FINAL THESIS REPORT

FOR A PROPOSED MULTIMODAL TRANSIT STATION

IN DOWNTOWN CALGARY.

SUBMISSION DATE: FEBRUARY 8, 2001
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TABLE OF CONTENTS

ABSTRACT

Given increasing commuter numbers, the potential for LRT expansion, increased tourist volumes and the need for more environmentally conscious modes of transportation the need for a multimodal transportation node is feasible. Constructed within the urban context such a function takes on the role of a gateway structure.

This project located at the site of the Calgary Tower is comprised of a LRT/rail station and bus terminal with a conceptual design for mixed use development in the site adjacent. Relocating the existing railway below grade allows for direct connections at grade level across currently unbridgeable space.

INTRODUCTION

Given the potential growth of Calgary's transportation system due to increased commuter ridership and tourism this project proposes a design solution that may go in part way to accommodate the future transportation requirements of the city. Furthermore the proposal is an attempt to introduce a facility that functions as an arrival point into the city core. Inclusive in the proposal is an attempt to address the divisive nature of the railway within the Calgary context. As an urban design solution the project attempts to address the existence of the railway as a generator of urban form while presenting a possible solution to mitigating this division. The project proposes a design for a multimodal transit facility with a conceptual solution for bridging the railway, linking the city core with the south downtown.

ACKNOWLEDGEMENTS

I would like to acknowledge the following individuals for their contributions to this project. John Morel, Dale Calhoun, John Chaput and Brian Sullivan for information provided in determining the feasibility of this project. Keith Hall for documentation of the existing Palliser Square and providing drawings for the site. Ted Loucks, Brian Tomachek and Bryan Roney for their engineering expertise. Thanks to Brian for his costing assistance. Doug Craig for his encouragement. Paul Maas and Lloyd Ostrinsky for their advice and support. RAIC Syllabus Programme national director Douglas Gillmor, provincial coordinator Gary Milton and the committee members Rick Lee, Nick Vale and Hong Yan for their critical eye. Finally to Katherine without whose love and presence, aside from typing abilities none of this would have been possible.

RESEARCH DOCUMENTATION AND ANALYSIS

FOR A PROPOSED MULTIMODAL TRANSIT STATION

IN DOWNTOWN CALGARY.

List of Figures

1.1 Thesis Objective:

Transportation systems are a strong determinant of urban form, past and present. The advent of rail technology and the subsequent construction of the Canadian Pacific Railway has had a profound effect on the evolution of the urban form of prairie centres. Gridiron layouts imposed a coherent imprint onto a landscape previously little disturbed by immigrant settlement (Figure 1). This imprinting established the basis to which future growth responded. The rectilinear plan of the central business district of Calgary arose for these reasons, the creation and implementation of the Mawson plan[1] being a response to alleviating and beautifying the city in part through mitigating the effect of the grid (Figure 2). One issue the Mawson plan could not address was the bisecting of city by the railway.

Positive in respect that an 'edge'[2] gives strong imageability to form, the railway can also be seen as a cause for the marginalization of adjacent sites due to factors such as noise, vibration, air quality, view and as a physical barrier limiting potential connections and interactions between opposite sides physically bisected by the tracks. These spaces are aptly described in Finding Lost : Theories of urban design by Roger Trancik as follows:

> "Lost space is the leftover unstructured landscape at the base of highrise towers or the unused sunken plaza away from the flow of pedestrian activity in the city. Lost spaces are the surface parking lots that ring the urban core of almost all American cities and sever

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1 Mawson Plan, Calgary Then and Now

2 Lynch, Kevin. The Image of the City. Cambridge, Massachusetts, M. I. T. Press, 1960. A study of city form and its impact and effect on legibility and imageability. A study that proposes that urban form is defined by its elements including, paths, edges, districts, nodes and landmarks.

> the connection between the commercial centre and residential areas. They are the no man's land along the edges of freeways that nobody cares about maintaining, much less using. Lost spaces are also the abandoned waterfronts, trainyards, vacated military sites and industrial complexes that have moved out to the suburbs for easier access and lower taxes. . . Generally speaking lost spaces are the undesirable urban areas that are in need of redesign - antispaces, making no positive contributions to the surrounding or user."[3]

The objective of this thesis is twofold: a strategy for intervention and reclamation of lost space in Calgary's Beltline and an exploration of the potential for viable connections between areas divided by the railway while recognizing and reasserting the significance of the railway as a generator of urban form. The built form proposed to achieve this objective is a multi-use project incorporating at its core a new transit node with supporting civic uses and ancillary residential and commercial components.

The Beltline contains the Calgary downtown to the south, encompassing the area south of the railway right of way to 17th Avenue and bounded east and west by 1st Street East and 14th Street respectively with the Bow River as a natural barrier to the north, east and west. The north edge necessitates bridges and underpasses as connecting forms to address the needs of vehicular and pedestrian movement into and through the city core. Resolution of the problems created by the railway are more problematic than the natural barriers. To date the response has been two dimensional, to bridge over the railway with utilitarian parking structures that, to address the needs of increasing vehicles numbers,

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3 Trancik, Roger. Finding Lost Spaces. New York, Van Norstrand Reinhold, 1986.

and to go under with roadways and sidewalks. Both do little to add to the richness of the city's fabric. An opportunity exists particularly along the northern edge of the Beltline to explore the possibility of habitable forms to connect the core and Beltline, to utilize the lost space of the railway and enhance the connections between the core and periphery, increasing accessibility and enhancing the vitality of both the downtown and south downtown areas.

1.2 Rationale: Main Factors that Justify the Design of a New Transit Station.

Decentralization is inevitable with the growth of the city and the overwhelming use of the automobile. The current Calgary Transportation Plan (Vision 2024)[4] indicates planning trends that although retaining a central city downtown core in terms of leaseable office space, services and cultural and retail facilities envision the growth of two other major concentrations of employment in "minidowntowns" to serve the increasing suburban areas (Figure 3). The primacy of maintaining a strong downtown core as the heart of the city is paramount to ensure its legibility and identity. Secondly given the current trends in volumes of visitors to Calgary and its surroundings, particularly Banff and Edmonton, and given the subsequent increase in vehicular traffic, alternate modes of transportation to the downtown core and points beyond will alleviate loads on roadways and significantly reduce the subsequent negative environmental impact (Figure 4). Given that only a finite amount of space exists downtown for future development and given the extent of the Beltline, a rationale exists for the exploration of a prototypical urbanizing solution. The

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4 Vision 2024. City of Calgary Publication. 1997.

design of a new multimodal station with ancillary uses presents an effective programmatic solution to the above stated problem.

1.3 A Background To The Idea Of An Urban Gateway: The Significance Of Three Modes Of Transport On The Development Of Cities: A Brief Overview.

The Automobile:

The development of the automobile produced a significant change in the nature of the North American city with the tendency towards decentralization and suburbanization, both being products of increased mobility. Reduction in the density of land use occurred as the freedom of movement afforded by the motor vehicle precluded the necessity of concentrated land use due to restricted accessibility. As pointed out by George Nader in Cities of Canada, [5]

> "There is a correlation between the shift of industrial land use to the urban periphery and residential/retail/service decentralization. Relocation of industry due to land costs and accessibility to transportation networks; airports, railway, port or expressway has promoted the shift and reduction in density of residential uses in that residential areas have followed industry in an attempt to retain close proximity to the workplace. Similarly retail uses have followed the population, but also in accordance with economics, have relocated to the periphery to offset increased costs in the C.B.D. Large retail malls at the periphery have a viable economic base in suburbia. "

As populations moved out of the centre so decreased the vitality of the core. The movement of services, cultural and entertainment venues to a closer proximity to this

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[5] Nader, George. Cities of Canada, Vol. 1 and Vol. 2. Theoretical and Historical Planning Perspectives. Toronto, McLelland Stewart, 1975.

migrating or removed population only served to exacerbate the problem of the decline of the city core. Examples of liveable cities commonly have a dense multi-use urban core with a significant residential population that enervates it. In Calgary's case therefore any increase in the base residential population within the downtown area and the increase in supporting services and functions will only serve to benefit the liveability of the central core.

The Railway

Development of the railway system had a profound effect upon the nation building process. Prior to confederation the first railways were built in present day eastern Canada in the mid 1830's. The construction of the Canadian Pacific Railway, as a condition written into the Constitution Act of 1867 initiated the development and urbanization of the Canadian west, being the most significant factor to the growth of urban centres from Winnipeg west. Bringing with it the influx of new immigrants and the need for key supply and transfer points for agricultural resources, and conversely as supply points for the new inhabitants of these regions, the West, as a source of agricultural produce and primary resources integrated with the established manufacturing centres of Central Canada. The Dominion Lands Act of 1872, using a square survey system, saw the division of arable prairie land into square townships based on the 36 sections (640 acres per section) per township. Legislated land use saw set amounts of land set aside for particular uses, for example, two sections in every township reserved for the support of education. The national railway was financed through a system of land subsidies, these

finances coming from the sale of Dominion lands to specific colonization companies, companies that promoted immigration to and settlement on land purchased from the government. The populating of the prairies was based upon a particular pattern.

> "There is a certain typical prairie town life cycle. It is precipitated by the rather explosive concurrence of the railway, rural settlement on cheap homestead land, and Red Fife grain which because of its short maturation period eludes the bite of the prairie frost. The town is designated as a railway divisional point, there is a sudden increase in homestead entries in the region and it takes off. "[6]

This essentially typified the development of Calgary as an urban centre. In 1881 Calgary had an established population of 78, mainly inhabitants associated with the Northwest Mounted Police and the Hudson Bay Company. By 1883 the population increased dramatically with the selection of the settlement as a divisional port of the C.P.R.

Urban growth and land use patterns in Calgary were particularly affected by the construction of C.P.R. Due to land costs the railway constructed its station west of the Elbow River and the original townsite; the core of the city shifted accordingly. Industrial and warehouse uses developed along both sides of the railway line, with the central business district developing between the boundaries of the Bow River and the railway track. This area developed along the gridiron plan, ubiquitous to many developing prairie centres . Presently the C.B.D. is still bounded by the Bow River and the railway, also within these boundaries being located the major concentration of business, services and cultural uses.

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6 Gertler, Leonard. Making Man's Environment, Urban Issues

The Airplane

The development of air travel effectively reduced the scale of the human world, making almost any point on earth accessible with the current technology. The reductionism does not however mitigate the fact that as an air passenger the process of arrival and departure from urban centres usually occurs at the periphery. Noise reduction/attenuation, air safety and simply spacial requirements for runways in most cases ensures the locating of the airport on an urban centre's periphery. Therefore what has become a key modern day gateway to a city is actually required to be located the furthest from its centre.

Summation

Modes of transport are significant as generators of urban form. Land use becomes inextricably tied to the modes and paths of transportation which in turn profoundly affects the means by which the individual perceives and orients within the urban context. Through the continuing process of decentralization due to modes of transport the days are past when the railway station was the principal gateway to the city. Amalgamating various modes of transportation to a centralized built form as landmark may be the means by which to recreate a sense of arrival to the heart of the city, replacing and reinterpreting the historical precedent of the railway terminus.

The station, be it airport, train or bus station is a port of entry into the city and at the same time a transitional space between the "here" and "there", the point of departure and the destination, an interstitial space. This perhaps is the main reason for the development of

a program which encompasses the idea of the proposed built form as a major civic space, its functional elements surpassing the use of the space solely as a station. Historically the railway station in major centres achieved its grandeur through its classical edifice, form and volumetrics. A new form is required for a new building type within the downtown core that reinterprets the poetics of the bygone era (Figure 5 and 6). A transport interchange that will function as an interstitial space, an area of juncture and convergence between modes of transport (interchange), convergence of districts (as bridge between north and south) and as a convergence and assembly of functions that vitiate the heart of the city.

