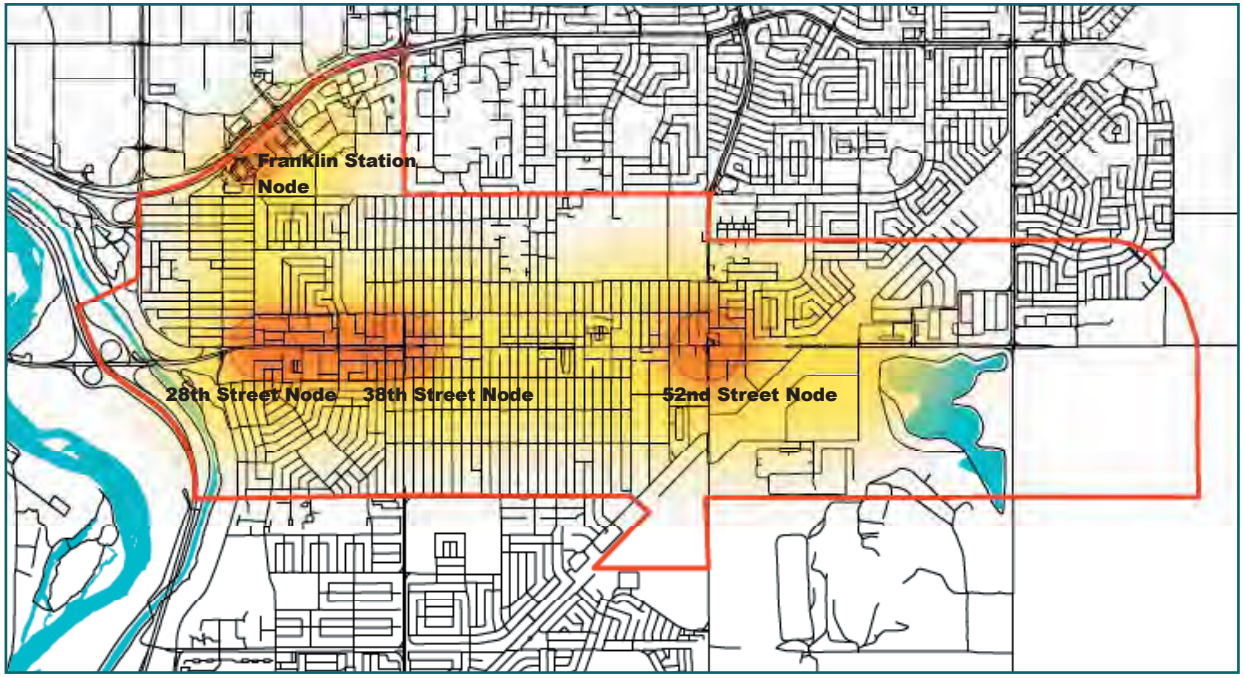




above:
The 52nd Street node features large- and small-scale retail at-grade, with maximum seven-storeys of office space above. Corner arcades and a south-facing plaza create a pedestrian-friendly node.

WORK Strategy 1: Jobs nodes along the corridor (Principles 3, 7, 8)

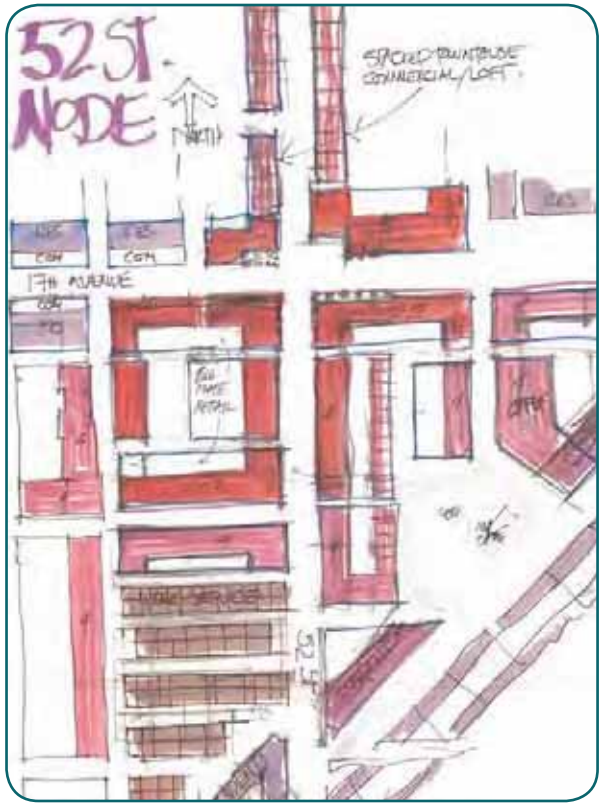
The team identified three jobs nodes along 17 Avenue SE at 52nd, 38th, and 28th streets. The high-capacity 52nd Street corridor supports the most intensive node, located on a topographical high-point that offers views towards downtown and the mountains. The 28th and 38th street nodes are minor. All nodes are commercial only, with at-grade retail uses and commercial office space above. A fourth, minor jobs node locates around Franklin Station on 28th Street.



right:
The team located three key jobs nodes along 17 Avenue SE: the 52nd Street major node; and, two minor nodes at 28th and 38th streets that merge along the avenue to create a "linear" node. The team also recognized the importance of Franklin Station to the north of the study area.

Commercial uses in the nodes wrap the corner, drawing activity a short way up streets perpendicular to 17 Avenue SE. In some cases, less intensive commercial uses connect areas of density, such as between Franklin Station and the 28th Avenue node, and between the 28th and 38th street nodes.

Development will occur gradually, with parcel assembly and existing large parcels providing opportunities for larger, signature buildings on the avenue.



right:
Commercial uses wrap the corner onto parallel streets to create a node of activity centred on the 17 Avenue SE corridor. Mixed-use, residential, and other land uses cluster around these job-oriented nodes.

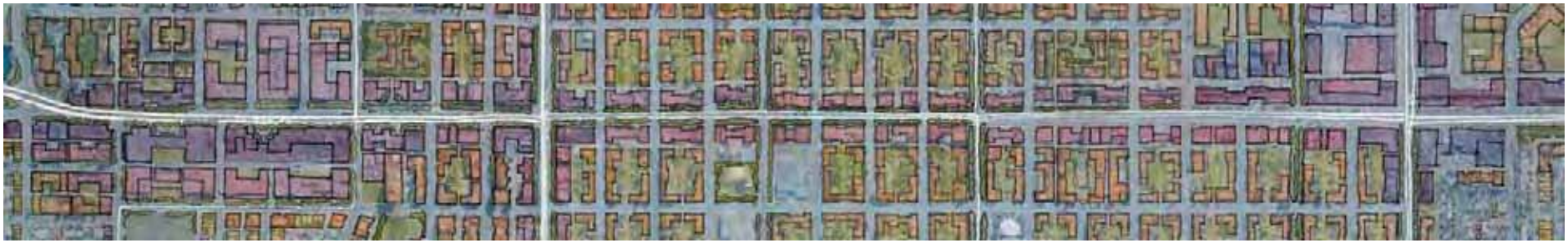
far right:
Less intensive commercial uses can connect nodes, such as between those on 28th Street at Franklin Station and at 17 Avenue SE.

WORK Strategy 2: Continuous at-grade retail along 17 Avenue SE (Principles 2, 3, 6, 7, 8)

The charrette team envisions 17 Avenue SE as the vibrant linear heart of this community. To achieve this, at-grade retail locates along both sides of the avenue between 28th and 68th streets. Larger stores locate in the nodes and smaller scale shops and services in between. Consultation with an economist confirmed that the study area population could generally support this amount of at-grade retail. To contribute to the vibrancy of the street, at-grade retail stretches between the 17 Avenue SE gateways.

right:
The continuous at-grade retail (orange) along 17 Avenue SE is combined with residential uses above (yellow). Residential units step-back to allow light penetration to the street and create private outdoor space for residents.

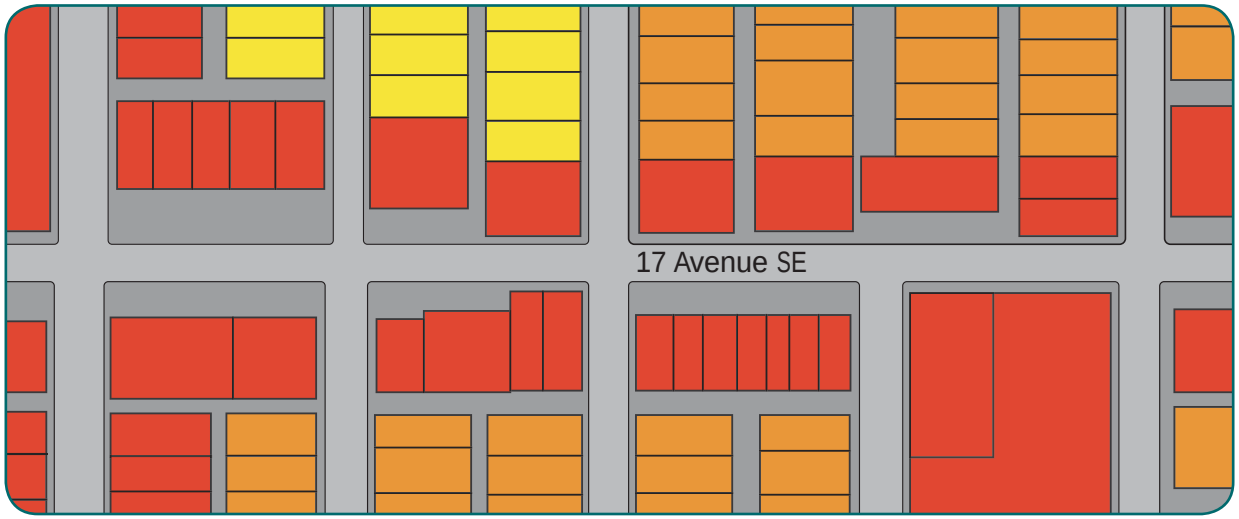
below:
Retail uses (red) stretch the length of 17 Avenue SE.



WORK Strategy 3: Maintain parcel size diversity
(Principles 3, 6, 7)

The current parcelization along 17 Avenue SE includes a range of parcel sizes and shapes, with many small parcels fronting directly onto the avenue. This configuration is desirable for fostering small businesses and creating a fine-grained, pedestrian-scale streetwall. However, economically viable redevelopment often depends upon parcel assembly. The team addressed this challenge by maintaining and creating larger parcels in the nodes, and preserving smaller parcels along the corridor outside nodes.

Buildings with multiple boutique commercial units could also locate where smaller parcels do not exist or are not viable for redevelopment. Within larger buildings on minimum 18 m wide and 30 m deep lots - the frontage required to start supporting underground parking - owners could develop individual store fronts. This would maintain the diversity of storefronts along the avenue and visually break up large development blocks.



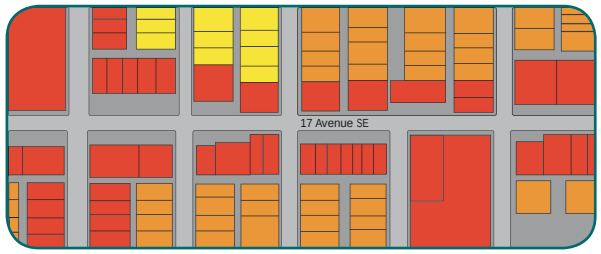
above:
Individual boutique storefronts locate within a single commercial building to maintain the diversity of storefronts along the street.

right:
The variety of parcel sizes creates a fine-grained streetwall. Larger parcels occur closer to nodes through through parcel assembly.

WORK Strategy 4: Two types of mixed-use building
(Principles 1, 3, 6, 7, 8)

The team identified two types of mixed-use buildings appropriate to the 17 Avenue SE corridor: ground-floor retail with office above; and, ground-floor retail with residential above. No mixed-use buildings will include all three uses. Larger commercial mixed-use buildings generally cluster at the nodes. Smaller residential mixed-use buildings generally front the corridor between nodes to provide eyes on the street outside of business hours. Some commercial mixed-use can also locate along the corridor outside nodes.

above:
Commercial mixed-use buildings with at-grade retail and office above generally locate in nodes (orange). Residential mixed-use buildings (yellow) generally locate in the smaller parcels between the nodes along 17 Avenue SE.



above:
17 Avenue SE has many smaller lots. Articulating the upper stories of buildings on these ensures enough square footage for at-grade retail.

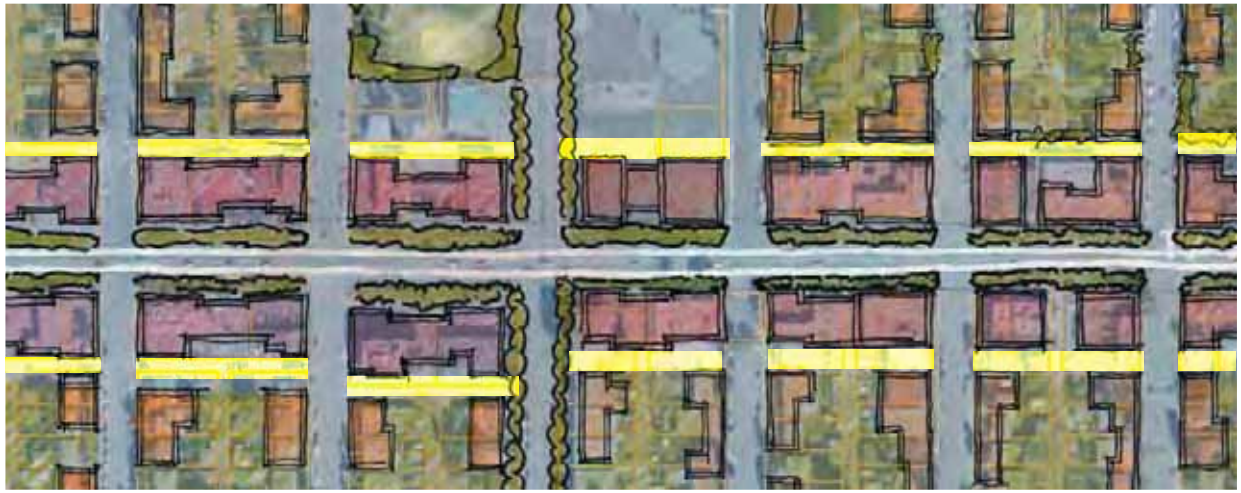
right:
Articulating upper storeys provides private outdoor space for residents and allows light penetration to the street. Maintaining a continuous street wall fronting close on the sidewalk also contributes to pedestrian-scale

WORK Strategy 5: Articulate residential mixed-use buildings (Principle 3)

Maintain a continuous, pedestrian-scale streetscape and provide residential privacy by articulating residential mixed-use buildings from the second level. Bringing the at-grade facade contributes to pedestrian-scale and also ensures smaller lots have enough square footage for at-grade retail. Stepped buildings also and allow better light penetration to the street.

WORK Strategy 6: Service lanes parallel 17 Avenue SE (Principle 9, 2)

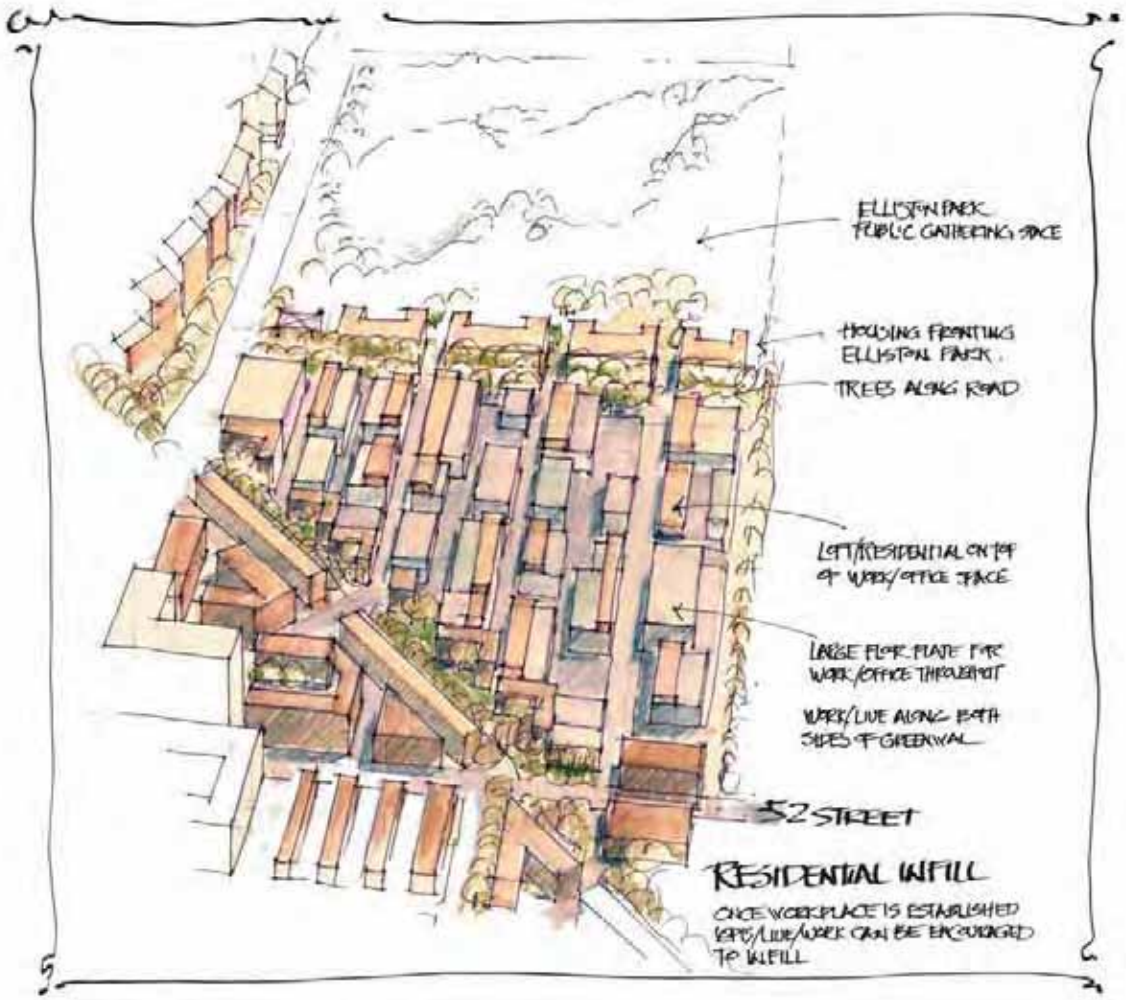
A number of commercial blocks along 17 Avenue SE are currently serviced from rear lanes. The team built on this pattern, adding lanes on blocks where they are absent. The lane network is primarily for servicing and underground parking access, and does not provide a continuous through-route, thus making alignment unnecessary. Servicing and parking access from the lane allows for a higher quality pedestrian environment on the street.



right:
The team built on the existing pattern of rear service lanes by adding lanes to blocks where they are currently absent. All buildings fronting on 17 Avenue SE are serviced from rear lanes (yellow).

WORK strategy 7: Industrial Infill
(Principles 1, 3, 6, 7, 8)

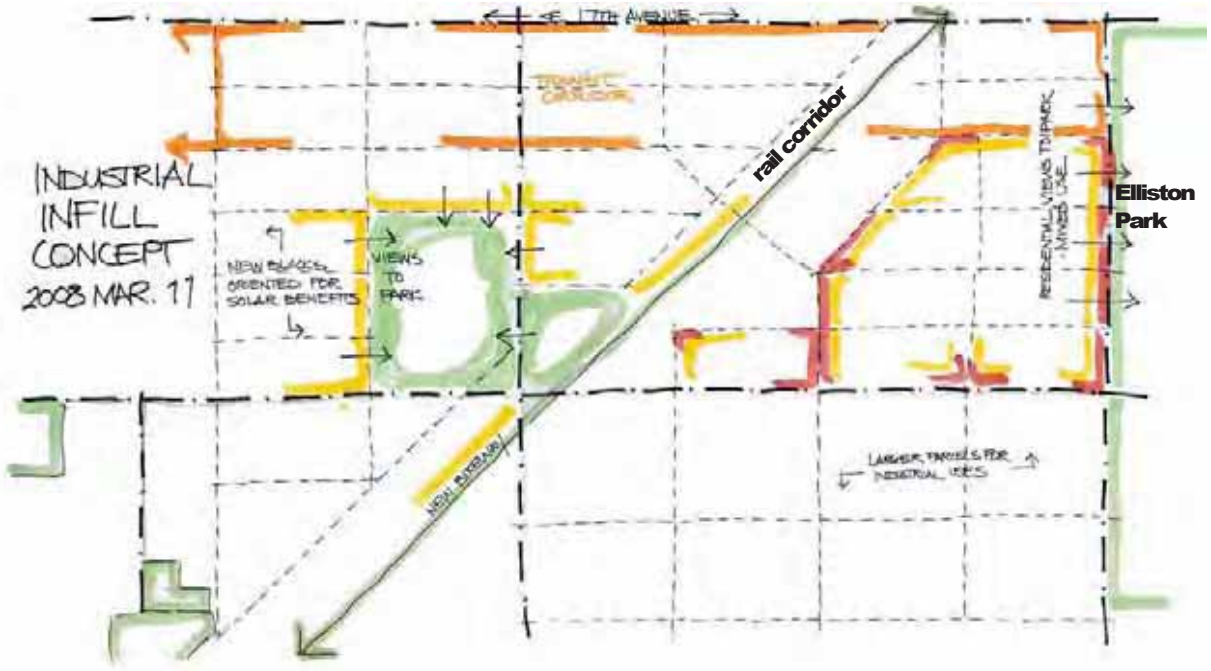
The Forest Lawn industrial area begins to offer residential opportunities as heavy industry shifts to cleaner, quieter activities. Existing industrial floorplates remain as repurposed light-industrial and artisan spaces. New townhouses locate along Elliston park and barnacle onto existing industrial buildings. The new mix of uses creates an area with activity throughout the day and night, reducing safety concerns.



right:
Perspective of the final Forest Lawn industrial area. Housing locates along Elliston Park and on top of existing industrial buildings, which continue to provide space for light industrial uses. The decommissioned rail line becomes a new greenway with live/work along both sides.

The industrial infill strategy will require careful planning, given current buffers around the landfill prohibiting residential or food-based activities. Initially, primarily industrial uses will persist while the landfill site decommissions and treatment occurs. Once complete, residential infill will begin, with heavy industry relocating to the more easily accessible Foothills industrial area. Flexible building that would initially develop as light-industrial or office, and later transition to loft-style residential units would be ideal for this site.

above & right:
Early concept sketches for the industrial area includeresidential north of the newly greened rail corridor (yellow), as well as residential (yellow) or mixed-use (red) fronting onto Elliston Park to the east. Larger parcels for industrial uses remain in the southeast of the site.



The final plan reflects this strategy. Residential buildings orient themselves along the greened rail corridor and cluster behind the commercial node. Residential facing Elliston Park benefits from the view and provides eyes into the park. Across the street, live-work or residential above industrial transition from residential to industrial land uses. Larger industrial parcels remain in the southeast, maintaining diversity for industrial uses. However, parcel-use increases dramatically from current conditions and the nature of industry shifts to lighter types.

Residential locates behind the commercial node and along the rail greenway. These parcels could initially develop as flexible commercial or light-industrial buildings that adapt to mixed-use or residential after landfill decommissioning is complete

Residential infill barnacles on top of pre-existing large floorplate industrial buildings, repurposed for light industrial uses.

Residential facing Elliston Park has a pleasant outlook and contributes eyes on the park.

Larger parcels and floorplates allow for a variety of industrial uses, even as the on-site nature of industry changes over time.

WORK Strategy 8: Commercial gateways at 28th and 60th streets (Principle 3)

The team identified gateway locations at either end of 17th Avenue SE. The 28th street node serves as the western gateway. This node is the start of commercial activity on the avenue when approaching eastward from downtown, or southward from Franklin Station. The 28th street node sits at the top edge of the escarpment, making it an ideal location for signature architecture. Sixtieth Street serves as the eastern gateway to the avenue where commercial uses begin after Elliston Park. The team did not detail the specific appearance of the gateway sites, but identified them as places for further exploration.

Summary:

The WORK team envisions the 17 Avenue SE corridor as a pedestrian-friendly, mixed-use urban boulevard with jobs nodes at 52nd, 28th, and 38th streets. Commercial mixed-use buildings with at-grade retail and office above locate on larger parcels in the jobs nodes. Residential mixed-use buildings with at-grade retail and residential above create a continuouse street wall along 17 Avenue SE between the nodes, and take advantage of medium- and smaller-sized parcels. All buildings fronting on 17 Avenue SE are serviced by rear lanes. Less intensive commercial uses along 28th street link the smaller jobs node at Franklin Station. The Forest Lawn industrial area becomes a residential and light-industrial mixed-use area as the TUC and rail realignment attracts heavy industry to the Foothills industrial area. Gateways at 28th and 60th streets mark the entrance to the corridor.

HOME team Design Strategies

HOME team participants

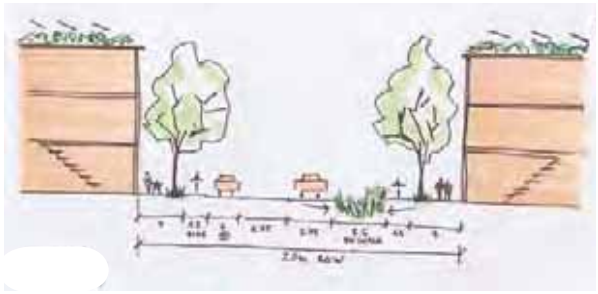
Liliana Bozic, Diane Danielson, Dick Ebersohn, Courteney Miller, Nicole Miller, Keath Parker, Daniel Roehr, Cameron Salisbury, Lesley Taylor, Karen Wilkie

see appendix 3 for full affiliations

HOME team

Residential neighbourhoods around 17 Avenue SE provide much potential for green initiatives. The HOME/GREEN team jointly explored these issues. The primary challenge for the team was accommodating a more than doubled residential density in the central site area - between 28th and 68th streets. The team developed two key strategies to successfully integrate density: locate density along corridors and around significant open space, leaving the bulk of existing residential neighbourhoods virtually untouched; and, create new building forms to transition between new density and existing single-family residential areas. New building forms, including three- and four-storey residential buildings with ground-oriented, family housing and large, semi-private courtyards, enabled increased density while maintaining high-quality, family-oriented options.

right:
Density locates along corridors and around open spaces, leaving the bulk of existing neighbourhoods virtually untouched. Mid-rise building forms, either purely residential (orange) or mixed-use (red) accommodate much of this density.



above:
Density fronting on greenstreets (top) and greenways, such as the decommissioned rail route (bottom), provides activity and eyes-on-the-street to make the public realm more safe.

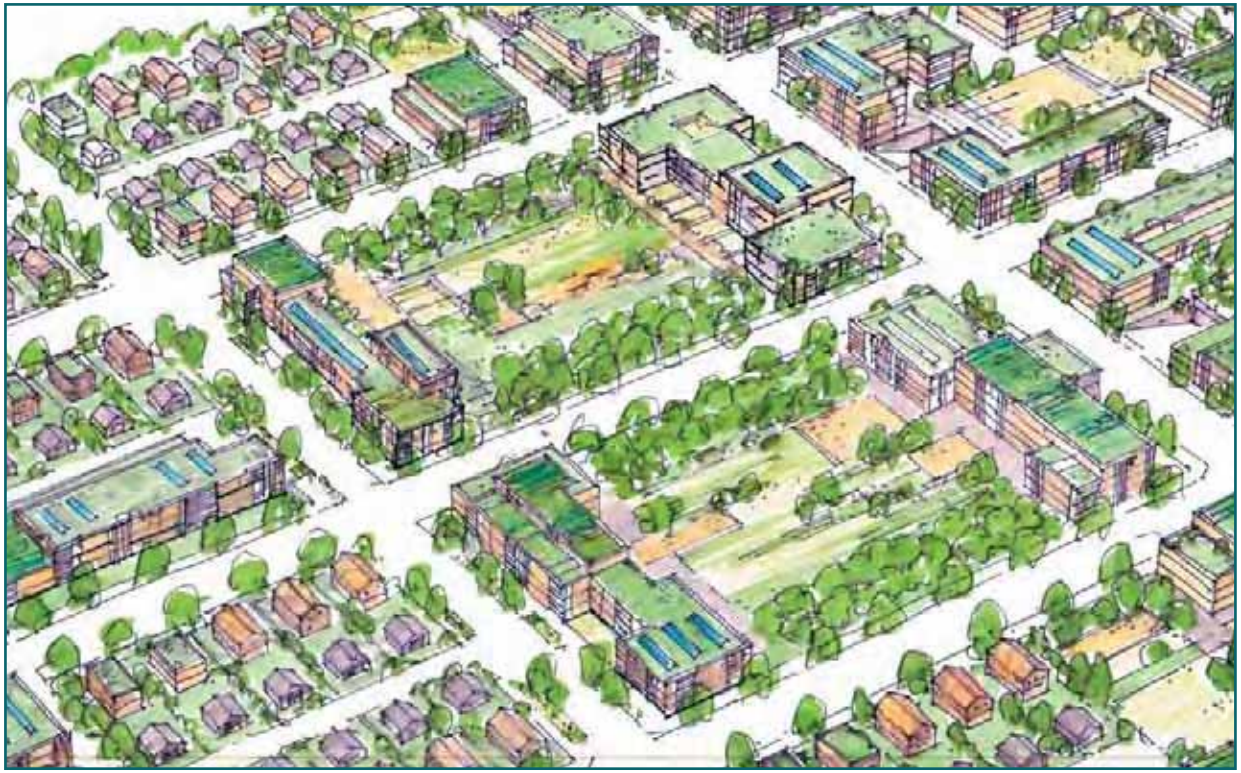
right:
Higher-density residential units surround semi-public open space. This amenity provides outdoor space for residents as both a recreational and visual amenity. Green couryards also provide alternative movement routes, increasing neighbourhood walkability.

HOME Strategy 1: Locate density strategically

Currently, lower-density, primarily single-family neighbourhoods generally surround 17 Avenue SE. The team identified three key strategies to implement densification into neighbourhoods sensitively.

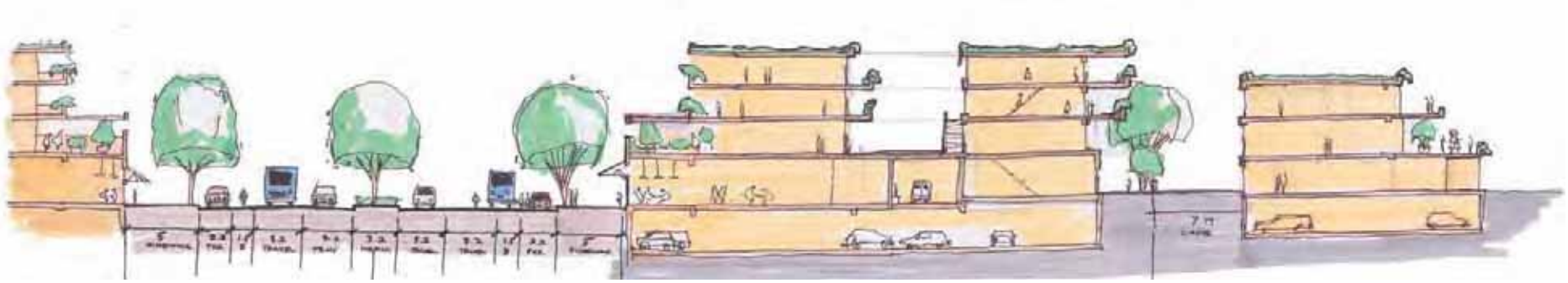
a) Densify in strategic locations (Principle 7)

Certain areas of residential neighbourhoods can accommodate more density than others - those adjacent to corridors and open space. Stacked townhouses or rowhouses fronting openspace, greenways, or green streets increase activity and sense of security in these public spaces. Such visual amenities also benefit residents of these units, who have smaller areas of private outdoor space.



b) Transition from high to low density
(Principles 1, 3, 7, 8)

Transitioning between higher-intensity uses along the corridor and surrounding single-family neighbourhoods is key to integrate density sensitively. Mid-rise building forms, such as low-rise apartment and townhomes gradually step density down from higher-intensity corridors to single family areas.



above:
Density is highest along the corridor. Buildings closer to residential neighbourhoods have fewer storeys, and step back from the street. Townhouses (not shown) can provide an additional step down in scale toward existing single-family neighbourhoods.

Image credit: The Co Design Group

right:
Participants of the SE17 Visioning Workshops also identified this strategy.

c) Densify gradually
(Principle 1, 7)

The team also identified strategies to densify sensitively in existing single-family neighbourhoods. While the final plan saw many single-family neighbourhoods remain virtually unchanged, several others will infill slightly over time, while maintaining their single-family character. New duplexes, rowhouses, stacked townhouses and carriage houses are all forms suited to creating a higher-density neighbourhood with lower-density character.

right:
A single-family neighbourhood densifies gradually. Over a thirty-year time frame, new duplexes, rowhouses, stacked townhouses, and carriage houses develop where opportunity arises. The resulting neighbourhood has a higher density with a lower-density character.

Existing Condition

2025

2050

2075

clockwise from top:
A single-family neighbourhood densifies gradually. Over the first twenty-five years, single-family homes retrofit with secondary suites - within the primary building where possible, or as a carriage house over the garage. Street improvements anticipate the need for screening as higher-density develops and contribute to a pedestrian- and bicycle-friendly environment. In fifty years, condominiums and apartments locate at busier intersections. Within seventy-five years, new single-family homes with basement suites and row- or townhouses begin to fill in the interior portions of the block.

HOME Strategy 2: Residential mixed-use buildings along the corridor
(Principles 1, 2, 6, 8)

The 17 Avenue SE corridor has great potential for increased residential density. Two- to four-storey residential townhouses and apartments set back above ground floor retail provide housing options and contribute to the lively, pedestrian-friendly 17 Avenue SE corridor. These residential mixed-use buildings locate along the avenue between the commercial nodes.

HOME Strategy 3: Industrial residential infill
(Principles 2, 6, 7, 8)

As the Forest Lawn industrial area transforms to light-industrial it will become more compatible with residential uses. Residential uses in these areas contribute to crime reduction and safety by providing eyes on the street during non-business hours. The large, flat structures of warehouses and low-density commercial are ideal platforms for townhouses or apartment additions. Rooftop semi-private green courtyards provide residential open space. Live/work units are ideally suited to such areas. This strategy transforms a previously single-use area into a vibrant neighbourhood.

HOME Strategy 4: Take advantage of solar opportunities (Principle 11)

Calgary has abundant solar resources. Solar-sensitive design can reduce the need for heating and cooling, reducing energy costs and increasing sustainability. The sun plays a key role in the success of public spaces through all seasons. The team identified two key strategies to maximize solar benefits.

a) Step buildings

Buildings that step back above the first floor allow sunlight to penetrate to the street. Stepping of taller buildings is particularly key. Setbacks at upper levels also create open space for residential units, which can serve as a patio or other private green space. On smaller parcels along 17 Avenue SE, setbacks also maintain the small-building "feel" from the street.

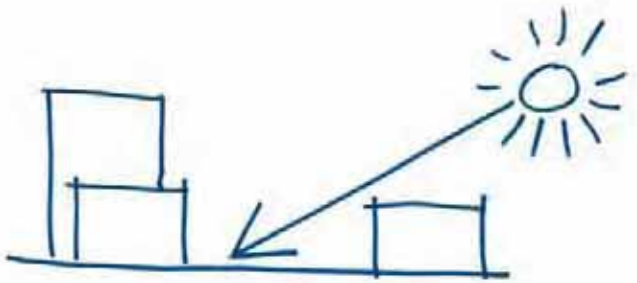
Image credit: The Co Design Group

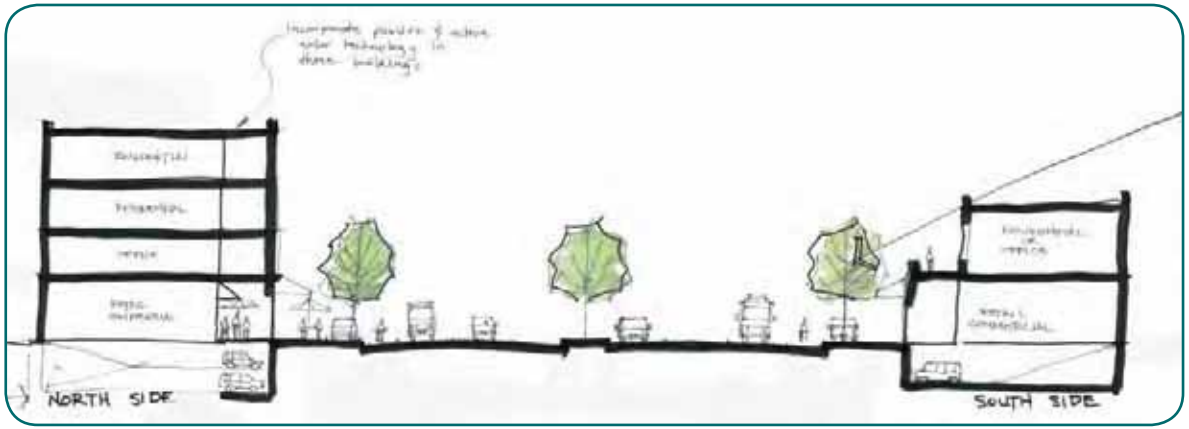
right:
Buildings that step back at the upper levels not only allow sun to reach the street, but also create private outdoor spaces for adjacent units (yellow).

far right:
Upper patios may also provide space for retail or commercial uses, such as a restaurant patio.

b) Locate higher buildings to the north

Locate higher buildings on the north side of the 17 Avenue SE so sunlight reaches the street. Locate shorter buildings on the south side to minimize the area impacted by shadows. The resulting sunny spaces and streets will be more well-used and vibrant. Although the charrette concept accommodates the target numbers of jobs and people within the mid-rise buildings, the larger seven– to eight-storey buildings locate according to this strategy to minimize shadowing.





right:
Participants of earlier Plan It Calgary engagement sessions and 17SE Visioning Workshops also identified placing the height on the north side of the street as a key strategy for solar access.