In Calgary's case with the continued growth and need for revitalization of the downtown an argument could be put forward for the removal and relocation of the railway and the integration of these lands into the urban core, however the economic feasibility of such a scenario is restrictive. Projects such as Palliser and Gulf Canada Square have attempted to address the challenges of integrating these spaces into the expansion of the Calgary's downtown. These projects however have viewed the railway as a liability to the core whereas the more appropriate response may be to approach the problem as a means to generating forms that could in fact inform and reassert the significance of the railway as generator of urban form.

The following summation regarding the Queensway Freeway in the recent Urban

Gateways Competition[7] may be applied to Calgary's railway, "the moment the freeway was considered as urban form, as a topic of consideration, was the moment it passed into history as an artifact of another time and economy."

2.1 Program and Rationale

Major Programmatic elements:

1. Multimodal Transit station: bus, taxi, private automobile and rail connections, including connections through to LRT system.
2. Civic and leisure centre component incorporated within transit station structure.
3. Business/tourist hotel
4. Residential component including live/work studio components
5. Ancillary retail/leasable spaces

Rationale of Program

1. Interurban transit between Calgary/Edmonton is not necessarily best served by air travel, departure and arrival points being located at both cities peripheries. An economic and environmental justification exists for a rail connection between both centres.

2. Tourism link, commuter service corridor serving Banff/Canmore and Calgary. Currently a significant percentage of visitors arriving by air bypass the Calgary downtown with bus connections through to Banff. The economic potential of this visitor population is

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7 Urban Gateways Competition Ottawa. R.A.I.C. Publication.

significant. The redirection of visitors through downtown would allow the city to accrue the benefits of an increased tourist market (Figure 3).

3. Development of transit station with civic, hotel and residential component will create a focal point to downtown.

4. The project can be tied into an overall urban scheme utilizing the Beltline's marginal lands. The final design could have a significant impact on the image and character of the downtown, particularly if established as a prototype for future Beltline development.

5. The design is to be a comprehensive scheme serving as a destination point for local and visitor populations; a unique built form combining residential/commercial/institutional and public use.

Program Elements: Detailed Rationale

Rail/transit station: The resurgence of passenger rail.

Justifications:

> "Airports are reaching gigantic proportions, taking them further and further away from city centres. The air passenger therefore has to make a land based journey of up to 50km before and after the air trip and their cumulative length, together with the duration of formalities is sometimes longer than the direct air journey itself. Finally, for a direct air journey in a subsonic jet plane, the commercial speed between city centres ranges between 150km/h

for 400-500 km."[8]

Based on the above conclusion commuter rail travel remains competitive with commercial air travel over trips of a maximum duration of 2½-3 hours as an airplane cannot provide a significant reduction in total travel time. Competition remains with the automobile, particularly in North America, despite increased traffic loads on roadways, fatigue from road travel and greater accident potential. We are not as a whole willing to give up the convenience, or perceived convenience, of our automobiles.

The potential exists for an economically viable rail connection between the downtown's of Alberta's two major urban centres despite the current lack of a population base similar to the Toronto/Windsor corridor, where commuter rail has proven to be profitable

> "Rail could possibly become competitive with air travel if the Edmonton Industrial Airport were closed for some reason. ... It is likely that existing rail facilities will become inadequate, and consideration will have to be given to expanding existing parking and station facilities at the urban interface."[9]

Travel time are similar between air and rail travel. Whereas rail travel is comparatively slower in terms of speed, point to point travel from downtown to downtown effectively eliminates the need for transfer to ground transport from airport (periphery) to downtown.

The potential also exists for a future rail link through the Banff, Canmore, Calgary corridor with the increasing growth in tourism and the movement of resident populations beyond city

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8 de Font Gallard, Bernard. The Railway System, Press Syndicate of the University of Cambridge, 1984.

9 Edmonton/Calgary Corridor Study. 1974

boundaries as Albertans take advantage of opportunities offered by the relative ease of road connections and proximity between centres. Further to the potential of a local commuter system, the revival of rail travel through the Rocky Mountains has reestablished Calgary as the eastern terminus for these excursions (Figure 7). A new terminus would become a focal and arrival point for visitors to the city, with high visibility and strong imageability being paramount. The design furthermore would require establishing connections to the existing LRT system and would anticipate the future extension of this system to the vicinity of the Calgary International Airport. Currently significant tourist traffic is lost to downtown as visitors to the Banff/Jasper area bypass a visit to the city core completely. The design must accommodate the arrival and departure of individuals and groups by rail, private coach, city transit, and private automobile in addition to addressing pedestrian circulation through and within the built form.

Civic/Leisure Centre

The intent is to develop this component to expand on existing facilities available in the downtown core. Liveable cities inherently have live and vibrant cores that are inhabited at all hours with continuous use by any variety of users. Currently the majority of users of downtown arrive and leave with the hours of the workday. Programmatic elements should include uses that are functional over extended periods particularly before and after daytime work hours and for brief periods such as the noon hour, the ideal being to incorporate elements that would allow for 24 hour a day use. Furthermore an enclosed green space would contribute to green areas of refuge over the winter period. Given the relative ease of accessabilty to the fitness facilities such as the Eau Claire YMCA and to a lesser degree at Lindsay Park, sports facilities will look beyond

the norm of what is currently available. Civic spaces in a structure bridging the railroad with dynamic views onto a working element of the city offer a unique opportunity that will be incorporated into the design. The intent is to incorporate a combined children's museum and science centre as a major civic use, the activity and interest of the site serving as a stimulating visual background to the activity within.

Business/Tourist Hotel

Given the proximity to the new convention centre, its connection to the rail station and an increasing number of visitors to the city a rationale can be established for the integration of this function as a part of the overall program. The design should address the needs of the commercial traveller and tourist, anticipating stays of short duration. Facilities should cater primarily to the hotel user with access provided to the other components of the project. The construction of a new convention centre within close proximity to the proposed hotel negates the requirement for large convention space, although the design should incorporate facilities for gatherings of groups of up to 200. Recreation space would only be minimal due to proximity existing and proposed facilities

Retail/Leasable space

This element is incorporated into the project to provide a revenue generating base as well as providing for local residents and visitors. Particular elements to complement tourism would include facilities such as tourism information offices, tourist retail and currency exchange services.

Residential Component

To be designed with a component of live/work studios the introduction of this element serves not only to increase the availability of residential units within the downtown core but also introduces a residential population specifically to the project area, a permanent population ensuring a degree of perpetual use. This component of the project will complement the existing context with a design that is pedestrian oriented and sympathetic in use and scale.

2.2 Design Objectives: Public Realm

1. To create a comprehensive urban design proposal, unique in character for the marginalized lands of the Beltline, while enhancing imageability of downtown Calgary as a whole. The design is to incorporate a multimodal transit station as the basis for a gateway to the downtown core.

2. Urban design to contribute to the liveability of bordering zones; C.B.D., Downtown residential area and South downtown area through programmatic use and shared public space.

3. Address pedestrian linkages between C.B.D. and South downtown area including +15 connections.

4. Integrate existing parking structures on Beltline into new urban design scheme.

2.3 Design objective: Private realm

1. Create an economically viable proposition for a mixed use development linking bordering zones.

2. Design of dwelling units for mixed age and user groups providing good liveability.

3. Maintain existing railway line with modifications meeting needs of current landowner.

2.4 Design Objective: Technical

1. Develop design for minimal impact from railway, due to proximity, onto new structure.

2. Incorporation of existing parking structures into design scheme with minimal impact on existing structures and uses.

2.5 Design Principles

1. Public realm: Building use to enhance vitality of street level

   - Transparency (buildings that open onto street through view, atrium spaces, glazed walkways)
   - Climate control (weather protection, shading devices at interior/exterior.)
   - Street/Sidewalk (demarcation of pedestrian/vehicular realm. streets as major arterial routes, major pedestrian routes design with buffer to street. i.e. treeplanting/soft landscaping)

- Public/private spaces: access to public/semi-public/private spaces
- Continuous activity along indoor pedestrian routes
- Penetrable spaces along pedestrian routes, winter activities indoors that move outdoors in summer.

2. Vehicular Traffic: Maintain existing circulation patterns

- Minimize impact of new design proposal on 9th Avenue vehicular arterial through C.B.D. allow for pedestrian friendly sidewalk promenade and intersections.
- Minimize impact on railway access through downtown core/maintain existing surface route.

3. Pedestrian Circulation: Create pedestrian connections through/over Beltline

- Create interesting spaces.
- Through buildings, not around.
- Integration of exterior and interior pedestrian walkways. (With winter city ensure that interior pedestrian walkways visible from street to add vitality to street scene)

4. Landscaping: To contribute to public/private realm

- Cannot compromise public safety
- Create significant public green space for outdoor/indoor year round use. Outdoor space to incorporate winter city design principles (wind protection/sunlight orientation/heated outdoor space). Indoor spaces visible to outside.

- Utilize existing building structures to create outdoor landscape spaces.

5. Sunlight: Maximize sunlight exposure to public/private spaces

   - Utilize east/west orientation of site.

6. Massing: Relate to existing context

   - Maximize view and sunlight potential.
   - Relate to existing topography (at existing underpasses at railway).
   - Articulate create public/private spaces (viewpoints/ activity nodes/plazas).
   - Determine proper scale, height, density
   - Create significant landmarks
   - Provide visible/physical penetration at street level

7. Views: Create viewpoints into/out of rail area

   - Maximize views above street level

8. Ordering Devices: to give coherence to built form (include landmarks, activity nodes, viewpoints)

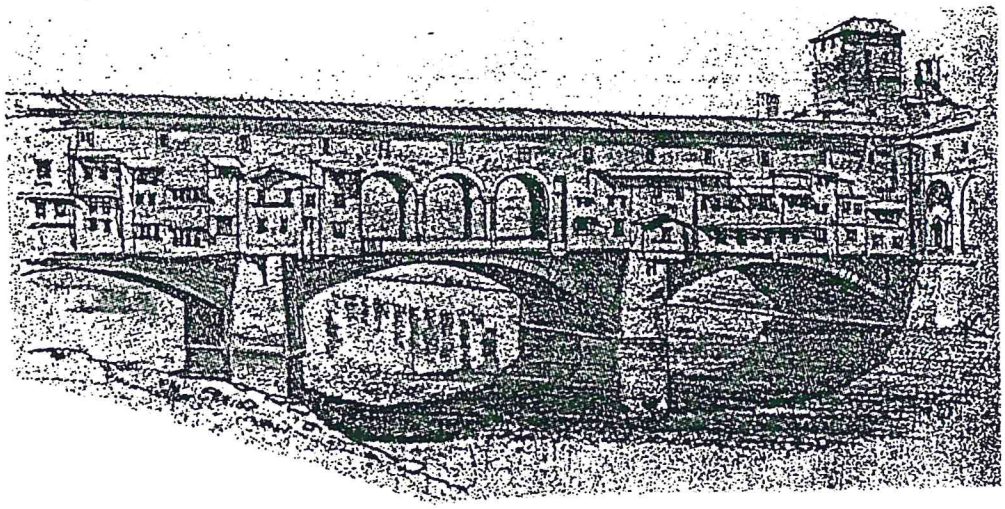
2.6 Precedent Buildings

Ponte Vecchio

Location: Florence, Italy

Construction Date: Originally constructed Roman Period, rebuilt 1117 A.D.; current construction, 1345 A.D.

Description: A habitable bridge originally constructed in Roman Times, destroyed by floods and reconstructed in current form in 1345 by Neri di Fioravante. Resting on three arches, the walkway was flanked either side originally by butcher shops which were replaced by goldsmiths in the 16th century who were responsible for the current form with shops cantilevered along the bridge's perimeter. The existing corridor constructed by Georgio Vassari connects the Palazzo della Signoria with the Palazzo Pitti on opposites sides of the Arno River. Currently the bridge is lined with a variety of shops as opposed to being locale of specific craftsmen.



Citta Nuova

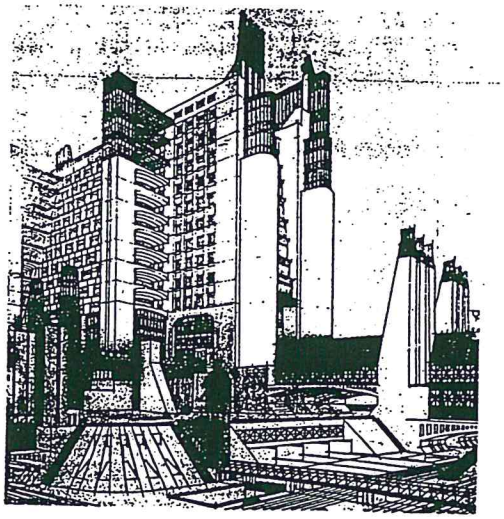
Architect Antonio Sant Elia

Design: Proposal for future of urban form exhibited 1914

Description: A proposal for the future city envisioning and extolling the virtues of technology. From the Messagio, recognized as the Futurist manifesto,

> "Modern structural materials and our scientific concepts do not lend themselves to the disciplines of historical styles. . . . We no longer feel ourselves to be the men of cathedrals and ancient moot halls, but men of the Grand Hotels, railway stations, giant roads, colossal harbours, covered markets, glittering arcades, reconstruction areas and salutary slum clearances. We must rebuild *ex novo* our modern city like an immense and tumultuous shipyard, active mobile and everywhere dynamic, and the building like a gigantic machine. . . . The street which, itself, will no longer lie like a doormat at the level of the thresholds but plunge storeys deep into the earth, gathering up the traffic of the metropolis connected for necessary transfers to metal catwalks and high speed conveyor belts."[10]

Although never built the imagery of this Futurist project would influence the Russian Constructivist movement in the 1920's and later, in the 1930's, the Italian Rationalists.



10 Frampton, Kenneth. Modern Architecture, A Critical History. London, Thames & Hudson, 1985.

Lausanne - Bridge City

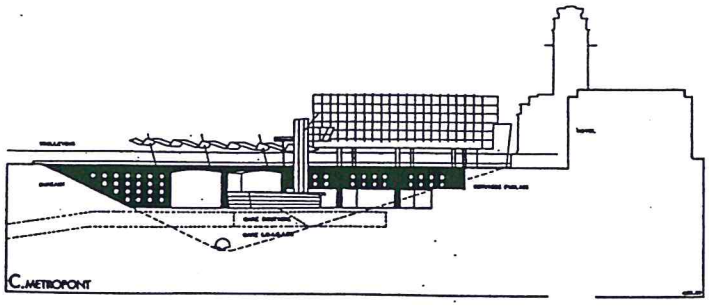
Architect: *Bernard Tschumi*

Location: Lausanne, Switzerland

Conceptual Design: 1988

Description: An obsolete industrial site located in a valley within the very heart of the city creates a no mans land effectively dividing the core of the city in two. The design problem is how to transform the site and effectively connect the two adjacent sides of the valley. The problem is resolved by a design incorporating bridge structures, borrowing on an existing typology inherent due to the topography of the city, and by making the forms habitable, introducing a new activities to the heart of the city.

> "The scheme's primary spatial elements then are the inhabited bridges. As functional supports, the four new structures augment the existing system of bridges and create a new density of spatial relationships and uses. Along the valley's north south axis, the inhabited bridge cities use the program to link two, parts of the city in conflict both in scale and character. . . . The individual programs then give each a specific character, allowing the inhabited bridge to function as an urban generator. The concept of the urban generator not only allows new spatial links with the existing city but encourages unpredictable programmatic factors, new urban events that will inevitably appear in upcoming decades."[11]



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11 Tschumi, Bernard. Event Cities. Rome, The MIT Press, 1995.

Grand Central Terminal

Architect: Warren and Wetmore

Location: East 42nd Street, New York

Constructed: 1903-1913

Description: With the development of railway technology, increased use and passenger flow, a series of stations were built on the site of the existing Grand Central Terminal. The existing terminal represents the apogee of an era with a design that dwarfs the user with its volume and height (the main concourse reaching to an interior height of 110 feet. The design carefully directs the flow of passengers within,

> "As an urban monument, Grand Central Terminal Stages an elaborate spectacle whose mythical object is the metropolitan crowd; as a piece of engineering, it orchestrates an immense flow of circulation".

It is this form that serves as the typology for the grand railway station and can be traced to recent station projects such as the Waterloo Terminal by Richard Grimshaw in London. The terminal has been described as a microcosm of the city by assuming some of the variety of its commercial activity,

> ". . . such activities as visiting an art gallery, borrowing books, listening to music and seeing an exhibit of railroad antiques. The terminal soon became a destination in and of itself, a place to spend hours as a shopper or spectator, without any intention of boarding a train."[12]

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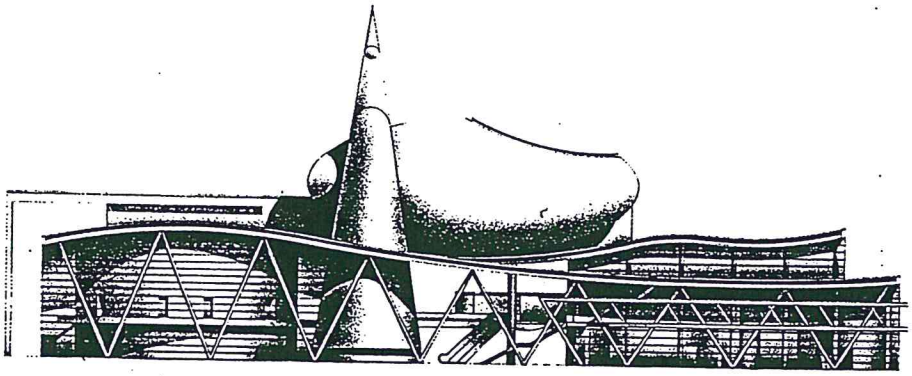
12 Raynsford, Anthony. "Swarm of the Metropolis: Passenger Circulation at Grand Central Station and the Ideology of the Crowd Aesthetic.", Journal of Architectural Education, Volume 50, No. 1, Winter 1995. (pp. 117-128)

Ferry Terminal and museum

Architect: Shin Takamatsu

Location: Mihonoseki, Japan

Description: This civic building design incorporates two main functions; a ferry terminal and a museum component to house a meteriote which has become a tourist attraction. It is an example of a matching of two distinct programmatic elements, one transportation based, acting in symbiosis with one another. Strong volumetrics define the individual programmatic elements.

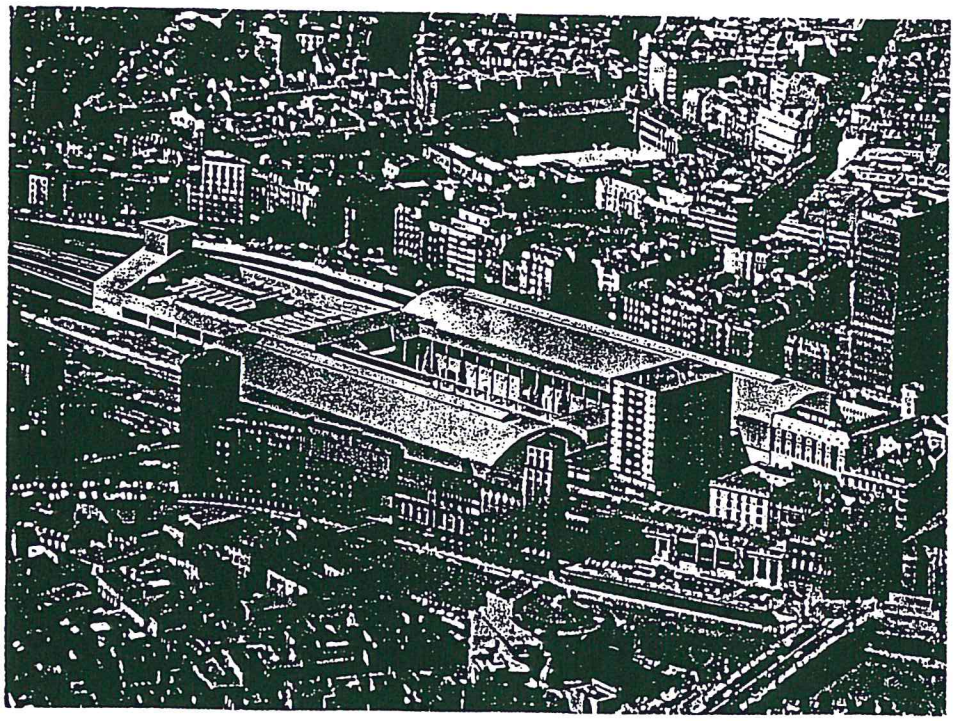


Abando Passenger Interchange

Architect: James Stirling, Michael Wilford & Associates

Location: Bilbao, Spain

Description: Designed as a transport interchange incorporating a bus station, metro station and train station this project serves as a terminus for several independent railways. Being situated on a raised landfill site allows for transport related circulation to take place on a variety of levels. The site location, between the old and new town calls for a design that serves to bind together two adjacent contexts. Amalgamating retail space, leasable space and an enclosed central plaza with the transportation station for a multiplicity of functions creates a design that serves as a new centre and connector for two distinct districts within the city as a whole.



Overview and Conclusion of Review of Precedent Building Types:

Habitable bridging structures over marginal spaces serve as significant connectors at marginal sites and with multiple civic functions contribute significantly to the urban context. Terminals for various modes of transportation are recognized as being able to contribute significantly to the context of the urban core particularly when designed to accommodate other civic functions. A multiple level circulation pattern is predominant means of dealing with circulation requirements of transportation node. This obviously is the most efficient means to deal with spatial constraints of sites located within the urban core. It should be noted that in most examples of railway terminals reviewed the railway is either subterranean or elevated relative to street level. From a design standpoint this allows for movement to goal, platform or exit, to take place on the vertical plane in one direction only . Vehicular paths, as for example within the Calgary context, with directional flow continuous through the site at street level requires the pedestrian access to be movement in both directions when presented with more than one rail platform.

The significance of the building type as statement has not been lost. Current designs allude to the historic grandeur of the built space both in volumetrics and in the expressions as engineered structure epitomizing the spirit of the age. Where now historic buildings example illustrated the technological advances of the age through the construction of the rail sheds, similarly new constructions such as Waterloo station by Richard Grimshaw, or the much smaller scale Standelhofen station by Santiago Calatrava are undisputedly technological as well as poetical statements in their own right.

PROGRAM AREA		
PROGRAM SPACE	**SPATIAL REQUIREMENT**	
BACK OF HOUSE	475 m^2 TOTAL AREA (5110s.f.)	Functions critical to daily operation of hotel. Service areas typically not open to public view, nor with direct access to public spaces within hotel.
GENERAL STORAGE	140m^2/1500s.f.	
LOADING DOCK	28m^2/300s.f.	
RECEIVING AREA	33m^2/350s.f.	
RECEIVING OFFICE	11m^2/120s.f.	
PURCHASING OFFICE	11m^2/120s.f.	
LOCKED STORAGE	14m^2/150s.f.	
EMPTY BOTTLE STOR.	14m^2/150s.f.	
GARBAGE HOLDING AREA	19m^2/200s.f.	
REFRIGERATED GARBAGE	9m^2/100s.f	
RECYCLING	19m^2/200s.f.	
GARBAGE COMPACTOR	23m^2/250s.f.	
ENGINEERING	159m^2 TOTAL AREA (1700s.f.)	Department responsibility to oversee functioning of hotel from mechanical/electrical aspect. Also includes maintenance/repair of systems/equipment within hotel.
ENGINEERING OFFICE 1	11m^2/120s.f.	