Summary:

The HOME team envisions 17 Avenue SE as a community that accommodates double the density, while maintaining much of the current single-family character. Residential density strategically locates along the corridor and around greenways, green streets, and open space. Density transitions from higher- to lower-density areas. Single-family neighbourhoods maintain their character, with some gradually densifying over time. Residential mixed-use buildings with at-grade retail and residential above front along the length of 17 Avenue SE between the jobs nodes. The Forest Lawn industrial area transitions to light-industrial with residential infill to create a more vibrant and safe neighbourhood. Buildings step back to provide outdoor space for upper-storey residential, commercial or retail acitivities, and to allow light penetration to the street. Taller buildings locate on the north-side of the street to minimize shadows.

GREEN team Design Strategies

GREEN team participants

Liliana Bozic, Diane Danielson, Dick Ebersohn, Courteney Miller, Nicole Miller, Keath Parker, Daniel Roehr, Cameron Salisbury, Lesley Taylor, Karen Wilkie

see appendix 3 for full affiliations

GREEN team

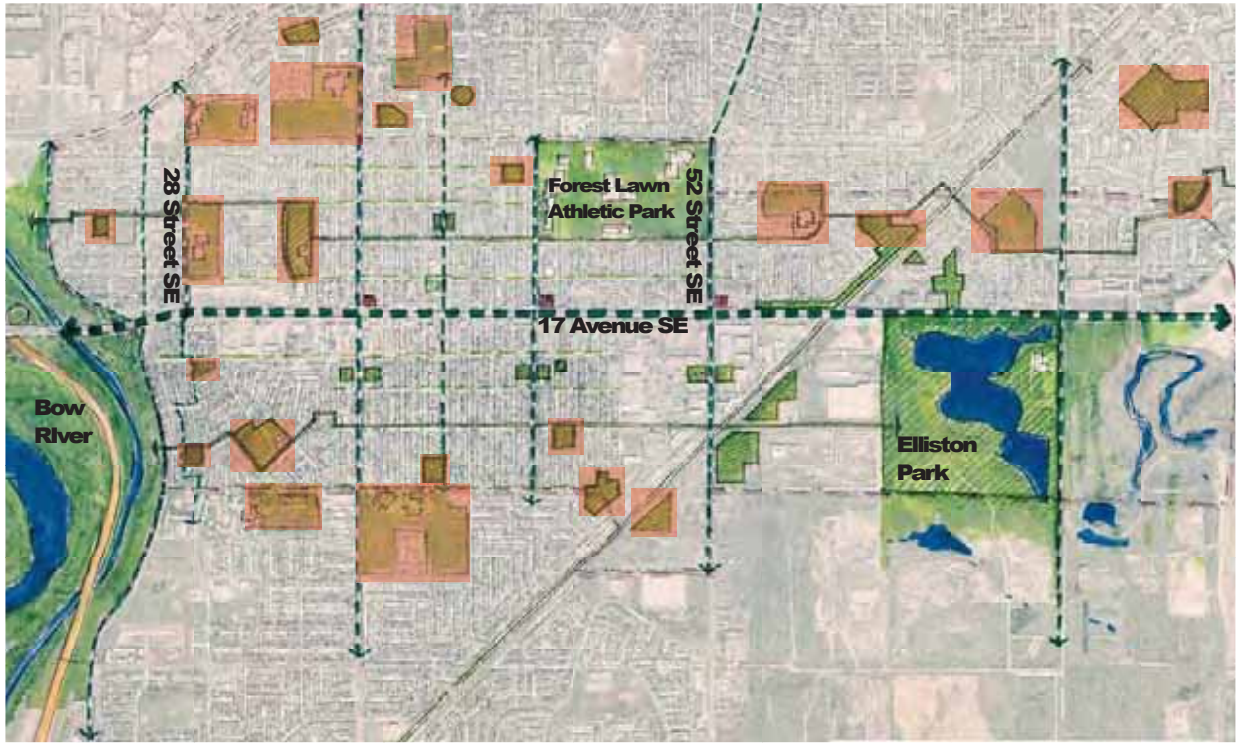
Residential neighbourhoods around 17 Avenue SE provide much potential for green initiatives. One breakout group explored GREEN issues jointly with HOME issues to capitalized on the synergies between these components of the site. The primary challenge for the GREEN team was to provide enough high-quality, multi-functional green space within an existing community and a more than doubled population. Generally, the GREEN team strategies group into a three-tiered approach:

1) preserve all existing open space including school sites and publicly owned land;
2) provide additional open space, either new or reclaimed; and,
3) connect open space.

right:
One breakout group worked to eplore HOME and GREEN issues jointly to capitalize on the opportunities of these issue areas. In the new green neighbourhoods, new single-family detached and low-rise residential buildings have green roofs. Taller buildings provide residential density while allowing much of the parcel to remain as private open space (left edge). This strategy applied to a whole block allows for buildings to cluster around semi-public open space (centre, right edge). Green streets with bioswales connect open space throughout the site.

GREEN Strategy 1: Preserve existing open space. (Principles 3, 5)

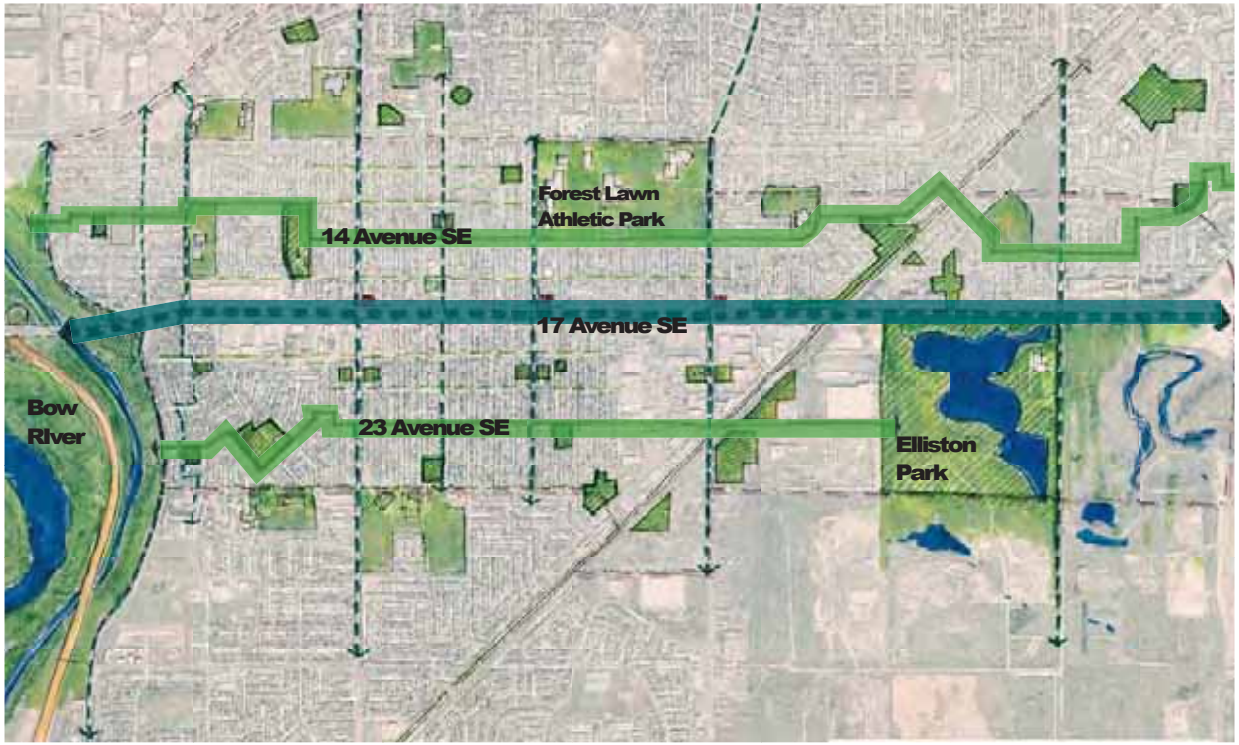
Identify and preserve the existing open space assets in the study site, including parks, schools, publicly owned land, environmentally sensitive areas, and other open space.



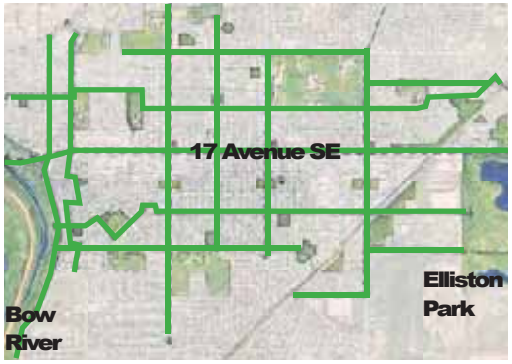
right:
The team identified existing open space assets as the starting point for the green network, including neighbourhood parks, school sites, and open space (shaded orange), the Bow River escarpment, Elliston Park, and Forest Lawn Athletic Park.

Green Strategy 2: Connect east and west green anchors. (Principles 2, 3, 5)

Two large green spaces anchor the study site at the extreme east and west ends. The Bow River escarpment in the west offers views of downtown Calgary and the Rocky Mountains, and includes recreation paths that link into the regional recreation network. Elliston Park in the east is a large regional open space with a stormwater retention pond. The 17 Avenue SE urban boulevard is the grand "High Street" connection between the river and the park. Wide, tree-lined sidewalks, and a continuous, pedestrian-scale street wall with at-grade retail create an attractive streetscape. The avenue includes pedestrians, bicycles, transit, and vehicles. Two key east-west green street corridors - along 23rd and 14th avenues - connect the parks through the south and north areas of the community.



right:
The Bow River escarpment and Elliston Park provide key open space anchors at either end of the site. 17 Avenue SE is the "High Street" connection (dark green line) between these major resources. Two key ast-west green streets (light green line) also connect these major open spaces with Forest Lawn Athletic Park and other parks, school sites, and open space generally along 14th and 23rd avenues.



Green Strategy 3: Interconnected grid of green streets. (Principles 2, 4, 9, 10, 11)

An interconnected grid of green streets that prioritize walking and cycling connect the community to parks and open space throughout the site. These streets feature tree-lined sidewalks and bike lanes, and one vehicle travel lane in each direction. On-street parking with permeable pavement locates on one side, with a planted storm water bioswale on the other. Two key east-west green street corridors connect Bow River and Elliston Park, generally along 23rd and 14th avenues. A segment of 8 Avenue SE is also a green street. Seven north-south streets - 26th, 28th, 36th, 40th, 44th, 68th, and the north portion of 34th - become greened to create strong connectivity between the residential neighbourhoods and the community parks and open space. The major arterial corridors, 52nd Street and Barlow Trail SE, also incorporate green street elements, as does the new rail greenway.

above:
Proposed greened streets connect residential neighbourhoods with community parks and open space.

right:
Green streets include tree-lined sidewalks and bike lanes, one travel lane in each direction, parking on one side, and a storm water bioswale that collects, cleans and infiltrates rain water.

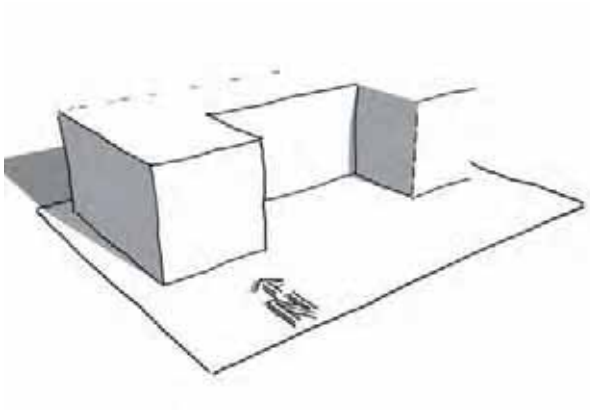
Existing Condition

2015

2030

2075

clockwise from top:
A typical residential street transforms from existing conditions (above) into a green street gradually. Over the first fifteen years, a bioswale, bike lane, and grass boulevard reclaim asphalt. Sidewalks on both sides improve walkability and a permeable parking strip supports site hydrology. Within thirty years, street trees line all green streets, providing shade to pedestrians and cyclists. Within seventy-five years, moderate densification incorporates sensitively along the pedestrian- and bike-friendly-route.



above:
Participants of earlier Plan It Calgary engagement sessions also identified the importance of buildings with south-facing open spaces.

GREEN Strategy 4: Increase amount of open space

The team developed four strategies to increase the total amount of community open space in addition to preserving and connecting existing areas.

a) Incorporate public plazas on 17 Avenue SE
(Principles 2, 3, 5)

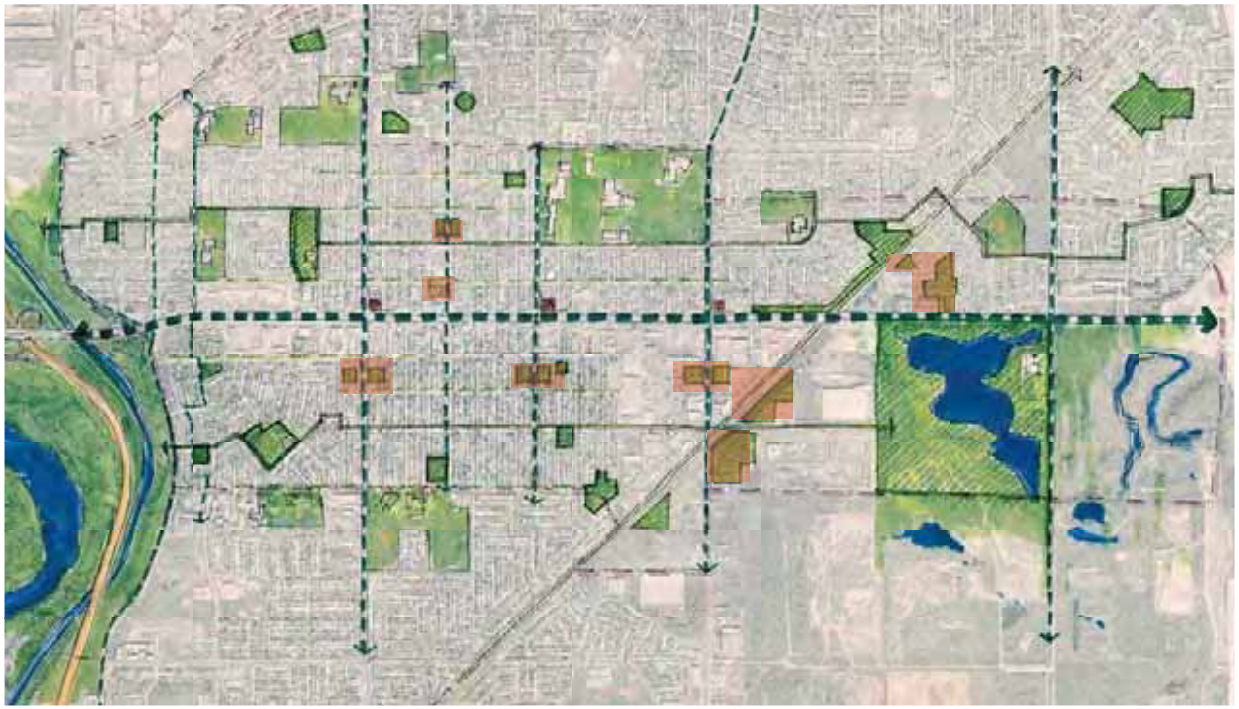
Locate mid-block, south-facing, urban plazas along the north side of 17 Avenue SE. South-facing open space is well-used and will enliven the street. Mid-block spaces wrapped by buildings have a comfortable sense of enclosure. Plant plazas with deciduous trees and allow commercial uses - such as cafes - to spill out into them.

right:
The final concept includes several hardscaped open spaces on the north side of the street (highlighted).

17 Avenue SE Case Study: Charrette Report
GREEN team

b) Add new passive open space
(Principles 2, 3, 5)

The team determined the portions of the study area that are currently poorly served with parks and open space and identified additional passive open space - unprogrammed, naturalized areas - connected by the green street network. In addition to increasing the total open space in the study area, this strategy evens the distribution of open space across the site.



right:
New passive open space - unprogrammed naturalized areas (shaded orange) connects to the green street network and evens open space distribution across the site.

c) Incorporate semi-public green space
(Principles 3, 5, 11)

Newly densified areas incorporate semi-public open space as an amenity for residents. New three- and four-storey buildings wrap around internal semi-private courtyards that provide increased pedestrian connectivity through the neighbourhood. Courtyards also contribute to green storm water management where underground parking is properly configured to maintain the surface-groundwater connectivity. Rooftop open space provide additional accessible or visual amenities. This strategy applies to blocks, clusters of parcels, and individual parcels, where taller buildings provide residential density and allow much of the parcel to remain as private open space.

above:
Buildings wrap the edge of parcels to create central semi-public courtyards. This strategy also applies to single parcels, and whole blocks (right).

right:
Green roofs decrease energy required for cooling and heating, and capture and use rain water. Residents can access all or a portion of lower rooftop gardens on adjacent units.

d) Create the rail greenway.

(Principles 2, 4, 5, 9)

The charrette team concluded that the rail line would relocate in the near future. The right-of-way transitions into a greenway, with bioswales, trees, and more dense development. The tracks remain in place for optional future use in goods or people movement. Noise impacts on residential uses along the corridor will require creative mitigation if the rail becomes active again in the future.

Existing Condition

2030

2050

right & opposite:
The rail greenway develops gradually from existing conditions (top). In the next fifteen to thirty years, the railway relocates, and the former rail corridor converts to pedestrian and bicycle use, with low-maintenance grasses and trees beginning to green the route (middle). Within fifty years, residential density fronts the bike and pedestrian corridor (bottom). By 2075, there is enough residential density to support local commercial to serve residents' daily needs.