ENGINEERING OFFICE 2	9m²/100s.f.	
CARPENTRY	14m²/150s.f.	
PLUMBING	14m²/150s.f.	
ELECTRICAL	14m²/150s.f.	
PAINT SHOP	14m²/150s.f.	
TELEVISION REPAIR	11m²/120s.f.	
KEY SHOP	7m²/75s.f.	
ENERGY MANAGEMENT COMPUTER ROOM	9m²/100s.f.	
ENGINEERING STORE ROOM	56m²/600s.f.	
EMPLOYEE CAFETERIA	93m²/1000s.f.	
PERSONNEL	77m² TOTAL AREA (830s.f.)	Staff maintenance/control/ records. Direct relationship with public space not required.
TIMEKEEPING	11m²/120s.f.	
SECURITY	11m²/120s.f.	
PERSONNEL RECEPTION	14m²/150s.f.	
PERSONNEL MANAGER	14m²/150s.f.	
INTERVIEW ROOM	9m²/100s.f.	
FILES/STOR./REPRO.	9m²/100s.f.	
FIRST AID	9m²/100s.f.	
LAUNDRY/HOUSE-KEEPING	381m² TOTAL AREA (4100s.f.)	Laundry facilities /control / supervision point for housekeeping staff.

SUPPLIES/STORAGE	132m²/1420s.f.	
SOILED LINEN	14m²/150s.f.	
LAUNDRY	112m²/1200s.f.	
LAUNDRY SUPERVISOR	9m²/100s.f.	
HOUSEKEEPER	12m²/130s.f.	
ASST. HOUSEKEEPER	9m²/100s.f.	
LINEN STORAGE	140m²/150s.f.	
UNIFORM ISSUE/STOR	46m²/500s.f.	
SUPPLY STORAGE	9m²/100s.f.	
LOST AND FOUND	9m²/100s.f.	
SEWING ROOM	9m²/100s.f.	
CHANGING ROOMS	TOTAL AREA 168m² (1800s.f.)	Staff changing rooms incl. locker, showers and washroom facilities.
MENS	75m²/800s.f.	
WOMENS	93m²/1000s.f.	
KITCHEN	TOTAL AREA 495m² (5300 s.f.)	Main kitchen area functioning as central food preparation area for all food services provided (restaurant, banquet, lounge/bar and room service).
COOKING AREA	280m²/3000s.f.	
BANQUET AREA	55m²/600s.f.	Holding area,final preparation area for banquet/conference facilities
ROOM SERVICE	22m²/240s.f.	

FOOD STORAGE INCL. DRY FOOD, REFRIGERATED BEV. STOR.,BEV. STORAGE	138m²/1500s.f.	
FOOD CONTROLLER OFFICE	9m²/100s.f.	
W/C'S	11m²/120s.f.	
FRONT OFFICE	TOTAL AREA 152m² (1650s.f.)	Area of initial direct contact between guest and hotel. Registration area, guest services.
FRONT OFFICE MANAGER	11m²/120s.f.	
RESERVATIONS MANAGER	20m²/220s.f.	
RESERVATIONS	11m²/120s.f.	
TELEPHONE OPERATOR	14m²/150s.f.	
FRONT DESK	19m²/200s.f.	
WORK AREA	19m²/200s.f.	
ASST. MANAGER	11m²/120s.f.	
ROOMS ASST. MANAGER	11m²/120s.f	
SAFE DEPOSIT	7m²/75s.f.	
CASHIER	11m²/120s.f.	
COUNTING ROOM	11m²/120s.f.	
BELLMAN'S DESK	7m²/75s.f.	
LOBBY	325m² (3500s.f.)	Main entry point into hotel. priority area for clarity of space, circulation, function

ACCOUNTING OFFICE	TOTAL AREA 99m^2 (1070s.f.)
COMPUTER	11m^2/120s.f.
CONTROLLER	11m^2/120s.f.
ASST. CONTROLLER	11m^2/120s.f.
BOOKKEEPING	11m^2/120s.f.
COPY/STORAGE	11m^2/120s.f.
PAYROLL	11m^2/120s.f.
CREDIT MANAGER	11m^2/120s.f.
RECEPTION	11m^2/120s.f.
CASHIER	11m^2/120s.f.

EXECUTIVE SALES OFFICE	TOTAL AREA 205 m^2 (2200s.f.)
RECEPTION	19m^2/200s.f.
GENERAL MANAGER	19m^2/200s.f.
SECRETARY	9m^2/100s.f.
FUNCTION BOOKING ASST. MAN.	17m^2/180s.f.
CONFERENCE ROOM	19m^2/200s.f.
W/C'S	11m^2/120s.f.
DIR. PUBLIC RELATIONS	14m^2/150s.f.
SECRETARY	9m^2/100s.f.
SALES DIRECTOR	14m^2/150s.f.
SALES/CATERING SECRETARY	9m^2/100s.f.
SALES REP.	30m^2/320s.f.

FUNCTION BOOKING	7.5m²/75s.f.	
CATERING MANAGER	14m²/150s.f.	
BANQUET MANAGER	14m²/150s.f.	
CONVENTION SERV. MANAGER	11m²/120s.f.	
BANQUET/CONFERENCE/ FUNCTION	Total area 330 m² (3600s.f.) 3@100 persons @1.1 m² per person. (not incl. breakout space)	
RECREATION	TOTAL AREA 369m² (3975s.f.)	
POOL	230m² /2500s.f.(INCL. DECK AREA)	
WHIRLPOOL	9m²/100s.f.	
CHANGE/W/C'S/SAUNA	46m²/500s.f.	
EXERCISE ROOM	46m²/500s.f.	
POOL PUMP/FILTER	19m²/200s.f.	
EQUIP. STORAGE	19m²/200s.f.	
SUITES	TOTAL AREA 10230m²/ 110000s.f. (400 SUITES)	
PARKING REQUIREMENTS	MIN. 1 STALL PER 3 SUITES	MIN. REQUIREMENT 133 STALLS

TRANSIT STATION	TOTAL AREA 1730m^2 (18630s.f.)	Consolidation of modes of transportation into one central interchange incl. rail, LRT, public transit, private bus services, taxis, private automobiles and pedestrian traffic.
TICKET COUNTER (11 positions)	55m^2/600s.f.	Assume 1 station per 25-30 waiting area seats, with approx. 50-60s.f. per station. 325m^2
ADMINISTRATION OFFICES	37m^2/400s.f.	4 offices @ 9m^2/100s.f per office.
WAITING AREA/ LOUNGE	930m^2/10000s.f.	Assumes one seat per 3 passengers/simultaneous arrival/departure of 2 trains, therefore 2 platforms min. Approx. 350 passengers per train = 700 passengers at 1 time at station. Area calculation based on gate/lounge requirements for airplanes.(Similar to Boeing 747 at 560m^2/6000s.f.) assume 2 at 464m^2/5000 s.f. at 930m^2/10000s.f.. Seating required 1 per 3 passengers = 340 seats total.
WASHROOM FACILITIES	93m^2/1000s.f.	700 passengers = 350 males at 11 w/c's 350 females at 11 w/c's
BACK OF HOUSE	TOTAL AREA 170m^2/1860s.f.	
CLERICAL/RECEIVING OFFICES	33m^2/360s.f.	

DRY STORAGE/EQUIPMENT	$27m^2$/300s.f.	
JANITORIAL	$19m^2$/200s.f.	
SERVICE ENTRY/EMPLOYEE ACCESS/GARBAGE AREA (SHARED WITH BUS TRANSIT AREA)	$93m^2$/1000s.f.	
SERVICES (INCL. BUREAU DE CHANGE, TOURIST INFORMATION, TOURIST DIRECTED RETAIL)	TOTAL AREA $420m^2$ (4500s.f.)	1.Bureau de change (kiosk) as per airport facility at $9m^2$/ 100s.f. 2.Tourist information including booking services for tours, hotels, event bookings and tickets sales plus general tourist information at $185m^2$/ 2000 s.f. 3.Newsstand/magazines at $70m^2$/750s.f. 4.Souvenir sales/toystore at $70m^2$/750s.f. 5.Telephones at $9m^2$/100 s.f. 6.Cafe/bistro (counter and free seating) at $70m^2$/750 s.f. (Supplemented by services available at retail/services at other areas within project)
BUS/TRANSIT COMPONENT	TOTAL AREA $665m^2$ (7160s.f.)	Assumes 6 motor coaches simultaneously including private intercity coaches, public transit buses and city tour buses.
TICKET COUNTER	$17m^2$/180s.f.	Assume 1 station per 25-30 waiting area seats, with approx. 4-$6m^2$/50-60s.f. per station.

ADMINISTRATIVE OFFICES	$33m^2$/360s.f.	Assume 3 offices at $11m^2$/100 s.f. per office
W/C'S	$46m^2$/500s.f.	230 passengers = 115 males at 6 w/c's 115 females at 6 w/c's
RETAIL	$93m^2$/1000s.f.	1.Newsstand/magazine at $46m^2$/500s.f. 2.Cafe/bistro at $46m^2$/500s.f.
WAITING LOUNGE	$465m^2$/5000s.f.	Assumes capacity at 38 passengers per coach = 228 total passengers maximum capacity. As per rail lounge 1 seat per every 3 passengers = approximately 80 fixed seats. Waiting area based on airline capacity = approx. $465m^2$/5000s.f.
CIVIC /LEISURE CENTRE		
ENCLOSED GREEN SPACE (INCL. CHILDRENS PLAY AREA)	$930m^2$/10000 s.f.	
CHILDREN'S MUSEUM	Total area $1400m^2$ (15100s.f.)	Philosophy/intent: to reflect the changing nature of the Calgary community and world community as whole. Arts/social sciences oriented museum as counterpoint to Science Centre.
EXHIBITION SPACE	$930m^2$/10000s.f.	Small scale exhibition area. Unstructured space to allow for full range of exhibits.

CLASSROOM AREA	85m²/900s.f.	Area to be utilized by visiting school groups. Area equivalent to typical school classroom to allow for range of activities. Independent of main exhibition space. Area to be closed off from main exhibit space. Potential to utilize space as lecture area.
LOBBY (INCL. CONTROL/TICKET AREA)	46m²/500s.f.	Congregation and control area for access to main exhibit space.
GIFTSHOP SALES	23m²/250s.f.	
W/C'S/CLOAKROOM	20m²/300s.f.	
BACK OF HOUSE	TOTAL AREA 290m²/3150s.f.	
COLLECTION STORAGE	93m²/1000s.f.	
WORKSHOP	83m²/900s.f.	
WORKROOM	56m²/600s.f.	
ADMINISTRATION	28m²/300s.f.	
STAFF ROOM	9m²/100s.f.	
LOADING/RECEIVING	23m²/500s.f.	
MECH/ELECTRICAL		
SCIENCE CENTRE	TOTAL AREA 1400m² (15100s.f.)	Small scale exhibition area as adjunct to existing facility currently located at west end of downtown. Philosophy to complement and enhance programs of school system, to engage interest of general public in science after leaving school.