2075

Summary:

The GREEN team envisions 17 Avenue SE as having a diversity of parks, open space, green streets, greenways, plazas and courtyards equitably distributed throughout the community. Existing parks, school sites and open space remain, enhanced by new passive open space in areas that are currently poorly served by parks. The 17 Avenue SE urban boulevard and two key green street corridors along 14th and 28th avenues connect the Bow River escarpment, Elliston Park, and the Forest Lawn Athletic Park. The rail line transforms into a bicycle and pedestrian greenway to serve the new surrounding residential infill neighbourhood. All residential neighbourhoods include more open space, including green roofs, green streets, and semi-public courtyard open space wrapped by new low-rise residential buildings. An interconnected network of green streets emphasize walking, cycling and stormwater infiltration and connect residents to parks and open space amenities throughout the neighbourhood.

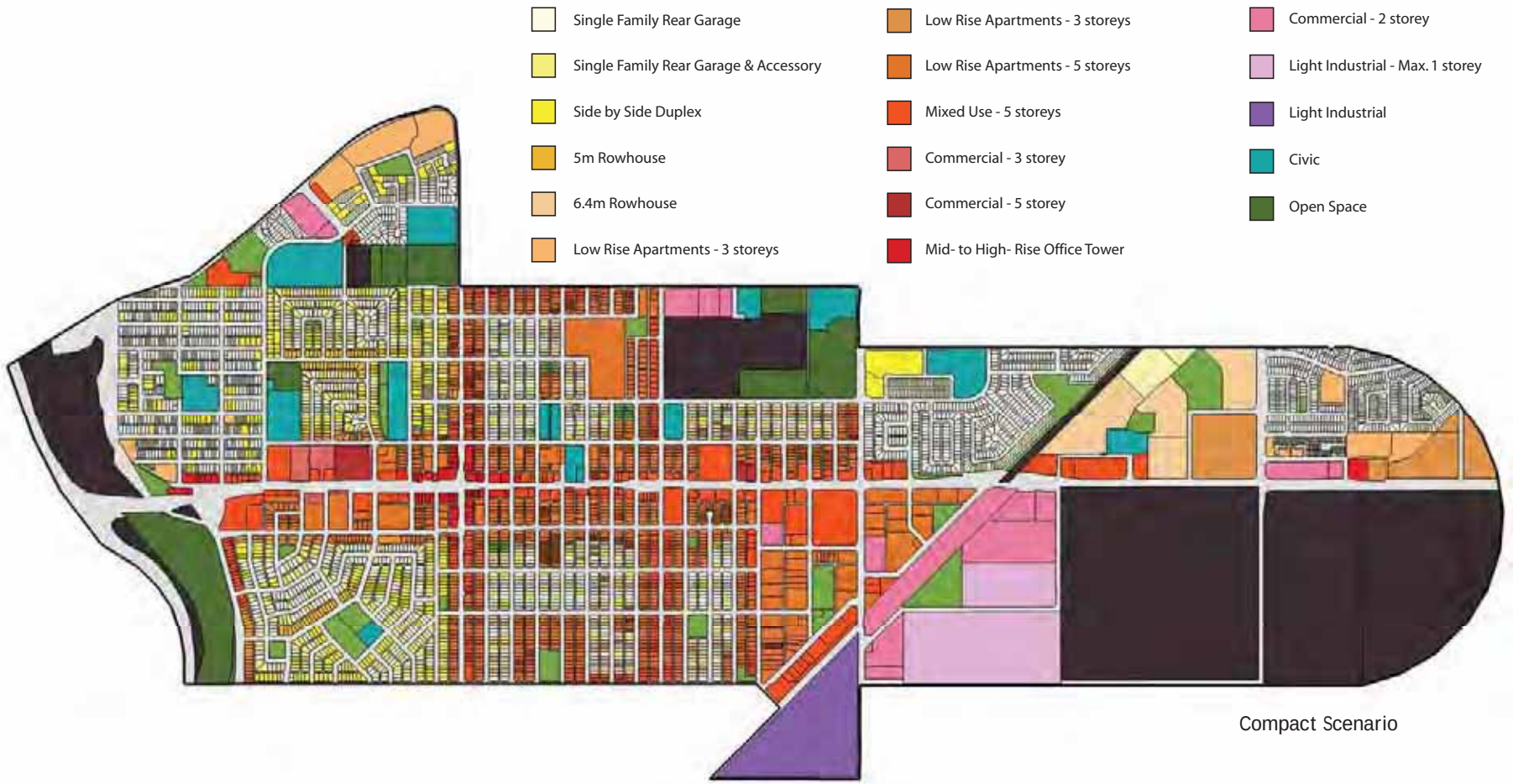
Indicator performance

Measurements and indicators

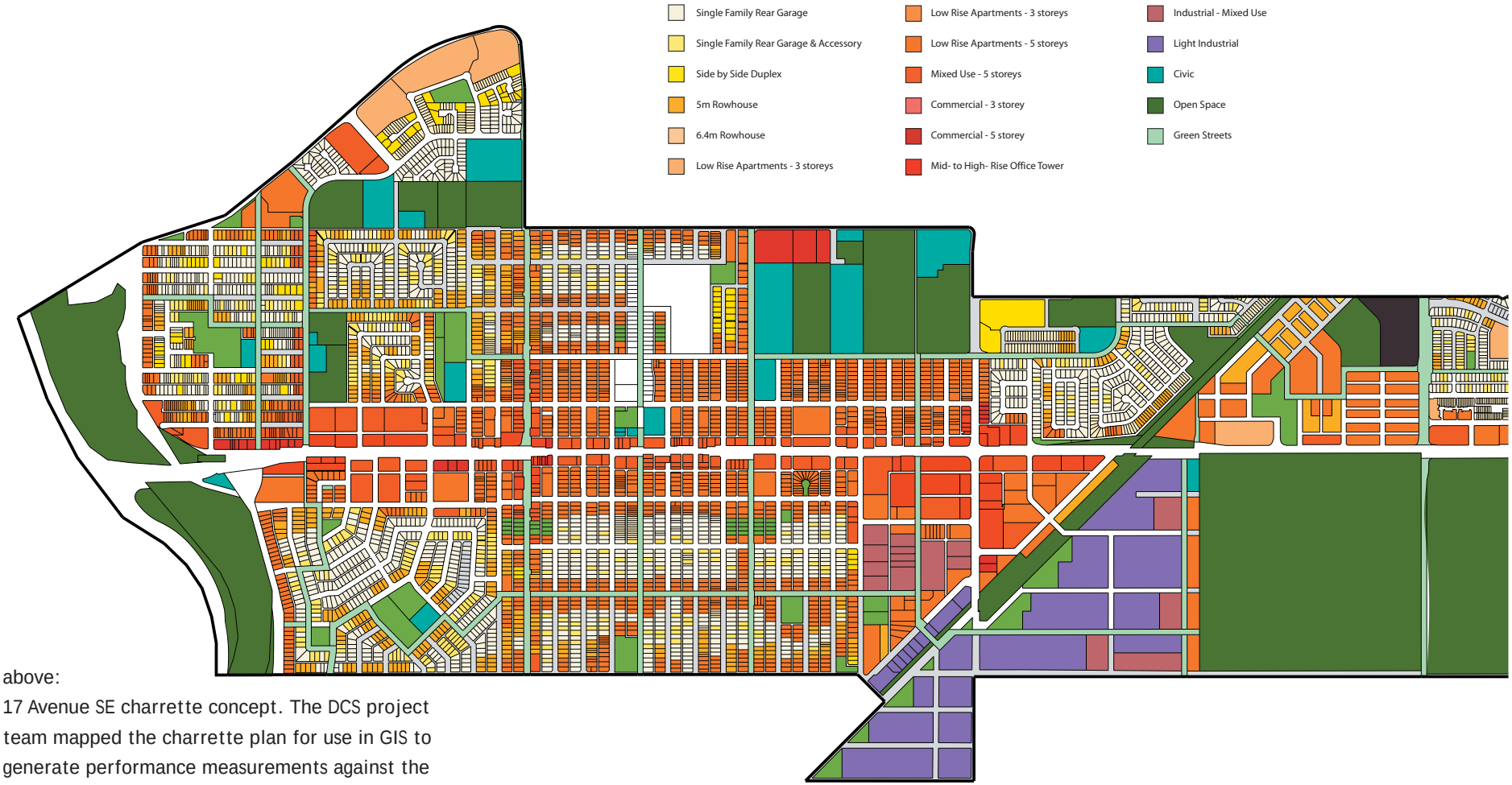
Indicators are tools that reveal the magnitude of attributes. The Plan It Calgary indicators link explicitly to key physical variables of sustainable urban design. These indicators provide a means to compare alternative scenarios against each other to evaluate how well each scenario achieves the 11 Sustainability Principles.

2005 Condition

The DCS project team created benchmarks for each indicator by mapping and measuring the charrette study site under current (2005) conditions and the Plan It Calgary Compact Scenario. Benchmarks provide contextual information relative to indicator performance. The charrette team used the benchmarks to frame discussions about the desired indicator performance of the charrette concept. In some cases, one of the Compact or 2005 scenarios is not measurable for a particular indicator, as the required level of data was unavailable. In those cases, only one of the scenarios is included as a benchmark.



Compact Scenario



above:
17 Avenue SE charrette concept. The DCS project team mapped the charrette plan for use in GIS to generate performance measurements against the indicators.

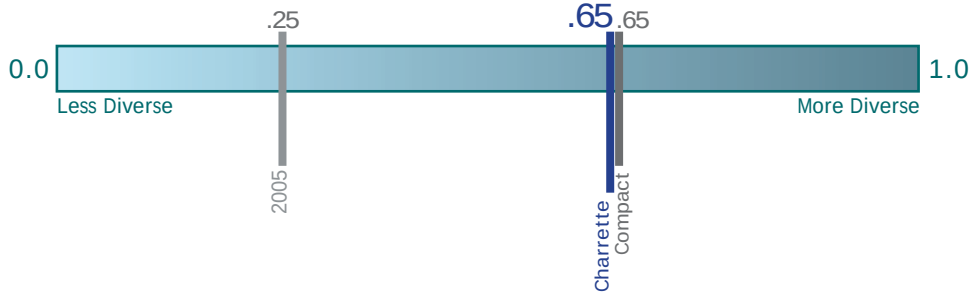
Indicator 1: Housing Diversity
Measure: housing diversity index (Principle 1)

Providing a range of housing opportunities and choices is an important aspect of building complete communities. Housing diversity within a community directly relates to housing affordability, as it indicates there are housing options to meet the needs of residents of differing economic situations and household type (e.g. families with kids, without kids, singles, seniors).

This metric uses the Simpson's diversity index to express housing diversity – both in terms of the number of housing types in a community as well as the share of housing in each type – as a value between 0 and 1, where 0 means less diversity and 1 means more diversity. A community wishing to create housing opportunity and choice would strive for a diversity index closer to 1.

Both the charrette concept and the Compact Scenario incorporate a wider, balanced range of housing types than the 2005 Scenario, and achieve a higher housing diversity index.

Indicator 1: Housing Diversity
Housing Diversity Index



Indicator 2: Proximity to Activity Centres
Measure: % people within 400m of activity centres and mixed-use corridors (Principles 2, 3, 8)

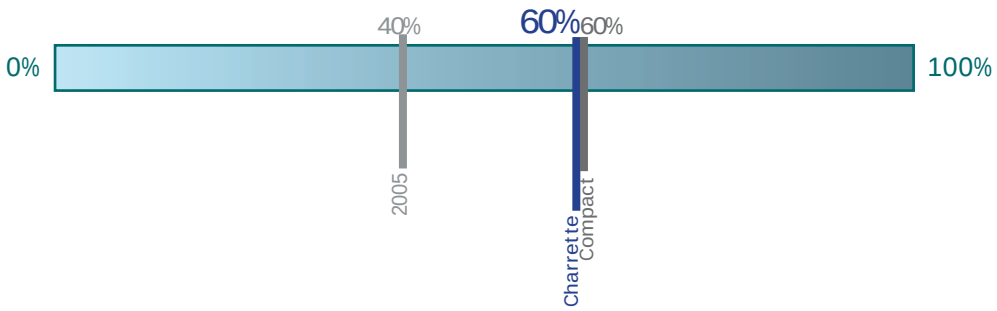
Generally, activity centres are mixed-use locations with a range of commercial, civic, and/or recreational land uses. Most people will walk 5 minutes (400m) to activity centres and mixed-use corridors. Clustering people and uses encourages residents to walk and cycle to their daily needs, and also creates more vibrant places. Measuring how many people live within walking distance to centres and corridors also provides a good indication whether the population is distributed to support local businesses. Making walking and cycling a viable option also requires well designed, interconnected routes that link residential neighbourhoods to mixed-use corridors and centres.

This metric measures the percentage of people within walking distance (400m) of activity centres, "as the crow flies." A community promoting compact development and more walkable environments would maximize population within walking distance of activity centres.

Both the charrette concept and the Compact Scenario incorporate more density in proximity to the mixed-use corridors and nodes, particularly 17 Avenue SE, and achieve a higher housing diversity index.

Indicator 2: Proximity to Activity Centres

% of people within 400m of minor activity centres and linear corridors



Indicator 3: Amenity Distribution
Measure: % commercial and civic uses within activity centres (Principles 3, 8)

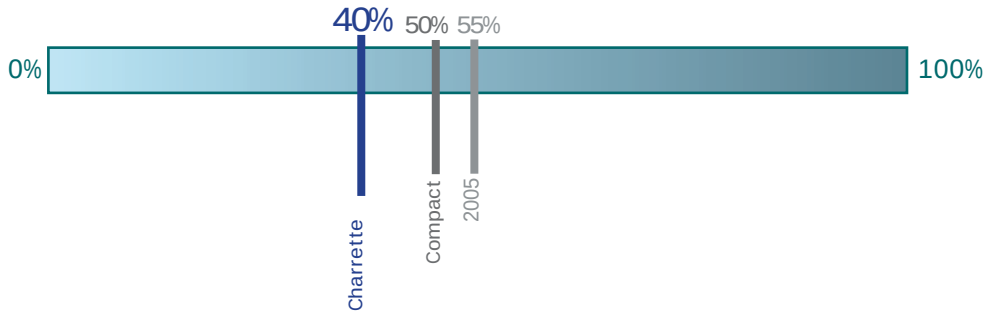
Clustering services and amenities is key in promoting walkability and creating vibrant, attractive communities. Activity centres are one type of urban form that clusters amenities. Activity centres – generally, mixed-use locations with a range of commercial, civic, and/or recreational land uses – function as neighbourhood nodes that support and are supported by compact development. Locating services and amenities along mixed-use corridors is an alternative means of achieving this objective, although this metric does not capture this strategy.

This metric measures the share of commercial and civic uses within the rest of land uses in activity centres. A community promoting compact development and more walkable environments would maximize clustering of services and amenities in activity centres, and/or along mixed-use corridors.

The charrette concept seeks to create a sense of place both within nodes, and along the entire length of 17 Avenue SE. To do so, the concept generally locates commercial mixed-use in jobs nodes along the corridor, and residential mixed-use between the nodes. With this blended approach to commercial distribution, the charrette concept achieves a lower percentage of commercial and civic uses within activity centres than the Compact and 2005 scenarios.

Indicator 3: Amenity Distribution

% commercial and civic land uses within activity centres



Indicator 4: Transportation Diversity
Measure: transportation diversity index (Principle 4)

Providing a variety of transportation options is an important aspect of encouraging alternative forms of transportation and of building complete communities. A multi-modal approach to transportation provides choice by integrating and connecting all modes: pedestrians, bicycles, transit, and vehicles. Capacity and proximity of people and jobs in relation to movement networks are both key to making alternative transportation modes viable, although this metric does not capture these qualities.

The Simpson's diversity index provides a measure of the different transportation options in a community, expressed as a value between 0 and 1, where 0 means less diversity and 1 means more diversity. A community wishing to create transportation choice would strive for a diversity index closer to 1.

The charrette concept and 2005 Scenario both include a range of walking, cycling, transit and vehicle transportation options, and achieve a similar diversity index. Transportation diversity is not measurable for the Compact Scenario.

Indicator 4: Transportation Diversity

Transportation diversity index

Indicator 5: Cycling Network Intensity
Measure: length of continuous cycling network per 1000 people (Principles 4, 9, 10)

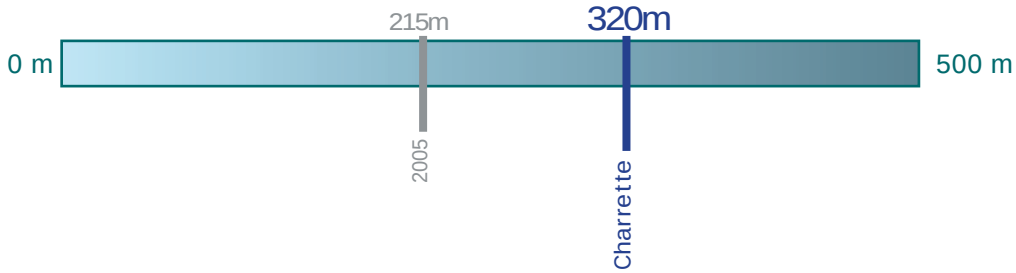
Promoting cycling is one way of providing transportation options and connecting people locally and regionally in an affordable and environmentally sustainable way. Cycling also contributes to health and well-being. The continuous cycling network has interconnected routes that generally connect to key destinations within Calgary. Ensuring there is enough capacity on the continuous cycling network is a key factor in encouraging cycling as a transportation option. Creating a comfortable and safe cycling network that connects to a full range of destinations is also necessary to encourage cycling, although this metric does not capture these qualities.

A community promoting transportation choice would strive for a higher ratio of continuous cycling network to population.

The charrette concept incorporates many more cycling routes, and achieves higher cycling network intensity than the 2005 Scenario, despite a more than doubled population. Cycling network intensity is not measurable for the Compact Scenario.

Indicator 5: Cycling Network Intensity

Length of continuous cycling network / 1000 people



Indicator 6: Proximity to Transit
Measure: % people and % jobs within 400m of transit nodes and transportation corridors (Principles 4, 8, 9, 10)

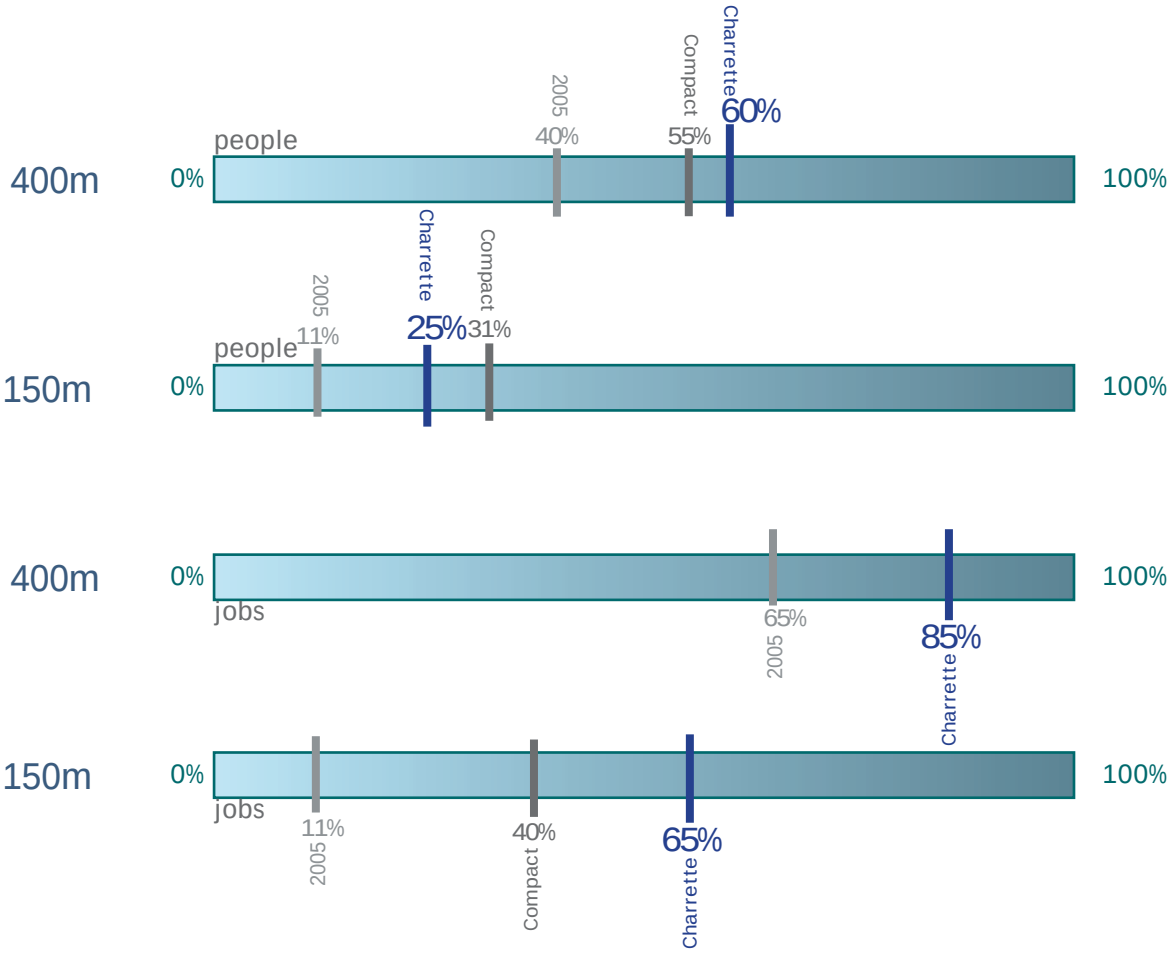
Measuring how many people live and work within walking distance (400m) to transit provides a good indication whether population and jobs are distributed to support transit. Proximity to transit nodes and corridors shortens total trip length, making transit more effective and attractive to use. This means increased ridership, and reduced traffic congestion and greenhouse gas emissions. A higher population and jobs base at a corridor or node also supports a greater mix of uses.

This metric measures population and jobs within a five-minute walking distance (400m) to both high capacity (streetcars, rapid bus, light rail, etc.) and/or basic service transit corridors and nodes, "as the crow flies." A community aiming to integrate land-use and transportation, and provide accessibility to transportation options would accommodate a greater percentage of population and jobs within a five-minute walking distance (400m) of transit corridors and nodes.

ANalysis TBA

Indicator 6: Proximity to Transit

% of people and jobs within 400m / 150m of transit corridors



Indicator 7: Open Space Intensity
Measure: open space area per 1000 people (Principle 5)

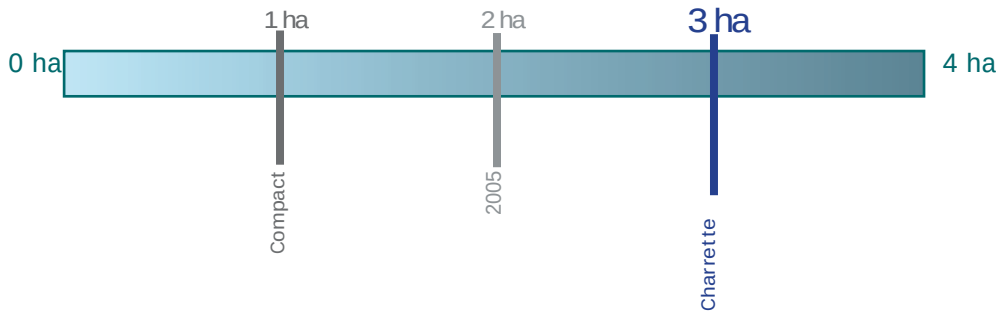
Open space intensity measures how much open space is available relative to the number of people potentially using it. Open space per capita is a common indicator of livability. “Parks help define the environment of our cities as well as their recreational offerings, culture, and feel” (Center for Public Park Excellence). Ensuring equitable distribution and connectivity of and accessibility to open space throughout neighbourhoods is also key in creating a liveable community, although this metric does not capture these qualities.

This metric measures the total area of public parkland, greenways and naturalized open space within the study site, per person. It excludes private open space, such as golf courses. Communities wishing to increase liveability would strive to incorporate more open space per person.

The charrette concept incorporates a new greenway and additional park area, and achieves higher open space intensity than the 2005 and Compact scenarios, despite a more than doubled population. The Compact Scenario achieves a lower open space intensity than the 2005 Scenario as it more than doubles population without adding much new open space.

Indicator 7: Open Space Intensity

Open space area / 1000 people



Indicator 8: Open Space Proximity
Measure: % people and % jobs within 400m of open space
(Principles 5, 9)

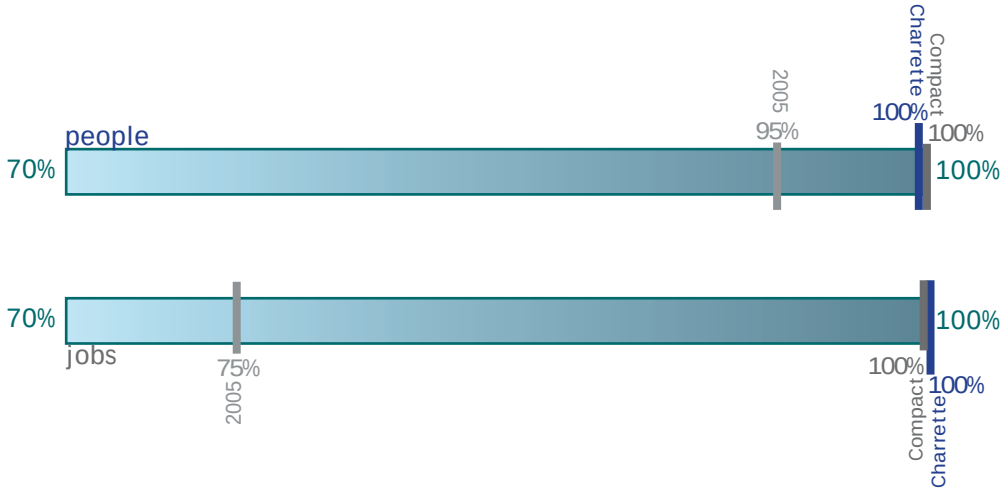
Proximity to open space is a key attribute of attractive, livable communities. Maximizing population within walking distance (400m) to open space increases accessibility and overall community walkability. A greater intensity of people also creates more vibrant and safer open spaces. Measuring proximity to open space is also a proxy for ensuring equitable distribution of open space to where people and jobs are located. Well-designed, interconnected routes that link people to open spaces are also required to encourage walking, although this metric does not capture these qualities.

This metric measures population and jobs within a five-minute walking distance (400m) to public parkland, greenways and naturalized open space, "as the crow flies." It excludes private open space such as golf courses. A community aiming to increase accessibility and walkability to open space would locate a higher share of the population within 400m of open space.

The charrette concept and Compact Scenario distributes jobs and population throughout the site, primarily focused on corridors and in nodes to achieve virtually 100% of people and jobs within walking distance to open space. The 2005 Scenario has a fairly good open space distribution, and achieves a high proximity of people to open space. However, the 2005 Scenario clusters many jobs away from open space in the industrial area, resulting in a relatively low proximity of jobs to open space.

Indicator 8: Open Space Proximity

% of people and jobs within 400m of open space at neighbourhood scale



Indicator 9: Land Use Diversity
Measure: land use diversity index (Principles 3, 6)

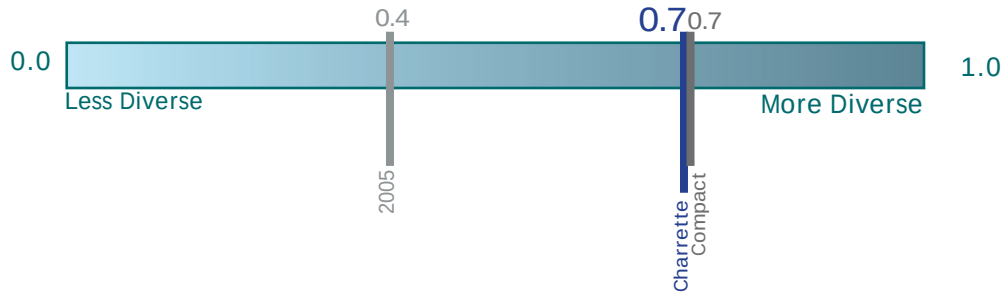
Land use diversity measures the degree to which different land uses are found within communities. Measuring land use diversity provides a good indication about the degree of community completeness. Complete communities provide opportunities for people to live, work, learn, and play, often within walking and cycling distance.

This metric measures land use in eight categories: detached, attached, multi-family residential; commercial; mixed-use; civic; industrial; and, open space. This metric uses the Simpson's diversity index to express land use diversity – both in terms of the number of land use types in a community as well as the share of land within each type – as a value between 0 and 1, where 0 means less diversity and 1 means more diversity.

This metric assumes an even balance of land uses to be optimal. This means it only provides a generalized indication of how well neighbourhoods provide the ideal mix of uses for a community, as an optimum land use balance does not necessarily mean an even proportion of land uses within a community's urban area. Nevertheless, a community aiming to be more complete would incorporate more diverse land uses, which for this metric translates to a value closer to 1.

Both the charrette concept and the Compact Scenario incorporate a wider, balanced range of land uses than the 2005 Scenario, and achieve a higher land use diversity index.

Indicator 9: Land Use Diversity
Land Use Diversity Index



Indicator 10: Mixed-Use Parcel Intensity
Measure: % parcels containing more than one use
(Principle 6)

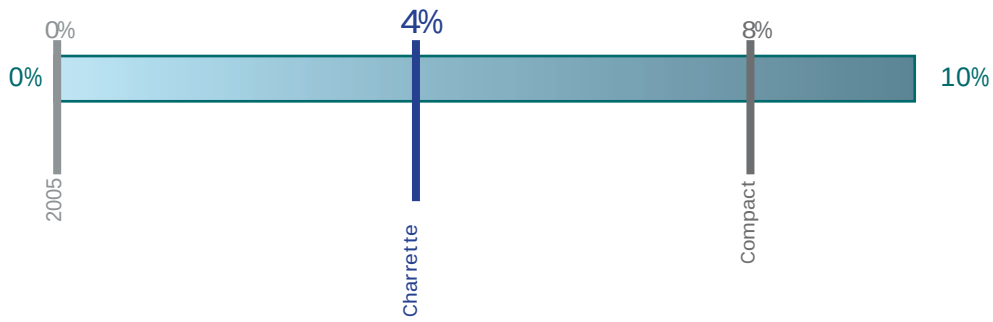
A fine-grained mix of land uses contributes to achieving a more complete community where businesses, services, civic, and commercial activities are close to where people live. Mixed uses within a parcel provide opportunities for people to live, work, learn, and play, often within walking and cycling distance, and contribute to community completeness. Parcels with a mix of residential and commercial uses are active day and evening, and the resulting increased number of people on the street enhances the community's vitality and perceived security.

This metric measures residential mixed-use buildings - buildings with at-grade retail and residential above – as a percentage of total study site parcels. This metric does not include commercial mixed-use buildings – buildings with at-grade retail and office above. A community aiming to ensure people can live close to where they work, learn and play would incorporate a more fine-grained mix of residential and commercial land uses at the parcel scale.

Both the charrette concept and Compact Scenario envision 17 Avenue SE as a local-serving, mixed-use corridor. The charrette concept presents a detailed vision with commercial mixed-use parcels in nodes, and residential mixed-use fronting the street between nodes. The Compact Scenario presents a less refined vision that assumes all buildings along 17 Avenue SE are residential mixed-use. As such, the Compact Scenario achieves higher than the charrette concept. Both achieve much higher than the 2005 Scenario, which includes no mixed-use parcels.

Indicator 10: Mixed Use Parcel Intensity

% of parcels that contain more than one use

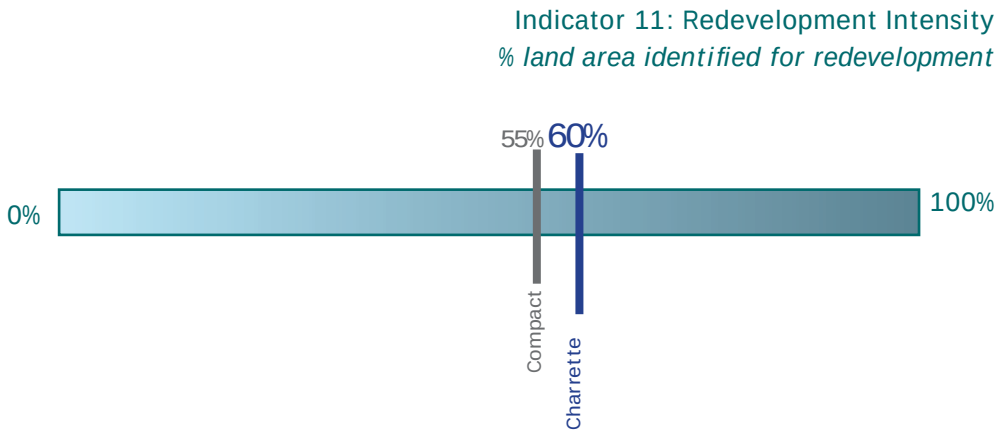


Indicator 11: Redevelopment Intensity
Measure: % land area redeveloped (Principle 7)

Encouraging development to occur in strategic locations within existing urban areas – infill – is a desired growth pattern and growth management strategy for metropolitan areas for several reasons: it optimizes existing infrastructure, intensifies land use, reduces congestion and GHG emissions, and results in lower land consumption. Given the significant land area required for residential land use compared to other urban land uses, this indicator is particularly important in building a compact metropolitan region.

This metric measures the land area identified for redevelopment, using the 2005 Scenario as the baseline. A city promoting compact development would strive for a higher percentage of redevelopment within strategic locations. Ideally, to have the least impact on the land base, a city would concentrate all new residential development within the existing city limits.

The charrette concept achieves a slightly higher redevelopment intensity than the Compact Scenario. Redevelopment intensity is not measurable for the 2005 Scenario.



Indicator 12: Development Intensity
Measure: population, jobs and dwelling units per hectare
(Principles 7, 8)

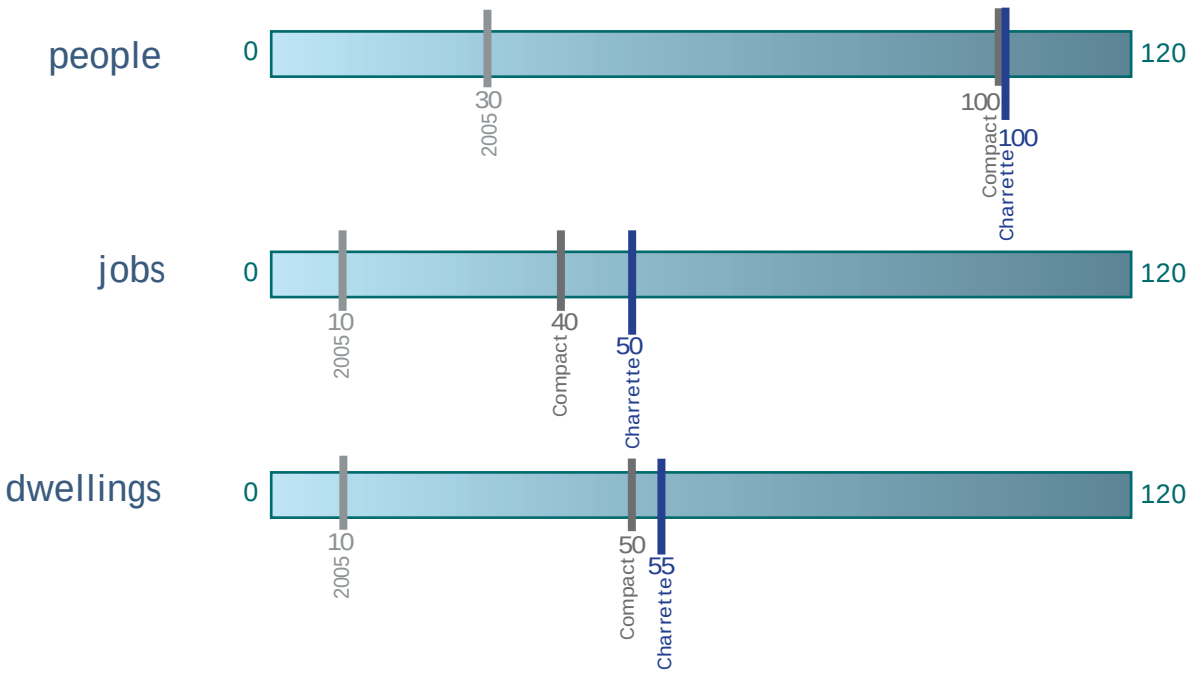
This indicator measures the average density of people, jobs, and dwelling units within a community. Measured over time, change in any of these densities at a community-wide scale helps describe its evolution towards a more or less compact model. Compact development supports balanced and livable communities, transit viability, and non-vehicle modes of travel. It also allows for more efficient growth management toward maintaining environmental quality, preserving open space, and using infrastructure more efficiently.

A city promoting compact development would strive to achieve higher population, employment, and housing densities. Density around transit routes must be thirty-five people or jobs per hectare to support basic transit service. Transit routes require 100 people per ha to support LRT or BRT systems.

Both the charrette concept and Compact Scenario achieve roughly a threefold increase in population, fourfold increase in jobs, and fivefold increase in dwelling units over the 2005 Scenario.