EXHIBITION SPACE	930m²/10000s.f..	Small scale exhibition area. Unstructured space to allow for full range of exhibits.
CLASSROOM AREA	83m²/900s.f.	Area to be utilized by visiting school groups. Area equivalent to typical school classroom to allow for range of activities. Independent of main exhibition space. Area to be closed off from main exhibit space. Potential to utilize space as lecture area.
LOBBY (INCL. CONTROL/TICKET AREA)(POSSIBLY SHARED WITH CHILDRENS MUSEUM)	46m²/500s.f.	Congregation and control area for access to main exhibit space.
GIFTSHOP SALES (AS PER LOBBY ABOVE)	23m²/250s.f.	
W/C'S/CLOAKROOM	28m²/300s.f.	
BACK OF HOUSE	TOTAL AREA 293m²/3150s.f.	
COLLECTION STORAGE	186m²/2000s.f.	Service space to allow for collection and storage of exhibits. Connected directly to workshop area with access to exhibition area.
WORKSHOP	25m²/900s.f.	service space to allow for construction of new exhibits. Tied directly to main exhibition space and administrative area. Visual connection to exhibition area to allow for viewing of work in progress by visitors.
WORKROOM	55m²/600s.f.	

ADMINISTRATION	$28m^2$/300s.f.	Museum services including offices, library and documentation services.
STAFF ROOM	$93m^2$/1000s.f.	
LOADING/RECEIVING	$23m^2$/250s.f.	
STUDIO FACILITIES	TOTAL AREA	
5 STUDIO SPACES	$464m^2$/5000s.f. (5X1000 s.f..)	
ADMINISTRATIVE AREA		
FOYER	$18m^2$/200s.f.	
OFFICES	$37m^2$/400s.f.(4X100 s.f.)	
COAT/CHANGE	$5.5m^2$/60s.f.	
STAFF AREA	$14m^2$/150s.f.	
CIVIC CENTRE LEISURE FACILITIES		
INDOOR GOLF PUTTING GREENS	$930m^2$/10000 s.f.	
CLIMBING WALLS	$93m^2$/1000s.f.	
OPEN BOWLING ALLEY	$880m^2$/9500s.f.	
SKATING/RUNNING/ WALKING TRACK (INCORPORATED INTO GREEN SPACE)		
CHILDRENS ADVENTURE PLAYROOM	$464m^2$/5000s.f.	
VIDEO ARCADE	$185m^2$/2000 s.f.	
POOL HALL	$390m^2$/4200 s.f.	

INDOOR/OUTDOOR PERFORMANCE SPACE INCL. MOVIE PROJECTION	(INCORPORATED INTO GARDEN SPACE)	
OTHER USES CONNECTED TO LEISURE FACILITY		
BRANCH LIBRARY	325m^2/3500s.f.	
BOOKSTORE	140m^2/1500s.f.	
CAFE(S)	112m^2/1200s.f. EACH	
RESTAURANT(S)	325m^2/3500s.f. EACH	
CYBERCAFE	186m^2/2000s.f.	
BAR(S)	112m^2/1200s.f.	
RETAIL COMPONENT	TOTAL AREA VARIABLE APPROX. 92m^2/1000s.f. MODULE	Assumes 92m^2/1000s.f. commercial retail unit module.(based on unit at approx. 15'-30' Wx 50'-60' depth) based on pedestrian scale to provide diversity and scale.

RESIDENTIAL/LEASABLE COMMERCIAL SPACE COMPONENT		Assumes mixed residential retail configuration to address proximity to railway (acoustic control) Bilateral split, commercial space to provide buffer (on vertical plane at street level with min. 1 level separation between residential units and street, at railway commercial space to match residential levels up to approx. 6th stories above railway). Refer to preliminary design section.)
RESIDENTIAL UNITS	100 UNITS @ 70m2 /750s.f. 100 Units@112 m^2/1200s.f.	Mixed live/work studio's, 1 and 2 bedroom residential units. Market segment to include groups interested in living in close proximity to the CBD experiencing and contributing to the dynamics of the urban core.
COMMON AREA (LOBBY, COMMON AREA, CONNECTIONS TO BRIDGING STRUCTURE)		
MIXED USE COMMERCIAL/RETAIL/ SERVICES	MAX. 3 LEVELS 6500m^2/70 000s.f.	1-3 levels commercial/retail above street level. Additional levels at north portion of property parallel to railway to act as buffer for residential units.
PARKING REQUIREMENT	1.05 PER RESIDENTIAL UNIT = 210 STALLS COMMERCIAL 1 PER 90 m^2 = 72 STALLS	

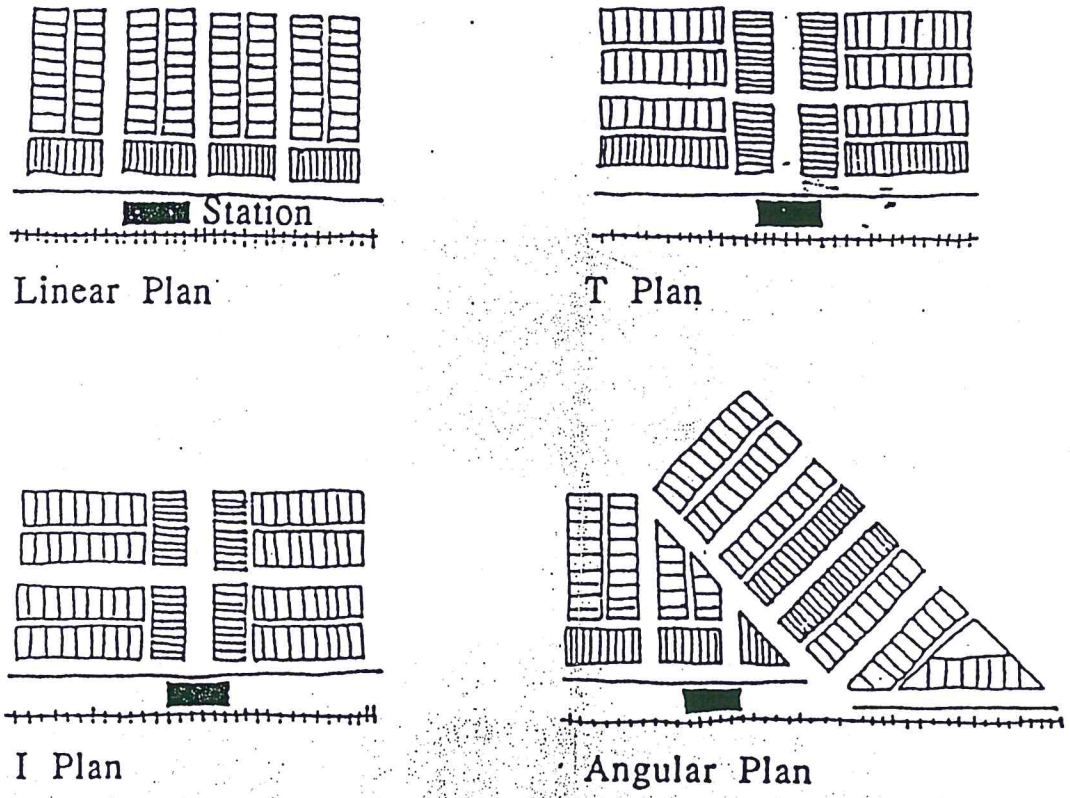


Figure 1 Types of Railway Town Layout

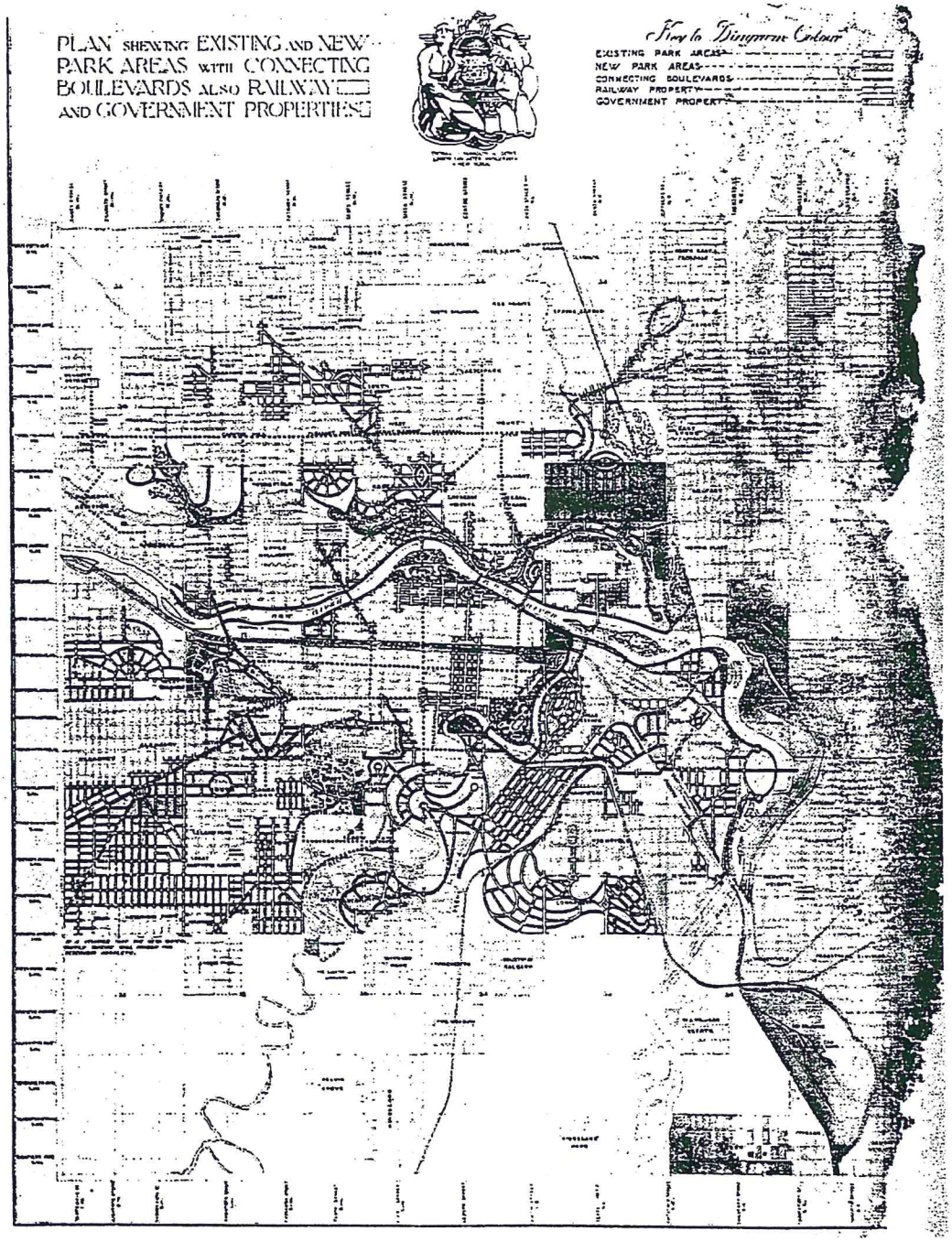
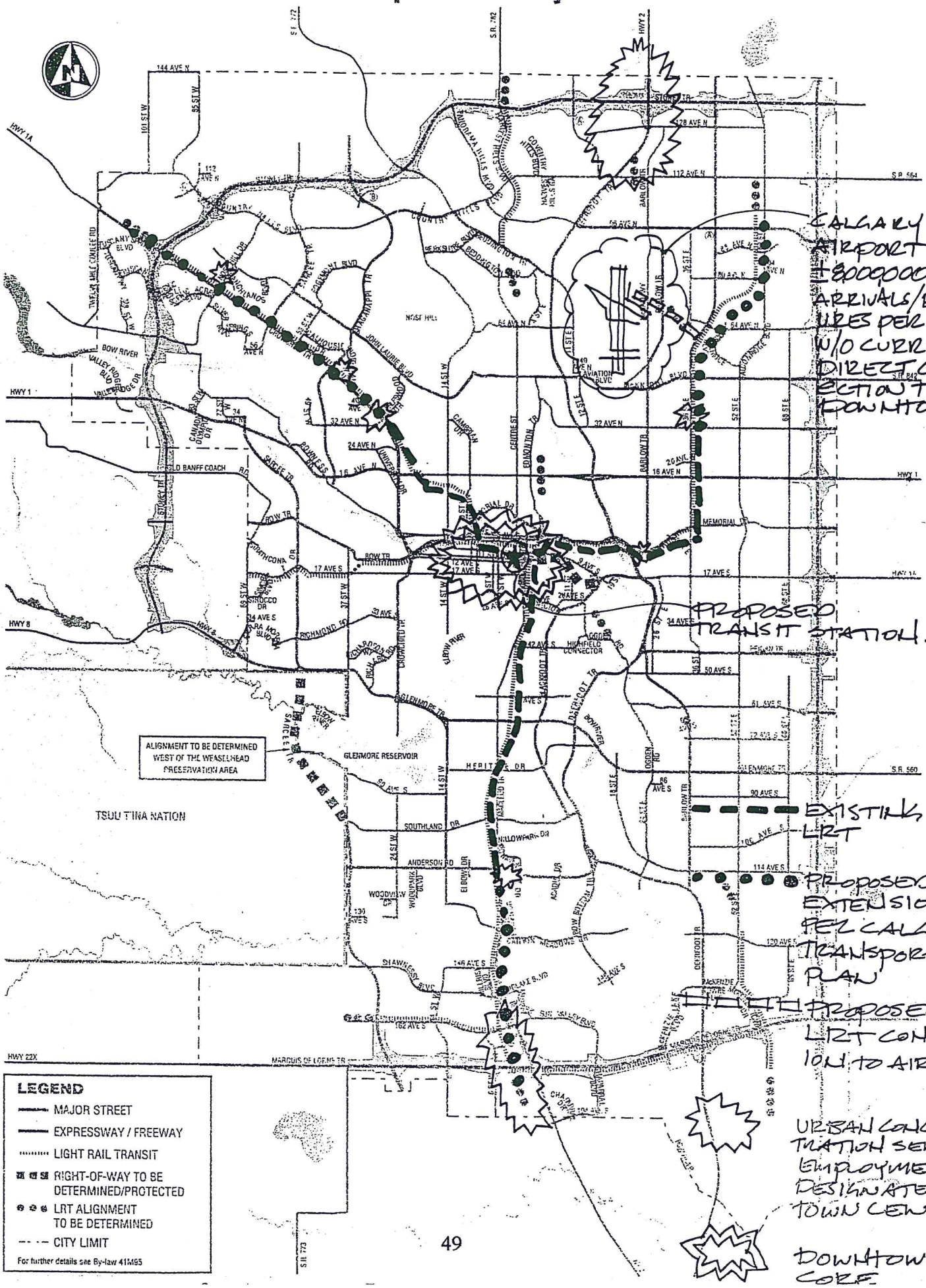

PLAN SHEWING EXISTING AND NEW PARK AREAS WITH CONNECTING BOULEVARDS ALSO RAILWAY AND GOVERNMENT PROPERTIES
Key to Diagram Colour
EXISTING PARK AREAS
NEW PARK AREAS
CONNECTING BOULEVARDS
RAILWAY PROPERTY
GOVERNMENT PROPERTY

Figure 2

Transportation System



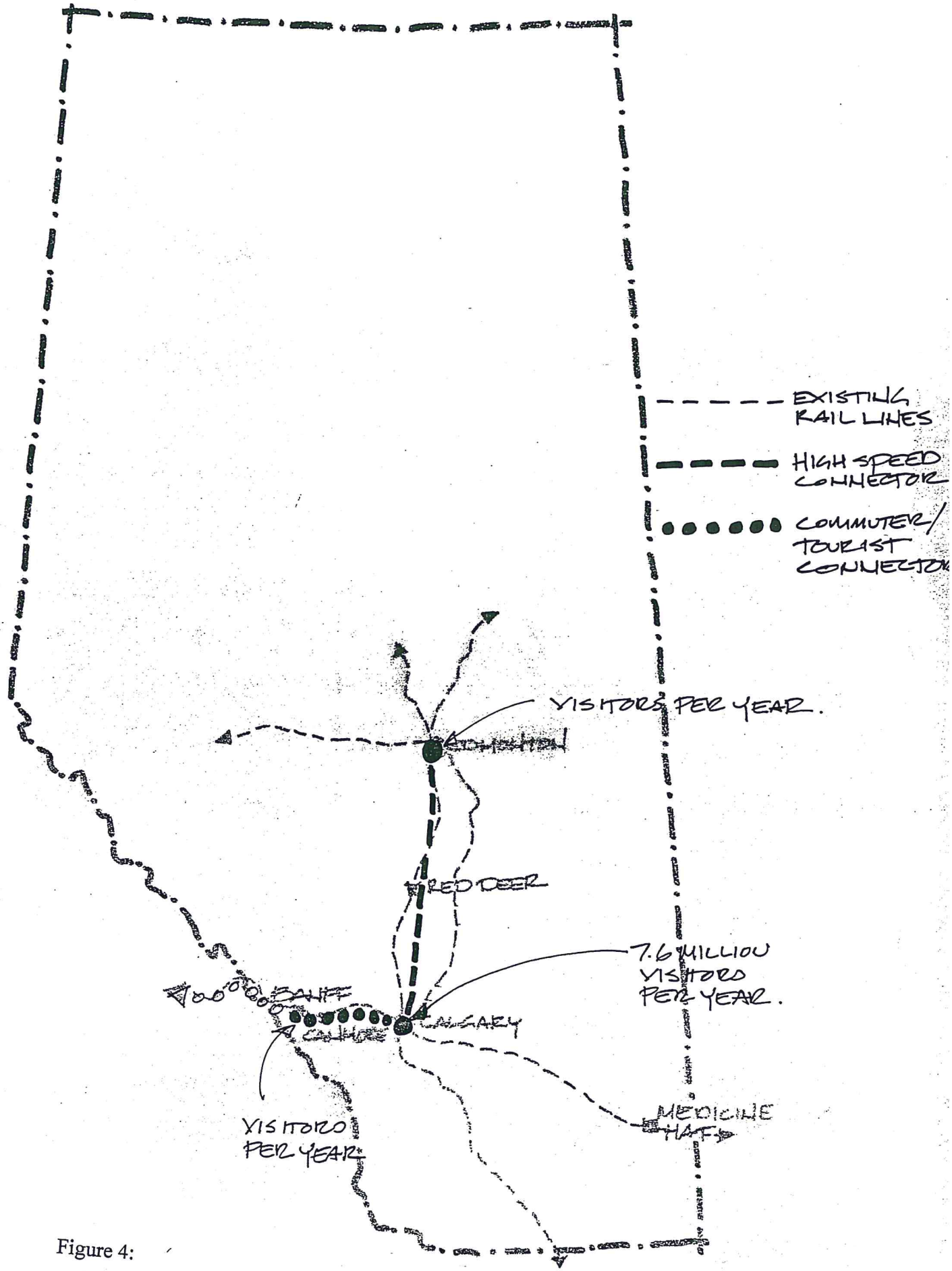

EXISTING RAIL LINES
HIGH SPEED CONNECTOR
COMMUTER/ TOURIST CONNECTOR
VISITORS PER YEAR.
RED DEER
7.6 MILLION VISITORS PER YEAR.
BANFF
CALGARY
MEDICINE HAT
VISITORS PER YEAR.

Figure 4:

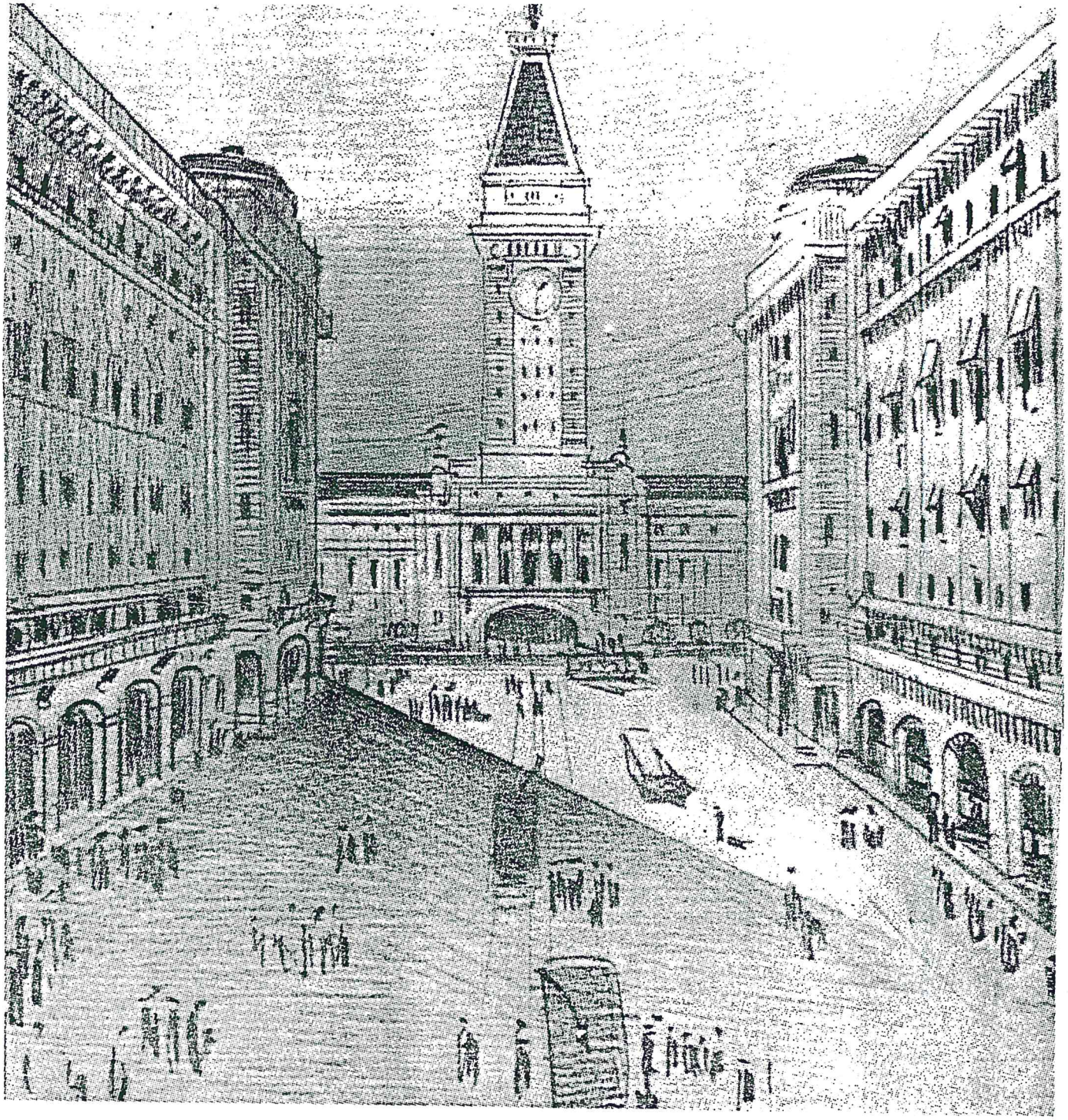


Figure 5

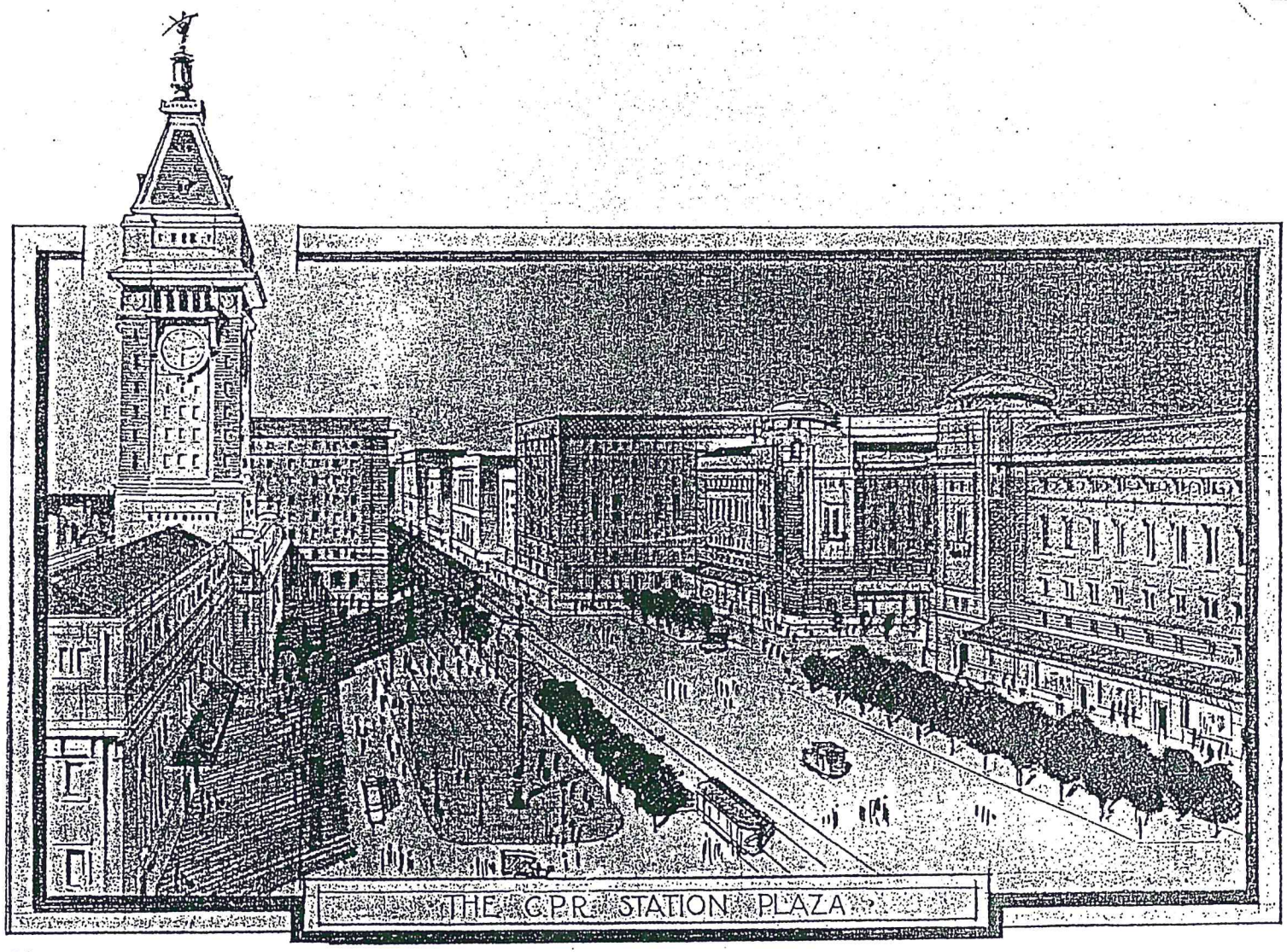


Figure 6

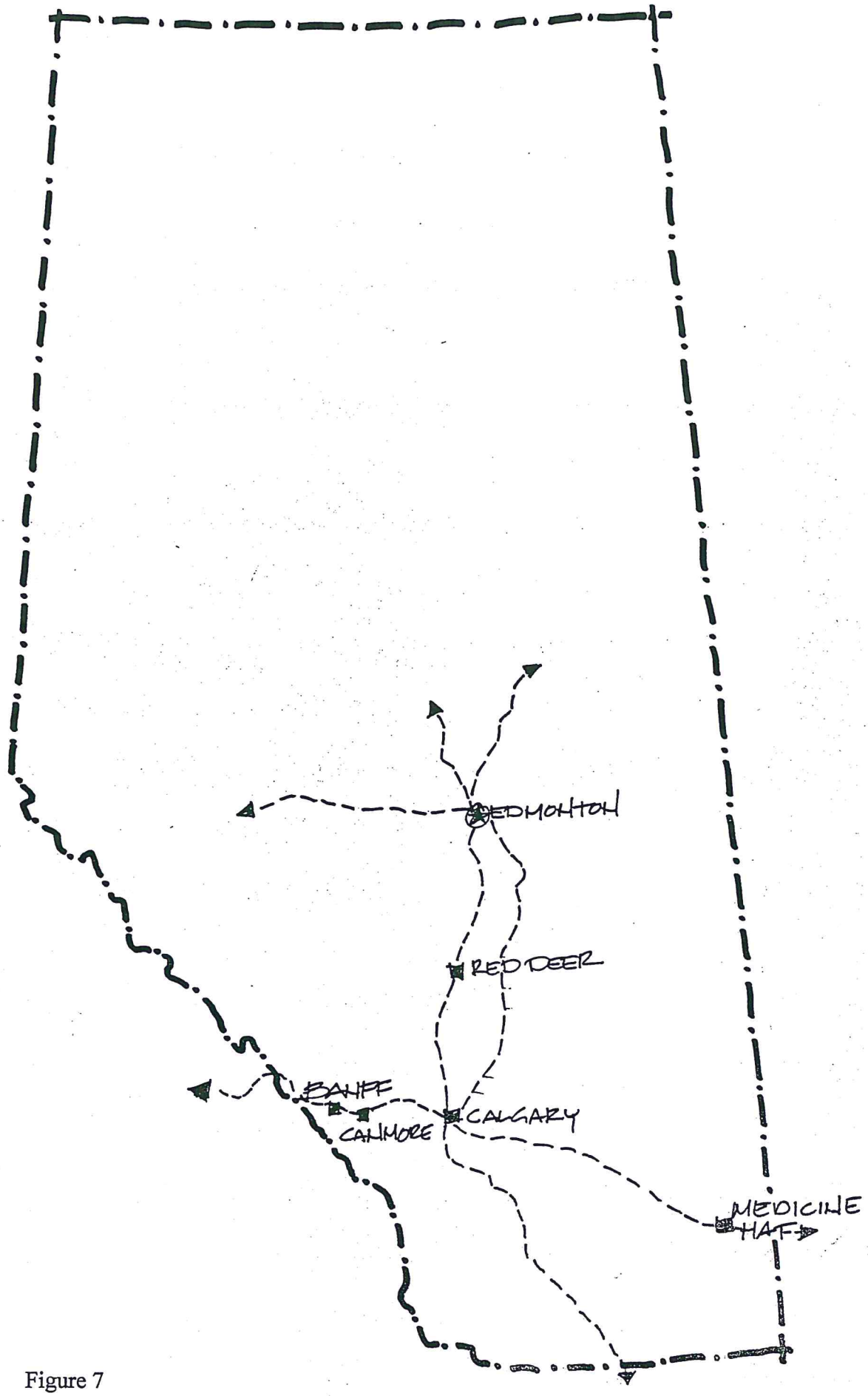


Figure 7

SITE ANALYSIS

LIST OF ILLUSTRATIONS

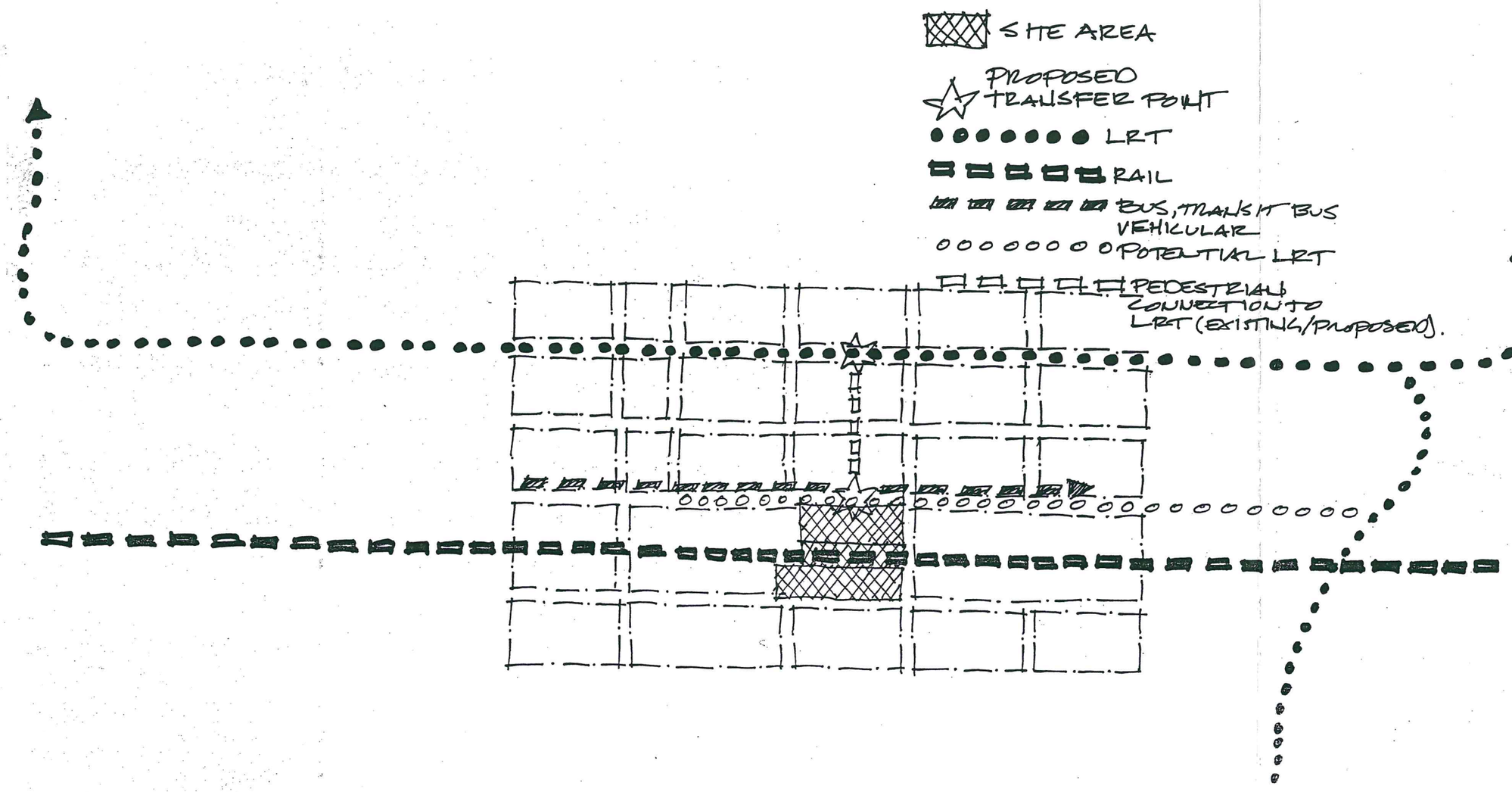