Indicator 12: Development Intensity

Population, jobs, and dwelling units / hectare



Indicator 13: External Community Connectivity

Measure: number connections to bounding roads per kilometre of community boundary (Principle 9)

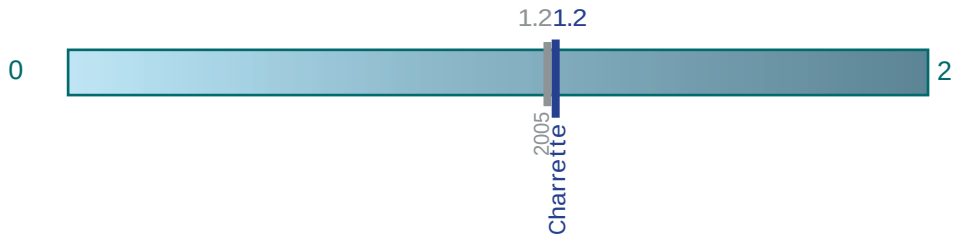
Increased connectivity to and between communities ensures a more effective and efficient transportation system for people, goods, and services. Measuring the number of connections per kilometre to roads bounding a community boundary provides a good indication of how well a community is connected to the rest of the City.

A community wishing to enhance the connections for people and goods between internal neighbourhoods and the surrounding City would provide a higher number of connections per kilometre of community boundary.

The 17 Avenue SE community has an interconnected grid of streets that provides excellent connectivity both internally and between neighbourhoods and bounding streets. The charrette scenario maintains and builds on this network internally. As such, the charrette concept and 2005 Scenario achieve the same external community connectivity. External community connectivity is not measurable for the Compact Scenario.

Indicator 13: External Community Connectivity

# of connections to bounding roads per kilometer of community boundary



Indicator 14: Green Infrastructure Intensity

Measure: % land allocated to green infrastructure (Principle 11)

Integrating natural systems into a community's infrastructure reduces costs and environmental impact. For instance, alternative storm water management systems including storm water retention and recharge maintain pre-development flows and volumes to reduce flooding and impact to streams, rivers, and habitat, and improve water quality. The amount of land within a community allocated to green infrastructure provides a good indication of whether the community can expect these types of benefits.

This metric measures all specifically identified retention ponds and green streets. A community striving for a more cost effective and environmentally supporting infrastructure system would allocate a higher percentage of land to green infrastructure uses.

The charrette concept includes an extensive green street network with bioswales that collect, clean and infiltrate storm water. As such, the charrette concept achieves a much higher green infrastructure intensity than the Compact Scenario. Green infrastructure intensity is not measurable for the 2005 Scenario.

Indicator 14: Green Infrastructure Intensity

% land allocated to green infrastructure uses

Concluding remarks

The charrette concept illustrates one vision of what the 17 Avenue SE community could look like if developed toward achieving the 11 Sustainability Principles. In this concept, 17 Avenue SE is a local-serving, multi-modal urban boulevard that acts as a community "High Street." Density clusters along the corridor, with three jobs nodes located at key intersections, and a fourth jobs node located on 28 Street SE at Franklin Station. Surrounding residential neighbourhoods remain virtually unchanged, with a more than tripled population residing in buildings of maximum eight-storeys. An interconnected network of green streets with walking and biking priority and storm water bioswales connects to parks and open space throughout the community. Bow River, Elliston Park and two new 17 Avenue SE gateways frame the community.

Generally, the charrette concept performs similarly or better than the Compact Scenario benchmark for all sustainability indicators. Both the Compact Scenario and charrette concept generally achieve much higher performance than the 2005 Scenario benchmark. The charrette concept achieves a lower measurement than both benchmarks for amenity distribution due to balancing a strategy of commercial along the length of 17 Avenue SE with clustering uses in nodes. The charrette concept achieves a similar measurement to the 2005 Scenario for external community connectivity, as the 17 Avenue SE community has an exiting interconnected grid of streets that already provides excellent external connectivity. The charrette scenario built on this by better integrating walking and cycling into the network.

The multi-day charrette process included a range of stakeholders whose participation and expertise were key in testing current outcomes of the Plan It Calgary project within the context of a real Calgary community. The charrette outcomes will inform the next stages of Plan It Calgary, as well as the development of a Concept Plan for the 17 Avenue SE community.

References:

Southeast 17 Corridor Study

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International Avenue Design Initiative

Report on Charrette 1: Envisioning International Avenue (2005), International Avenue Design Initiative

Charrette 2: 50th Street East Urban Centre, Development Study and Master Plan (2006), International Avenue Design Initiative

APPENDICES

Appendix 1: 17 Avenue SE Case Study Charrette Decision Support Framework

Plan it Calgary - Design Indicators **1:2,000 Scale**

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PRINCIPLE	OBJECTIVE	INDICATOR	METRIC	STRATEGIES	DESIGN MEASURES
1) Create a range of housing opportunities and choices	*1.1a* Increase mix of market and non-market housing types within communities.	**Housing Diversity**	**Housing Diversity Index**	Incorporate a range of housing types	Mix uses within blocks, parcels, and buildings
					Locate multi-family housing such as apartments, townhouses and rowhouses behind corridor mixed-use to step down to quiet, single-family neighbourhoods
	1.2a Increase use of adaptable block and parcel patterns.	Block Pattern	Area of land supported by grid / modified grid transportation infrastructure	Create flexible housing that can accommodate a variety of tenants	Incorporate live/work buildings
					Use flexible housing that can be configured in a variety of ways (e.g. incorporate lock-off suites in condo units to facilitate renters, in-law suites, etc.)
2) Create walkable environments	*2.1a* Increase proximity of housing to local goods and services.	**Proximity to Activity Centres**	**% of people within 400m of minor activity centres, neighbourhood activity centres and linear corridors**	Increase development intensity	Locate multi-family housing such as apartments, townhouses and rowhouses behind corridor mixed-use to step down to quiet, single-family neighbourhoods
	2.2a Increase amount, directness, connectivity, accessibility, and safety of pedestrian routes.	Directness of Route	Street Connectivity Index	Improve pedestrian connections across 17th ave and between key destinations	Increase number of pedestrian crossings on 17th Ave.
					Establish free community transit on SE 17th Ave.
				Create a safe, continuous, and comfortable pedestrian realm	Follow a transportation hierarchy, incorporate street trees, create dedicated bike and bus rights-of-way, use selective on-street parking to enliven the street, incorporate wide pedestrian sidewalks, use medians to minimize crossing distance, provide pedestrian amenities
					Reconfigure large format stores into more walkable retail
					Use a 1:2 ratio or building height to street width to create a human scale
					Use design guidelines to create a continuous expression of character along the street
				Ensure pedestrian priority	Locate most parking off-street (underground or behind fronting buildings) with selective on-street paralell parking
					Implement traffic-calming measures in residential neighbourhoods surrounding the corridor
		Pedestrian Directness	Ratio line distance : walking distance		
3)Foster distinctive, attractive communities with a strong sense of place	*3.2b* Focus location of community amenities at nodes.	**Amentiy Distribution**	**% commercial and civic land uses within activity centres**	Create a focal point along the corridor	Create a 100% corner at the intersection of major arterials, which serve as a focal point and activity node
		Proximity to Activity Centres	% of people within 400m of minor activity centres, neighbourhood activity centres and linear corridors		Locate multiple nodes along the corridor
					Locate public spaces with a civic presence at the northeast corner of nodes
	3.4a Create mixed use activity centers and public spaces at all scales (regional and neighbourhood)			Locate gateways to define the neighbourhood and improve legibility	Design gateways which empasize the unique features of SE 17th Ave.

Plan it Calgary - Design Indicators **1:2,000 Scale**

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PRINCIPLE	OBJECTIVE	INDICATOR	METRIC	STRATEGIES	DESIGN MEASURES
				Create an aesthetically pleasing corridor environment that refects the multi-ethnic nature of the neighbourhood	Use design guidelines to encourage a variety of architectural styles within the corridor, while creating a unified neighbourhood
				Design with the sun in mind	Locate higher buildings on the north side of the urban boulevard and lower buildings on the south to achieve density while permitting sun penetration
					Locate most office space on the more skady south side of the urban boulevard and retail on the north, to enliven the retail and provide a sunny shopping environment
					Incorporate south-facing public open sapces in buildings fronting on the north side of the corridor
		Land Use Diversity	Land Use Diversity Index		
4)Provide a variety of transportation options (CHOICE)	*4.1a* Increase amount of transportation infrastructure that is multi-modal.	**Transportation Diversity**	**Transportation Diversity Index**	Ensure pedestrian priority	Locate most parking off-street (underground or behind fronting buildings) with selective on-street paralell parking
				Create a safe, continuous, and comfortable pedestrian realm	Follow a transportation hierarchy, incorporate street trees, create dedicated bike and bus rights-of-way, use selective on-street parking to enliven the street, incorporate wide pedestrian sidewalks, use medians to minimize crossing distance, provide pedestrian amenities
					Reconfigure large format stores into more walkable retail
				Design for multiple transportation modes	Separate sidewalks, bike lanes and vehicular areas
					Include dedicated bus lanes, signal priority and bus bulb-outs
	4.1c Increase use of non-auto transportation infrastructure.	**Cycling Network Intensity**	**Length of continuous cycling network / 1000 people**		
		Proximity to Transit	**% of people and % of jobs within 400m of transit nodes and transportation corridors**	Support and encourage effective transit service	Locate higher density close to transit
5)Preserve open space, agricultural land, environmental beauty and critical environmental areas	*5.1a* Increase size and number of protected, restored and connected open spaces and	**Open Space Intensity**	**OS area / 1000 people**	Maintain and enhance open space in the community	Improve recreation infrastructure in Elliston Park
					Provide for all-weather activities (e.g. skating, skiing) in Elliston Park
		Open Space Proximity	**% pop and % jobs within 400m of open space at neighbourhood scale**		Retain existing neighbourhood parks
		Open Space Connectivity			
		Open Space Diversity			
				Preserve views to city and mountains	Identify and preserve view corridors from key locations in the community

Plan it Calgary - Design Indicators **1:2,000 Scale**

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PRINCIPLE	OBJECTIVE	INDICATOR	METRIC	STRATEGIES	DESIGN MEASURES
6)Mix land uses	*6.1a* Increase use mix within buildings, blocks and communities.	**Land Use Diversity**	**Land Use Diversity Index**	Provide a mix of land uses within the community	Concentrate retail, service and commercial uses on the corridor, stepping down to residential neighbourhoods behind
					Include civic uses (e.g. libraries, community centres, cultural centres, recreation facilities etc.)
		Mixed Use Parcel Intensity	**% parcels that contain more than 1 use**	Mix uses at block and parcel scales	Locate mixed-use buildings on the corridor
					Retrofit existing large format retail with residential above
	6.1b Increase use mix at transit nodes and along transportation corridors.	Mixed Use Proximity	% mixed use within 200m/400m of LRT transit nodes and transportation corridors		
		Proximity to Mixed Use	% population and jobs within 200m/400m transit stops/stations		
7)Strategically direct and manage redevelopment opportunities within existing areas	*7.1a* Increase area of restored brownfield and greyfield land redeveloped.	**Redevelopment Intensity**	**% land area redeveloped**	Intensify underutilized parcels	Reconfigure large format stores into more walkable retail
					Retrofit existing large format retail with residential above
	7.1b Increase percentage of development in existing areas .	**Development Intensity**	**Population, Jobs, and Dwelling Units / Hectare**	Increase density along a gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use to step down to quiet, single-family neighbourhoods
				Grow vertically rather than horizontally	Stack uses and spaces (e.g. mixed-use buildings with underground parking and accessible rooftop green spaces)
8)Support compact development	*8.1a* Increase overall density of development (residential and non-residential).	Development Intensity	Population, Jobs, and Dwelling Units / Hectare	Increase density along a gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use to step down to quiet, single-family neighbourhoods
				Grow vertically rather than horizontally	Stack uses and spaces (e.g. mixed-use buildings with underground parking and accessible rooftop green spaces)
		Amenity Distribution	% commercial and civic land uses within activity centres	Create focal points along the corridor	Create a 100% corner at the intersection of major arterials, which serve as focal points and activity nodes
		Proximity to Activity Centres	% of people within 400m of minor activity centres, neighbourhood activity centres and linear corridors		Locate multiple nodes along the corridor
	8.2b Cluster residential and non-residential uses around activity centres and nodes and transportation corridors.				Locate public spaces with a civic presence at the northeast corner of nodes
		Proximity to Transit	% of people and % of jobs within 400m of transit nodes and transportation corridors	Support and encourage effective transit service	Locate higher density close to transit
9) Connect people, goods and services locally, regionally and globally	*9.1a* Increase pedestrian, cyclist and transit connectivity to and among employment, goods, service areas, and cultural activities.	Directness of Route	Street Connectivity Index		
		External Community Connectivity	**# connetions to bounding roads per kilometre of community boundaries**	Improve route connectivity for non-auto transportation Connect to surrounding neighbourhoods using alternative transportation	Strengthen pedestrian and bike links among key community destinations Create pedestrian and bicycle links into adjacent neighbourhoods
		Cycling Network Intensity	Length of continuous cycling network / 1000 people		

Plan it Calgary - Design Indicators **1:2,000 Scale**

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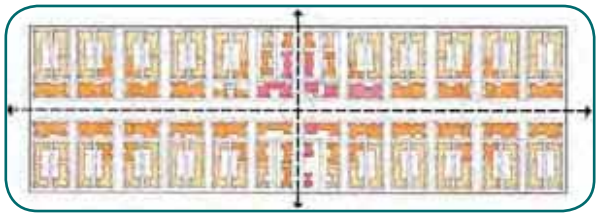
PRINCIPLE	OBJECTIVE	INDICATOR	METRIC	STRATEGIES	DESIGN MEASURES
		Pedestrian Directness	Ratio line distance : walking distance		
	9.1c Increase population and jobs within walking distance of major transit nodes.	Proximity to Transit	% of people and % of jobs within 400m of transit nodes and transportation corridors	Support and encourage effective transit service	Locate higher density close to transit
	9.2a Ensure access to and connectivity of natural areas.	Open Space Proximity	% pop and % jobs within 400m of open space at neighbourhood scale		Establish free community transit on SE 17th Ave.
	9.3b Provide consistent and well connected movement of goods by air, rail and road.	Goods Movement	% intermodal and warehousing facilities within 1600m of expressways and freeways		
	9.4a Increase connectivity to and between communities.	Transit Choice	Transit Diversity Index		
10)Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens (SERVICE)	*10.1a* Provide cost-effective public transit, pedestrian, and cycling service to every part of city.	Proximity to Transit	% of people and % of jobs within 400m of transit nodes and transportation corridors	Support and encourage effective transit service	Locate higher density close to transit
					Establish free community transit on SE 17th Ave.
					Include dedicated bus lanes, signal priority and bus bulb-outs
	10.4c Ensure supportive land uses adjacent to transportation corridors.	Development Intensity	Population, Jobs, and Dwelling Units / Hectare	Increase density along a gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use, to step down to quiet, single-family neighbourhoods
		Cycling Network Intensity	Length of continuous cycling network / 1000 people		
11)Utilise green infrastructure and buildings	*11.2a* Promote urban forms and infrastructure that support alternative and renewable energy production and reduced energy consumption.	Development Intensity	Population, Jobs, and Dwelling Units / Hectare	Increase density along a gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use, to step down to quiet, single-family neighbourhoods
				Grow vertically rather than horizontally	Stack uses and spaces (e.g. mixed-use buildings with underground parking and accessible rooftop green spaces)
		Solar Orientation	% blocks oriented east-west	Design with the sun in mind	Locate higher buildings on the north side of the urban boulevard and lower buildings on the south to achieve density while permitting sun penetration
					Locate most office space on the more skady south side of the urban boulevard and retail on the north, to enliven the retail and provide a sunny shopping environment
					Incorporate south-facing public open sapces in buildings fronting on the north side of the corridor
		Green Infrastructure Intensity	**% land allocated to green infrastructure uses**	Include green design in all new development	Design for energy-efficiency and alternative energy
					Design all new community buildings to LEED standards
	11.8a Develop alternative stormwater management systems that reduce environmental impact and maintain pre-development flows and volumes.			Make greenspace productive	Use planting strips, medians, and green open spaces for stormwater treatment, air cleaners, and for termperature management

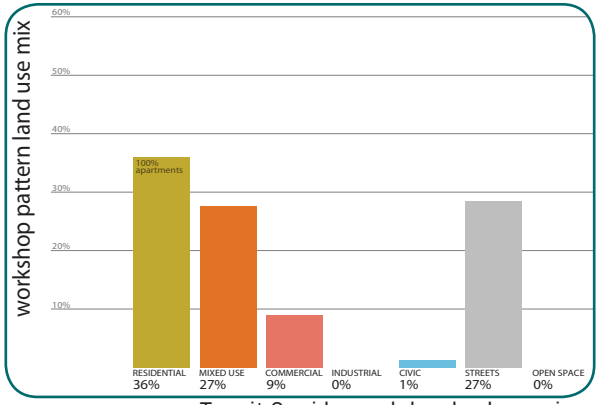
Appendix 2: Project Methodology

The Design Centre for Sustainability develops knowledge, processes and innovative tools toward sustainable community design and implementation. We apply our qualitative and quantitative tools within a collaborative stakeholder engagement process to generate scenarios that illustrate possible alternative futures for a community toward informing urban design decision-making and implementation. Two framing tools guided the 17 Avenue SE Case Study Charrette, and are specifically linked to the measurement methodology:

The Decision Support Framework: The Framework organizes the vision, principles, goals, objectives, indicators, and preliminary strategies into a strategic, decision-supportive structure. The Framework guides the decision-making process at the charrette, ensuring resulting scenarios reflect community aspirations. The imagineCALGARY report and 11 Sustainability Principles provide the high level sustainability vision, principles, and goal/objective level direction that guide the Plan It Calgary project. The SCP and DCS teams developed charrette-specific indicators and preliminary strategies with input from City staff and ideas generated at the SE 17 Visioning Workshops, held January 2008. The indicators are tools that reveal the magnitude of attributes explicitly linked to physical urban design variables, and provide the means through which to compare alternative scenario performance against the 11 Sustainability Principles. Each of the 11 Sustainability Principles relates to at least one of the fourteen 17 Avenue SE Case Study indicators. Evaluating charrette outputs against the indicators provides a means of measuring how well that scenario achieves the 11 Sustainability Principles.

Performance Scales: A performance scale illustrates a range of benchmarks located on a value scale apecific to each indicator. The Compact Scenario and existing (2005) conditions provided benchmarks for the 17 Avenue SE Case Study indicators. The DCS project team mapped and modeled the study site under 2005 and Compact conditions, and measured each against the indicators. In some cases, one of the Compact or 2005 scenarios was not measurable for a particular indicator, as the required level of data was unavailable. In those cases, only one of the scenarios is included as a benchmark. The performance scales are an effective tool for visualizing relative performance, and the charrette team used them to frame discussions about desired performance for the charrette scenario. Performance measurements for charrette outputs are comparable to the benchmarks as a relative “order of magnitude.”





credit: Design Centre for Sustainability

Transit Corridor workshop land use mix

Above: The Transit Corridor was one generic development pattern used in the Plan It Calgary project. This pattern was one of 6 patterns to be "truthed" by City of Calgary staff and other expert stakeholders. The resulting land use is also displayed above. This, as well as other patterns, was applied to the 17 Avenue SE study area the first day, to start discussion and provide data in areas not designed in detail later in the charrette.

A key modeling tool aided the DCS team in quantitatively analyzing the complex relationships between form and space - as described by maps and drawings - and the data required to generate the performance measurments for benchmarks and charrette outputs:

Development Patterns

Development patterns link performance measurement data with areas of contiguous physical urban characteristics - i.e. areas with consistent parcel and building, local street, and open space types. These urban elements locate in cities according to recurring mixes and proportions of land uses. A development pattern consists of a data set that describes areas with that type of land use mix and proportion. Development patterns are theoretical in the sense that they are not site specific, but hold essential attributes that can be associated to similar areas across the city. For instance, recent single family neighbourhoods in Calgary often share similar characteristics, and could be considered an existing development pattern.

Many different development patterns combine to create a city's urban fabric. The array and level of data embedded within development patterns is greater than in conventional land use planning, making development patterns a useful short and long-term planning tool. This data ranges from jobs and population figures to physical information about land use mix, housing mix, densities and FAR. It is used to help inform future policy, in the form of pattern-specific design rules that can easily integrate into policy documents.

Development patterns provide the data that supports the other Plan It Calgary project components. Throughout the evolution of the project the amount of data provided by the patterns has increased as the number of patterns has been delimited. In the early stages of Plan It Calgary there were a greater number of patterns with limited associated data. The Compact Scenario and exisitng (2005) condition, applied herein as benchmarks, are based on the early development pattern set. For the 17 Avenue SE Case Study charrette, participants evaluated and adjusted the pattern allocations described for the study site by the Compact and 2005 scenarios. The DCS project team was able to used the refined development pattern assumptions to provide target numbers of people (75,000) and jobs (33,000) to guide the charrette team.

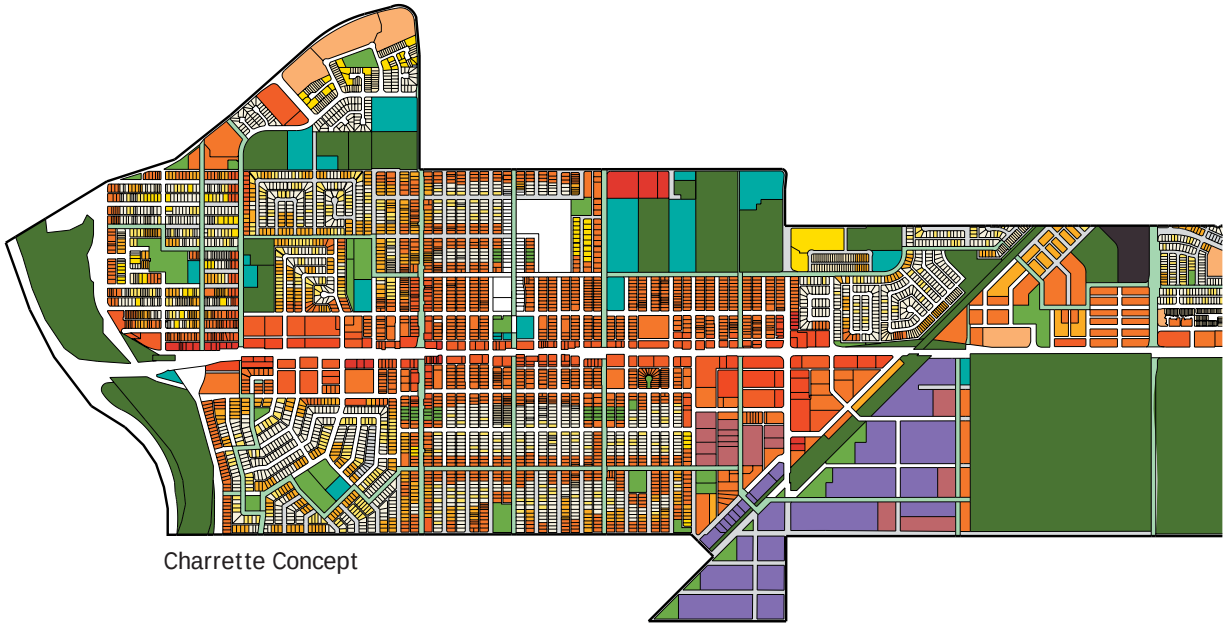
2005 Condition

Compact Scenario

Scenario Modeling

The DCS uses Graphic Information Systems (GIS) to visualize and measure spatial conditions of charrette study sites and outputs. The DCS project team constructed study site models for existing (2005) condition, Compact Scenario, and the charrette concept. The team used GIS data to determine existing block and parcel configurations for the base of each model. The team mapped parcel data under each of the three conditions - indicated through a colour code representing areas of similar building type and associated data, including job and population numbers. Inputs to parcel allocation for the existing (2005) condition were orthophotos, land use bylaw data, land use maps and a detailed map book. Development pattern allocations from the 1:40,000 scale city-wide Compact Scenario provided the basis for parcel allocation under that condition, with additional pattern refinements from the Development Pattern Workshops and related, detailed case studies. Study site development pattern allocations refined by the charrette team provided the basis for parcel allocation for the charrette concept, again integrating pattern refinements from workshops and case studies.

The DCS project team used the GIS maps to measure each of the three conditions against the fourteen indicators, as detailed on the following pages.



Charrette Concept

Indicator 1: Housing Diversity
Measure: housing diversity index
(Principle 1)

Steps:

1) Use the "select by attribute" function within the attribute table of the development patterns GIS coverage to count the number of parcels for each of the different housing types (here we considered four)

For eg., Single Family homes (SF):
i. In Arc, select all parcels with development pattern of SF_20uph, SF_30uph, other_RES, SF20_apt, SF30_apt
ii. Enter this number (2235 in this case) of parcels into chart below
iii. Enter the total number of parcels for these 4 housing types (5214 in this case)

2) Enter these values into Simpsons Diversity Index

Simpson's Diversity Index:

$D = 1 - \Sigma(n/N)^2$

Where n is the number of dwelling units (parcels) for each type, and N is the total number of units (parcels). D is the resulting diversity index and is expressed in a value ranging from 0 to 1, where values closer to 0 mean less diversity and values closer to 1 mean more diversity.

"D = 1-(SUMSQ((R26),(S26),(T26), (U26)))"

0.64063138 =D (Housing Diversity I

	SF	ATT	APT-4	APT+4
# parcels	2235	1028	23	1928
TTL # parcels	5214	5214	5214	5214
n/N	0.428653625	0.197161488	0.004411201	0.369774

SF_20, 30uph	64,75m_ROW	MF_80,115uph	MF_195,330,670uph
other_RES	SxSdup_40dph	MU_65uph	MU_160uph
SF20, 30_apt	TanDup_60uph	Ind_MU	
	5, 43m_ROW		

These are development patterns that contain housing, organized into four categories:

SF = Detached single family
ATT= Attached homes
APT-4 = Apartments under 4 stories
APT+4 = Apartments over 4 stories

Housing Type	Development pattern codes (in Arc)
Detached (SF)	SF_20,30uph, other_RES, SF20,30_apt
Attached (ATT)	65,75m_ROW, SxSdup_40uph, TanDup_60uph, 5,43m_ROW
Apartments-4 (APT-4)	MF_80,115uph,
Apartments+4 (APT+4)	MF 195, 330, 670uph

Indicator 2: Proximity to Activity Centres

Measure: % people within 400m of activity centres and mixed-use corridors (Principles 2, 3, 8)

Steps:		
1) Select the vectors (centrelines) of streets that make up linear corridors / activity centres from the road network GIS coverage		
2) Create a new shapefile with this selection		
3) Create a 400m buffer (Arc toolbox Buffer) around this coverage		
4) Clip (Arc toolbox Clip) the development pattern GIS coverage using this buffer layer		
5) In Arc, create new field to calculate total population in the attribute table of this newly clipped development pattern GIS coverage		
6) Right-click the area field name in the attribute table to expose a menu; select 'field calculator' from this menu, and multiply the People / Ha field and the Area field (in Ha) to get population for each parcel		
7) Use 'Select By Attributes' function to select all parcels with population greater than 0		
8) Right click the field name for the newly calculated Population attribute, right-click, and select "Statistics" to get population within 400m of linear corridors		
9) In Arc, create new field to calculate total population in the attribute table of the original (full study area) development pattern GIS coverage		
10) Right-click the area field name in the attribute table to expose a menu; select 'field calculator' from this menu, and multiply the People / Ha field and the Area field (in Ha) to get population for each parcel		
11) Right click the field name for the newly calculated Population attribute, right-click, and select "Statistics" to get population of study area (total site population)		
	pop'n	parcels
Population within 400m of corridors:	45772	2755
total site pop'n:	78406.58597	5594
%	58%	49%

right:
Parcels identified as part of the linear corridor and activity centre for this measurement.

Indicator 3: Amenity Distribution

Measure: % commercial and civic uses within activity centres

(Principles 3, 8)

Steps:		
1) In ArcGIS, use the "select by attribute" function in the development patters GIS coverage to select and count the number of parcels of commercial and civic land uses and divide by the total number of parcels		
2) In ArcGIS, add the area of the selected parcels of commercial and civic land uses and divide by the total area of parcels		
For eg., Commercial within corridors:	i. In ArcGIS, create parcel layer for the desired corridor area	
	ii. In ArcGIS, "Select by attribute" for parcels with a Commercial development pattern of LC_02FAR, LC_03FAR, MC_07FAR, MC_13FAR, MC_23FAR, MC_32FAR, HC_80FAR, HC_50FAR	
	iii. Enter this number (in this case, 78), and divide by total number of parcels in corridor (in this case, 282)	
ttl #parcels commercial	78	
ttl #parcels corridor	282	
% of corridor	27.7%	by # parcels
area commercial	15.44120116	
total area corridor	37.13455191	
% of corridor	41.6%	by area
Land Use Type	**Development pattern codes (in Arc)**	
Commercial	LC_02FAR, LC_03FAR, MC_07FAR, MC_13FAR, MC_23FAR, MC_32FAR, HC_60FARHC_50FAR	
Civic	civic	

Indicator 4: Transportation Diversity
Measure: transportation diversity index
(Principle 4)

Steps:										
1) Count the number of parcels for each of the different housing types (here we considered four)										
For eg., Commercial:	i. In Arc, select all parcels with development pattern of LC_02FAR, LC_03FAR, MC_07FAR, MC_13FAR, MC_23FAR, MC_32FAR, HC_80FAR, HC_50FAR									
	ii. Enter this number (84 in this case) of parcels into chart below									
	iii. Enter the total number of parcels for these 4 housing types (5704 in this case)									
2) Enter these values into Simpsons Diversity Index										
Simpson's Diversity Index:										
$D = 1 - \Sigma(n/N)^2$										
Where n is the number of dwelling units (parcels) for each type, and N is the total number of units (parcels). D										
is the resulting diversity index and is expressed in a value ranging from 0 to 1, where values										
closer to 0 mean less diversity and values closer to 1 mean more diversity.										
"=1-(SUMSQ((Q327/Q330),(Q328/Q330),(Q329/Q330)))"										
0.26 D										
Across entire site										
Transportation mode	**length (m)**									
Bike	24966.3975									
Transit	6007.741391									
Path / street	175104.3417									
sum	206078.4806									

Indicator 5: Cycling Network Intensity
Measure: length of continuous cycling network per 1000 people
(Principles 4, 9, 10)

Steps:												
1) Create new field to calculate total population in the attribute table of the development pattern GIS coverage												
2) In this new field, use field calculator to multiply the People / Ha field and the Area field (in Ha)												
3) In ArcGIS, select vectors from a road network layer that are designated cycling routes												
4) Make new layer from this selection												
5) Create new field to calculate length of vector segments, and right-click the field name in the attribute table to expose a menu; select 'field calculator' from this menu, then click the help button to find formula for calculating vector length												
6) Calculate [(total cycle route length) by (total population)]*1000												
total cycle route length (m)	24966.3975											
total population	78406.58597											
cycle route / 1000 people:	**318.4**	"=1000*R315/R316"										

Indicator 6: Proximity to Transit

Measure: % people and % jobs within 400m/ 150m of transit nodes and transportation corridors

(Principles 4, 8, 9, 10)

Steps:

1) Select the vectors (centrelines) of streets that make up transit corridors from the road network GIS coverage
2) Create a new shapefile with this selection
3) Create a 400m buffer (Arc toolbox Buffer) around this coverage
4) Clip (Arc toolbox Clip) the development pattern GIS coverage using this buffer layer
5) In Arc, create new field to calculate total population in the attribute table of this newly clipped development pattern GIS coverage
6) Right-click the area field name in the attribute table to expose a menu; select 'field calculator' from this menu, and multiply the People / Ha field and the Area field (in Ha) to get population for each parcel
7) Use 'Select By Attributes' function to select all parcels with population greater than 0
8) Right click the field name for the newly calculated Population attribute, right-click, and select "Statistics" to get population within 400m of linear corridors
9) In Arc, create new field to calculate total population in the attribute table of the original (full study area) development pattern GIS coverage
10) Right-click the area field name in the attribute table to expose a menu; select 'field calculator' from this menu, and multiply the People / Ha field and the Area field (in Ha) to get population for each parcel
11) Right click the field name for the newly calculated Population attribute, right-click, and select "Statistics" to get population of study area (total site population)
12) Repeat using 150m buffer instead of 400m buffer
13) Repeat using jobs attribute instead of population

400m	pop'n	parcels
pop'n sum:	47332	2820
total site pop'n:	78407	5594
%	**60%**	**50%**

	jobs	parcels
jobs sum:	31530	333
total site jobs:	37307	5594
%	**85%**	**6%**

150m	pop'n	parcels
pop'n sum:	20861	821
total site pop'n:	78407	5594
%	**27%**	**15%**

	jobs	parcels
jobs sum:	24163	226
total site jobs:	37307	5594
%	**65%**	**4%**

400m	pop'n	parcels
pop'n sum:		
total site pop'n:	78407	5594
%	**100%**	**100%**

	jobs	parcels
jobs sum:		
total site jobs:	37307	5594
%	**100%**	**100%**

Indicator 7: Open Space Intensity

Measure: open space area per 1000 people (Principle 5)

Steps:			
1) Create new field to calculate total population in the attribute table of the development pattern GIS coverage			
2) In this new field, use field calculator to multiply the People / Ha field and the Area field (in Ha)			
3) Create new field to calculate polygon area in Hectares			
4) Right-click the area field name in the attribute table to expose a menu; select 'field calculator' from this menu, then click the help button to find formula for calculating polygon area			
5) In ArcGIS, use the "select by attribute" function to select polygons with a development pattern of OS_inpattern and OS_outpattern			
6) Right-click the area field name in the attribute table to expose a menu; select 'statistics' to sum the total area of the selected parcels			
7) Calculate [(total area) by (total population)]*1000			
	Area (Ha)		
OS_inpattern			
OS_outpattern			
sum:	222.944577		
total population	78406.58597		
OS / 1000 people (Ha)	2.8	"=1000*Q341/Q343"	

Indicator 8: Open Space Proximity

Measure: % people and % jobs within 400m of open space

(Principles 5, 9)

Steps:		
1) Select the polygons from the development pattern GIS coverage which have a development pattern of OS_inpattern or OS_outpattern (open space parcels)		
2) Create new coverage from this selection		
3) Repeat steps 3 - 12 from section 4.1 c) Proximity to Linear Corridors / Activity Centres		
400m	pop'n	parcels
pop'n sum:		
total site pop'n:	78407	5594
%	**100%**	**100%**
	jobs	parcels
jobs sum:		
total site jobs:	37307	5594
%	**100%**	**100%**

Indicator 9: Land Use Diversity
Measure: land use diversity index
(Principles 3, 6)

Steps:											
1) Count the number of parcels for each of the different housing types (here we considered four)											
For eg., Commercial:	i. In Arc, select all parcels with development pattern of LC_02FAR, LC_03FAR, MC_07FAR, MC_13FAR, MC_23FAR, MC_32FAR, HC_80FAR, HC_50FAR										
	ii. Enter this number (84 in this case) of parcels into chart below										
	iii. Enter the total number of parcels for these 4 housing types (5704 in this case)										
2) Enter these values into Simpsons Diversity Index											
Simpson's Diversity Index:											
$D = 1 - \Sigma(n/N)^2$											
Where n is the number of dwelling units (parcels) for each type, and N is the total number of units (parcels). D											
is the resulting diversity index and is expressed in a value ranging from 0 to 1, where values											
closer to 0 mean less diversity and values closer to 1 mean more diversity.											
"D=1-(SUMSQ((Q71),(R71),(S71),(T71),(U71),(W71),(X71),(Z71),(AA71)))"											
Across entire site:											
0.697244644 D											
	Detached	**Attached**	**Apartments-4**	**Apartments+4**	**Commercial**		**Mixed**	**Civic**		**Industrial**	**Park**
#	2235	1028	23	1928	84		242	21		25	118
TTL#	5704	5704	5704	5704	5704		5704	5704		5704	5704
n/N	0.391830295	0.180224404	0.004032258	0.338008415	0.014727		0.042426367	0.003682		0.004382889	0.020687
Across corridor:	For SE 17th Ave, the "corridor" was delineated as the band of parcels bordering the north and south sides of 17th Ave (see inset diagram)										
0.607137468 D											
	Detached	**Attached**	**Apartments-4**	**Apartments+4**	**Commercial**		**Mixed**	**Civic**		**Industrial**	**Park**
#	0	0	0	41	78		153	0		2	8
TTL#	282	282	282	282	282	282	282	282	282	282	282
n/N	0	0	0	0.145390071	0.276596		0.542553191	0		0.007092199	0.028369
Land Use Type	**Development pattern codes (in Arc)**										
Detached	SF_20,30uph, other_RES, SF20,30_apt										
Attached	65,75m_ROW, SxSdup_40uph, TanDup_60uph, 5.43m_ROW										
Apartments-4	MF_80,115uph,										
Apartments+4	MF 195, 330, 670uph										
Commercial	LC_02FAR, LC_03FAR, MC_07FAR, MC_13FAR, MC_23FAR, MC_32FAR, HC_80FAR,HC_50FAR										
Mixed	MU_65uph, MU_160uph, Ind_MU										
Civic	civic										
Industrial	Ind_02FAR, Ind_03FAR, Ind_06FAR										
Park (local)	OS-inpattern, outpattern										

Indicator 10: Mixed-Use Parcel Intensity

Measure: % parcels containing more than one use

(Principle 6)

Steps:			
1) In ArcGIS, use the "select by attribute" function in the development patterns GIS coverage to select and count the number of parcels of mixed land uses and divide by the total number of parcels			
2) In ArcGIS, add the area of the selected parcels of commercial and civic land uses and divide by the total area of parcels			
For eg., within corridors:	i. In ArcGIS, create parcel layer for the desired corridor area (see linear corridor map for SE 17th Ave)		
	ii. In ArcGIS, "Select by attribute" for parcels with a development pattern of MU_65uph, MU_160uph, Ind_MU		
	iii. Enter this number (in this case, 151), and divide by total number of parcels in corridor (in this case, 282)		
Within Corridor			
Pattern		# Parcels	
MU		151	
	Corridor total	282	
	% MU:	**53.5%**	
Across entire site			
Pattern		# Parcels	
MU		227	
	Corridor total	5594	
	% MU:	**4.1%**	

Indicator 11: Redevelopment Intensity

Measure: % land area redeveloped

(Principle 7)

This metric measures the change in population density between the existing site condition, and the proposed site condition (see inset map)						
Steps:						
1) In ArcGIS Arc toolbox, use "UNION" to join the existing condition and proposed condition development pattern coverages						
2) Create a new field for this metric in this new unioned attribute table						
3) Right-click the field name to expose a sub menu, then select field 'calculator'						
4) Enter a formula which subtracts the 'People / Ha' field for the proposed condition from the 'People / Ha' field for the existing condition						
5) Use 'Select by Attributes' function to select all parcels greater than 0, less than 0, and equal to 0						
		# parcels	% of total site			
No change in People/ha		1340	20.1%			
Positive change in people/Ha		4003	60.0%			
Negative change in people/Ha		1327	19.9%	MC_32FAR, HC_50FAR, OS_pattern		
	total number of parcels	6670				

Indicator 12: Development Intensity

Measure: % parcels containing more than one use

(Principle 6)

Steps:

1) Create a Union (Arc toolbox Union) with a TZ coverage and the development pattern coverage
2) Create new field to calculate area of polygons, and right-click the field name in the attribute table to expose a menu; select 'field calculator' from this menu, then click the help button to find formula for calculating polygon area (convert to Ha)
3) In this newly unioned coverage, create new fields to calculate total population (multiplying population/Ha * Area fields) and total jobs (multiplying jobs/Ha * Area) in the attribute table
4) In this newly unioned coverage, create a new fields that adds total dwelling units (sum single family, apartment and attached fields) and multiply by area (in Ha) to calculate total dwelling units
5) Using the "Select by attributes" function, select all parcels within each TZ code, then right click the population field, select summarize, collect the sum of these populations
6) Repeat for newly created total jobs field
7) In development patterns coverage, 'Select by Attributes' to select all parcels with a population greater than 0
8) Right-click newly calculated total Population field, select "Statistics" for the selected parcels, collect this summed population for the study area
9) Repeat steps 6 - 8 for total jobs field and total dwelling units field
10) Repeat steps 2 - 3, 7 - 8 for Corridor coverage created in section 3.4

TZ	Total Jobs	Total Population
4208	0	637.122246
309		
1955		
1933		
1931		
1737	0	174.599805
1736	0	1120.350761
1735	143.426225	2209.441994
1734	69.614852	5600.265687
1733	1818.993481	2500.239213
1721		
1720		
1719	80.38523	10157.86964
1718	2649.245183	3182.320684
1717	1080.969924	2786.768837
1716	704.659737	2341.779235
1715	1066.100988	4360.793976
1714	162.800322	10796.03873
1713	75.768247	5.664373
1712		
1706	3326.420893	8350.004161
1705	3888.442801	2343.25031
1704	136.93031	4834.928879
1703	1543.839191	5265.717008
1702	315.259886	2728.992435
1656	0	0
1635		
1634	0	116.775334
1633	5432.416351	2093.110087
1632	5114.200293	2228.356172
1631	7350.421135	4572.195592
1630	2347.319381	0
Total	**37307.21443**	**78406.58516**

Jobs / site	
ttl jobs	37316.04048
ttl Ha	748.6087396
ttl jobs/Ha	49.84718787

Population / site	
ttl popn	75430.53689
ttl Ha	748.6087396
ttl popn/Ha	100.7609622

Dwelling Units / Site	
DU/Site	40422.42472

Dwelling Units / Corridor	
DU/Corridor	3249.948165

Jobs / corridor	
ttl jobs/Ha	20607.95191

Population / corridor	
ttl popn/Ha	5833.653137

Population / Pattern	
pattern	ttl pop
SF_20uph	5184.302
SF20_apt	2318.836
75m_ROW	1085.96
SxSdup_4(	1134.906
5m_ROW	6354.983
MF_80uph	1912.78
MF_195up	48081.24
MU_160up	9289.134
Ind_MU	3022.185

Jobs / site	
ttl jobs	37316.04
ttl Ha	748.6087
ttl jobs/Ha	49.84719

Jobs / Pattern	
pattern	ttl jobs
LC_02FAR	7.349182
Ind_02FAR	3.001993
MU_160up	4513.869
MC_23FAR	4871.133
MC_32FAR	8071.735
Ind_06FAR	7680.674
HC_50FAR	10799.54
Ind_MU	1368.537

Population / site	
ttl popn	75430.54
ttl Ha	748.6087
ttl popn/Ha	100.761

Indicator 13: External Community Connectivity

Measure: number connections to bounding roads per kilometre of community boundary (Principle 9)

Steps:								
1) In the attribute table for the study area boundary coverage, create new field to calculate perimeter of the vector, right-click the field name in the attribute table to expose a menu;								
	select 'field calculator' from this menu, then click the help button to find formula for calculating vector length							
2) Count the number of roads that extend from within the study area into the surrounding city (without a T-intersection)								
# connections:	20							
boundary perim (m):	16660							
#/km:	**1.20**							

Indicator 14: Green Infrastructure Intensity

Measure: % land allocated to green infrastructure

(Principle 11)

Steps:										
1) Create new field to calculate polygon area in Hectares										
4) Right-click the area field name in the attribute table to expose a menu; select 'field calculator' from this menu, then click the help button to find formula for calculating polygon area										
2) Right-click the area field name in the attribute table to expose a menu; select 'statistics' to sum the total area of all parcels										
3) In ArcGIS, use the "select by attribute" function to select polygons with a development pattern of OS_inpattern, OS_outpattern, and greenstreets										
4) Right-click the area field name in the attribute table to expose a menu; select 'statistics' to sum the total area of the selected parcels										
5) Divide the green infrastructure area by the total site area										
	parcels		Ha							
Green infrastructure	196		271.0							
Total	5594		941.7							
%	3.5		28.8							

Appendix 3: Participant List and Affiliations

Go:

-Design Facilitator: Patrick Condon (DCS)
-Team Coordinator: Jone Belausteguigoitia (DCS)
-Digital / Drawing Support: Sara Fryer (DCS)

-Denise Carbol – City of Calgary: Sustainable City Team / Plan It Calgary
-Pat Churchman – City of Calgary: Transit
-Dave Colquhoun – City of Calgary: Plan It Calgary
-Nora Kajdy – City of Calgary: Transportation
-Dennis Ogle – Community
-Ron Smith – City of Calgary (Department?)

Work:

-Design Facilitator: Ron Walkey (DCS)
-Team Coordinator: Kristi Tatebe (DCS)
-Digital / Drawing Support: Inna Olchovski (DCS)

-Wesley Andreas – City of Calgary Land Use Planning and Policy: Geodemographics
-Blair Erb – Coriolis Consulting Corp.
-Karen Holz – City of Calgary: Plan It Calgary
-Alison Karim-McSwiney / Mike Shymka – Community
-Grace Lopushinsky – City of Calgary: Land Use Planning and Policy: Southeast 17 Corridor Study team
-Eric MacNaughton – City of Calgary: Plan It Calgary
-Peeter Tosine – City of Calgary: Urban Development

Green / Home:

-Design Facilitator: Daniel Roehr (DCS)
-Team Coordinator: Nicole Miller (DCS)
-Digital / Drawing Support: Courtney Miller (DCS)

-Liliana Bozic – City of Calgary: Stormwater Management
-Diane Danielson - Community
-Dick Ebersohn – City of Calgary: Calgary Sustainable Suburbs / Plan It Calgary
-Keath Parker – City of Calgary: Parks
-Cameron Salisbury – City of Calgary: Land Use Planning and Policy: Southeast 17 Corridor Study team
-Lesley Taylor – City of Calgary: Social Planning
-Karen Wilkie – City of Calgary: Environmental Management

Event Coordinator: Elisa Campbell (DCS)
Event Resource: Rachael Cabrerra (DCS)
Sigrid Grunberger (DCS)

Appendix 4: Public Mid-Course Correction and Final Presentation Feedback

Approximately 15 community members attended the Public Mid-Course Correction on March 11, and 20 attended the final presentation on March 13. The following is a summary of the few comments received.

Mid-Course Correction Public Comments – March 11, 2008

General:

- We have to build in incentive for property owners to redevelop. No one will redevelop on 17th Ave with a 2-3 storey height limit. Four stories – maybe. Most want higher for more profit but 5-6 stories requires more expensive building methods.

-Attention needs to be paid to housing and amenities that attract families back to the area in order to ensure the viability of the area.

-Not all affordable housing! We already have a great deal with the accompanying social problems.

-Previous charrettes and the recent workshop show that residents are not opposed to higher development along 17th ave. Lessen the height toward residential area.

-(from International Avenue Design Initiative participants:) Subcentre, view edge, promenade

"Go":

-have the 2.5 metre sidewalk/pathway for mixed use
-more frequent service, better service, better connections (Ogden Rd.)
-save the line (rail corridor)
-I prefer no median in the middle of the 17th because you can't access to the business on the other sides of the street
-Bike lanes missing from all drawings
-Curb lane is better for transit & pedestrians
-Bike lanes are missing – multi-modal facility

"Work"

-keep this industrial (existing industrial area)

Final Presentation Public Comments – March 13, 2008

"Go"

- Higher frequency bus route along 52nd to cover transit demand from N.E. residential areas to SE commercial/industrial areas

- Rail R.O.W. with housing – doesn't function with housing if rail becomes active again in future (noise issues etc.)

Appendix 5: Strategy Comparison

The DCS and SCP teams synthesized outputs from the 17SE Visioning Workshops into preliminary strategies (blue) and design measures (green). The charrette team used these strategies and measures to frame design discussions. Through the charrette exercise, the team applied all of the preliminary strategies and many of the preliminary measures - indicated by a 'Y' in the far right column; an 'N' indicates those measures not applied. The team also generated new design measures, and specific refinements of preliminary design measures (yellow).

PRINCIPLE	STRATEGIES	DESIGN MEASURES	SUPPORTING MEASURES FROM CHARRETTE
1)Create a range of housing opportunities and choices	Incorporate a range of housing types	Mix uses within blocks, parcels, and buildings	Y
		Locate multi-family housing such as apartments, townhouses and rowhouses behind corridor mixed-use	Y
		Blend of large lots and small lots	
	Accommodate a variety of tenants	Incorporate live/work buildings	Y
		Use flexible housing that can be configured in a variety of ways (e.g. incorporate lock-off suites in condo units to facilitate renters, in-law suites, etc.)	
		Residential along rail???	
2)Create walkable environments	Create a focal point along the corridor	Create a 100% corner at the intersection of major arterials, which serve as a focal point and activity node	y
		Locate multiple nodes along the corridor	Key node/ highest density at 52nd St, secondary nodes at 36th and 28th Streets
		Increase development intensity in nodes	Y
		Incorporate a mix of uses in nodes	Y
	Improve pedestrian connections	Increase number of pedestrian crossings on 17th Ave.	Ped. Crossings every 2 blocks
		Establish free community transit on SE 17th Ave.	N
		Enhance pedestrian routes between key community destinations	Minimize street crossings from major transit stations
	Create a safe, continuous, and comfortable pedestrian realm	Follow a transportation hierarchy	Prioritize pedestrian and cycling movement
		Reconfigure large format stores into more walkable retail	Locate residential above large format retail in former industrial area
		Use a 1:2 ratio or building height to street width to create a human scale	Y
		Incorporate street trees	Y
		Create dedicated bike and bus rights-of-way	Y
		Incorporate wide pedestrian sidewalks	Y
		Use medians to minimize crossing distances	Y
		Use selective on-street parking to enliven the street	Y
		Use design guidelines to create a continuous expression of character along the street	N
		Locate most parking off-street (underground or behind fronting buildings) with selective on-street paralell parking	Y
		Implement traffic-calming measures in residential neighbourhoods surrounding the corridor	Y

3)Foster distinctive, attractive communities with a strong sense of place	Create a focal point along the corridor	Create a 100% corner at the intersection of major arterials, which serve as a focal point and activity node	Y
		Locate multiple nodes along the corridor	Key node/ highest density at 52nd St, secondary nodes at 36th and 28th Streets
		Locate public spaces with a civic presence at the northeast corner of nodes	Y
	Define neighbourhood boundaries and improve legibility	Design gateways which empasize the unique features of SE 17th Ave.	Commercial gateways at 28th and 68th
	Create an aesthetically pleasing corridor environment that refects the multi-ethnic nature of the neighbourhood	Use design guidelines to encourage a variety of architectural styles within the corridor, while creating a unified neighbourhood character	N
	Design with the sun in mind	Locate higher buildings on the north side of the urban boulevard and lower buildings on the south to achieve density while permitting sun penetration	Y
		Locate most office space on the more shady south side of the urban boulevard and retail on the north, to enliven the retail and provide a sunny shopping environment	N
		Incorporate south-facing public open spaces in buildings fronting on the north side of the corridor	At every major intersection at on the north side to maximize sunlight
4)Provide a variety of transportation options (CHOICE)	Create a safe, continuous, and comfortable pedestrian realm	Follow a transportation hierarchy	Prioritize pedestrian and cycling movement
		Use a 1:2 ratio or building height to street width to create a human scale	Y
		Incorporate wide pedestrian sidewalks	Y
		Use medians to minimize crossing distances	Y
		Use selective on-street parking to enliven the street	Y
		Use design guidelines to create a continuous expression of character along the street	N
		Locate most parking off-street (underground or behind fronting buildings) with selective on-street parallel parking	Y
		Implement traffic-calming measures in residential neighbourhoods surrounding the corridor	Y
		Minimize street crossings from major transit stations	
	Design for multiple transportation modes	Separate sidewalks, bike lanes, and vehicular areas	Y
		Include dedicated bus lanes, signal priority and bus bulb-outs	dedicated lanes
		transform 17 Ave SE into a multi-modal urban boulevard	

5)Preserve open space, agricultural land, environmental beauty and critical environmental areas	Maintain and enhance open space in the community	Improve recreation infrastructure in Elliston Park	Create an education centre at Elliston Park
		Provide for all-weather activities (e.g. skating, skiing) in Elliston Park	N
		Retain existing neighbourhood parks	Y
	create new infill greenspaces at 36th, and 44th	passive greenspace as community gathering spaces	
		Buildings fronting onto green space	
		straddle green corridor to maximize size and to encourage traffic calming (what	
		landscape: grassy, trees (native species), low impact maintenance, naturalized landscaping, shrubs	
		unstructured recreation activities	
	Connect the greenspace network	connect anchors (Elliston Park and the Escarpment) via a multimodal SE17th, green streets on 14th and 23rd.	
		Connect existing green spaces/pockets	
	Preserve views to city and mountains	Identify and preserve view corridors from key locations in the community	Y
	Improve ecological function	decrease salinity	?
		increase number of trees (biodiversity, shading)	Y
		reduce microclimate effect	Y
6)Mix land uses	Mix uses at neighbourhood, block and parcel scales	Concentrate retail, service and commercial uses on the corridor, with residential behind	Y
		Include civic uses (e.g. libraries, community centres, cultural centres, recreation facilities	Y
		Locate mixed-use buildings on the corridor	Y
		Retrofit existing large format retail with residential above	Y

7)Strategically direct and manage redevelopment opportunities within existing areas	Intensify underutilized parcels	Reconfigure large format stores into more walkable retail	Y
		Retrofit existing large format retail with residential above	Y
	Use a density gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use to step down to quiet, single-family neighbourhoods	Y
	Grow vertically rather than horizontally	Stack uses and spaces (e.g. mixed-use buildings with underground parking and accessible rooftop green spaces)	Y
8)Support compact development	Use a density gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use to step down to quiet, single-family neighbourhoods	Y
	Grow vertically rather than horizontally	Stack uses and spaces (e.g. mixed-use buildings with underground parking and accessible rooftop green spaces)	Y
	Create focal points along the corridor	Create a 100% corner at the intersection of major arterials, which serve as focal points and activity nodes	Y
		Locate multiple nodes along the corridor	Y
		retail at grade everywhere along 17 Avenue SE	
	Support and encourage effective transit service	Locate higher density close to transit	Y
9)Connect people, goods and services locally, regionally and globally (CONNECTIVITY)	Improve route connectivity for non-auto transportation	Strengthen pedestrian and bike links among key community destinations	Y
	Improve north/south connections across SE17th	green 36th and 52nd Streets as multi-modal	
		green 44th (public transit, pedestrians, cycling)	
	provide pedestrian connections to major open spaces	connect anchors (Elliston Park and the Escarpment) via a multimodal SE17th, green streets on 14th and 23rd.	
	provide rapid East / West connections for public transit	Develop SE 17th as a multi-modal urban boulevard	
	Support and encourage effective transit service	Locate higher density close to transit	Y
		Establish free community transit on SE 17th Ave.	N
		provide good local transit	

10)Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens (SERVICE)	Connect to surrounding neighbourhoods using alternative transportation	Create pedestrian and bicycle links into adjacent neighbourhoods	Y
	Support and encourage effective transit service	Locate higher density close to transit	Y
		Establish free community transit on SE 17th Ave.	N
		Include dedicated bus lanes, signal priority and bus bulb-outs	
	Use a density gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use, to step down to quiet, single-family neighbourhoods	Dedicated lanes
	Explore various options for transit service	dedicated right-of-way, median-based transit - prioritizes regional role of 17 Ave SE	Y
		curb lane option - prioritizes local transit for community	
11)Utilise green infrastructure and buildings	Use a density gradient	Locate multi-family housing such as apartments, townhouses and rowhouses behind intensive corridor mixed-use, to step down to quiet, single-family neighbourhoods	Y
	Grow vertically rather than horizontally	Stack uses and spaces (e.g. mixed-use buildings with underground parking and accessible rooftop green spaces)	Y
	Design with the sun in mind	Locate higher buildings on the north side of the urban boulevard and lower buildings on the south to achieve density while permitting sun penetration	Y
		Design south-facing buildings for passive-solar heating	Y
		Incorporate photovoltaics on south-facing buildings	Y
	Include green design in all new development	Design for energy-efficiency and alternative energy	Y
		Design all new community buildings to LEED standards	N
	Make greenspace productive	Use planting strips, medians, and green open spaces for stormwater treatment, air cleaning, and for termperature management	Y
		Increase use of permeable surfaces	
		integrate commuity gardens where feasible	
		improve ecological function	