FINAL THESIS REPORT

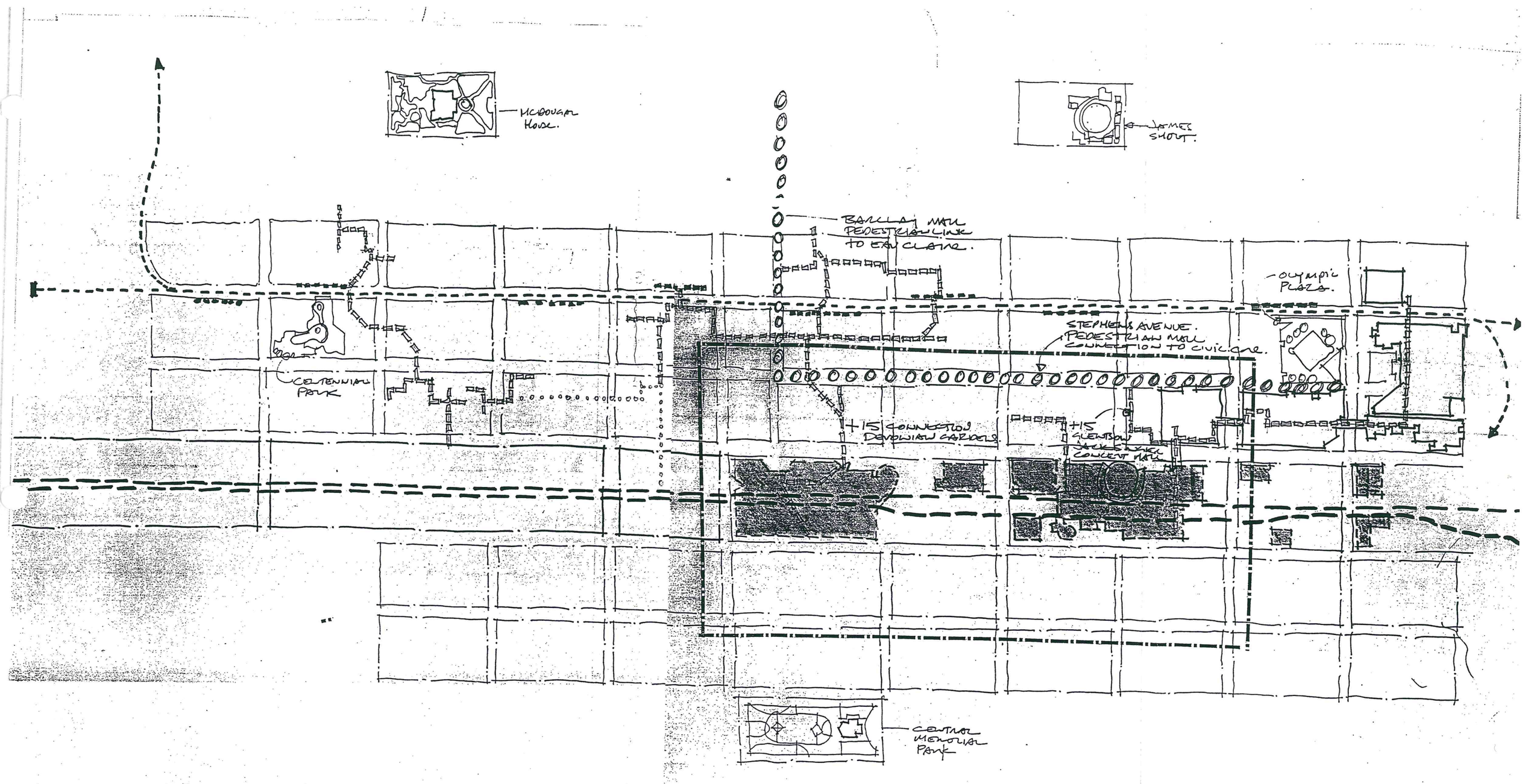
FOR A PROPOSED MULTIMODAL TRANSIT STATION

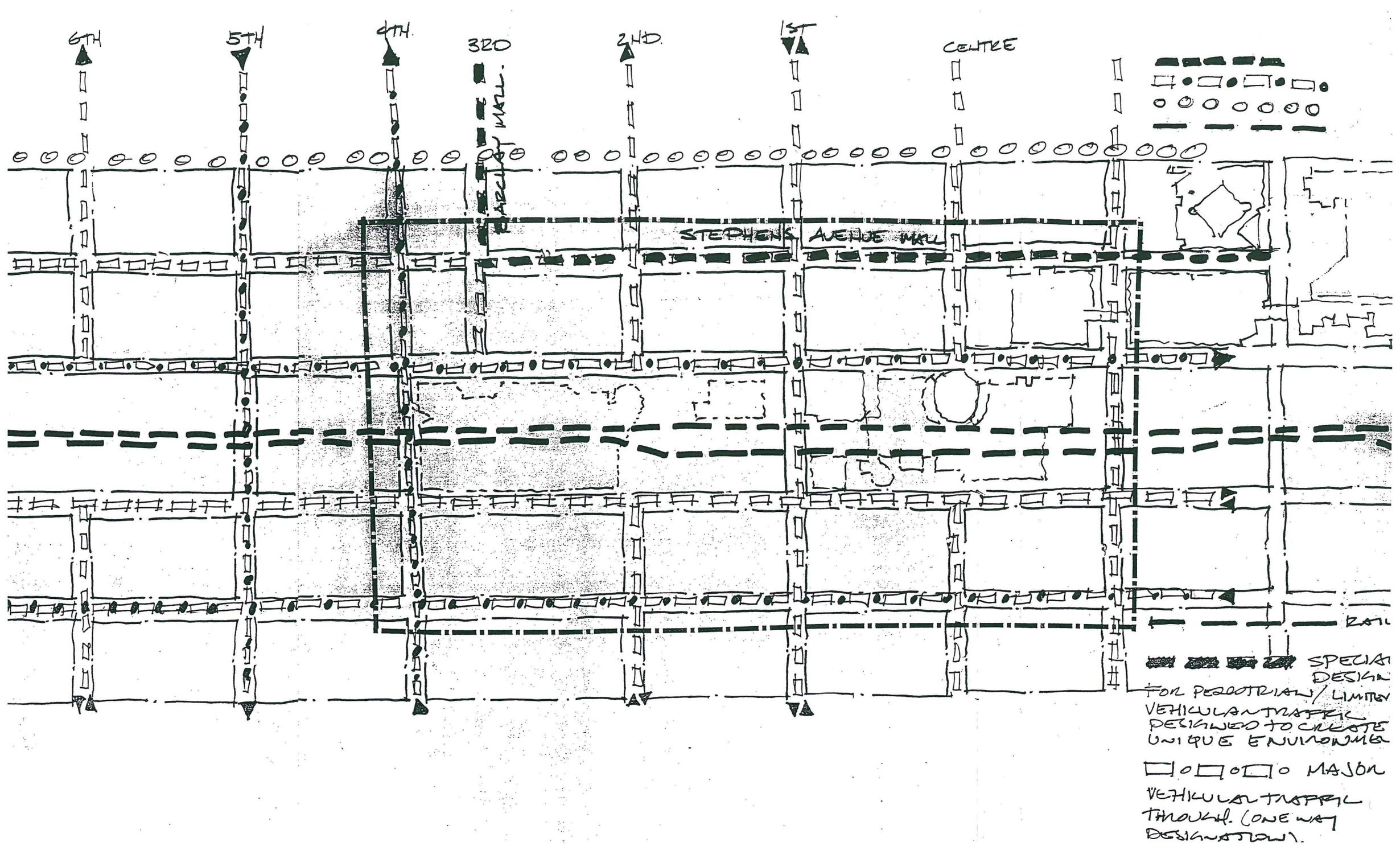
IN DOWNTOWN CALGARY.

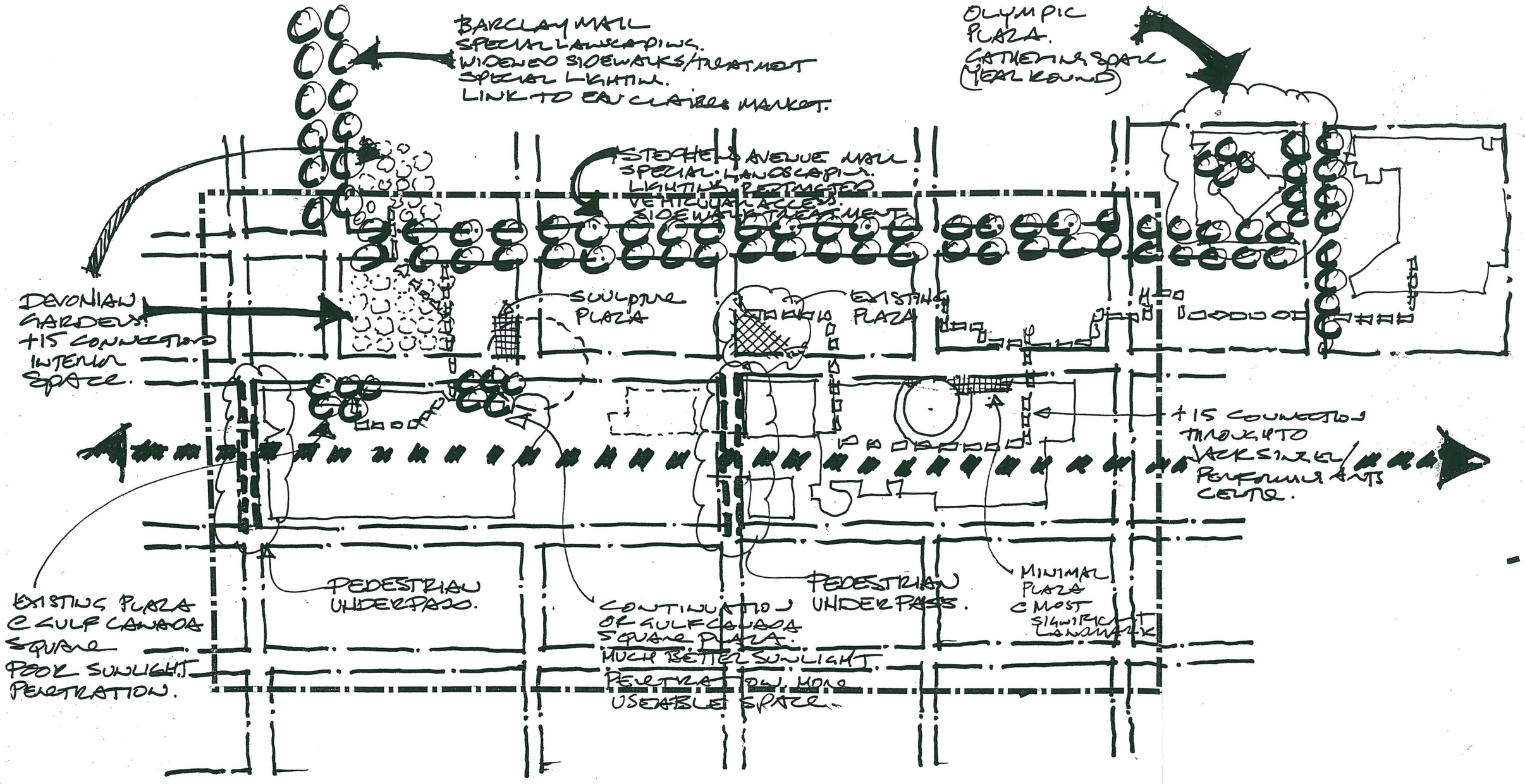
SUBMISSION DATE: FEBRUARY 8, 2001

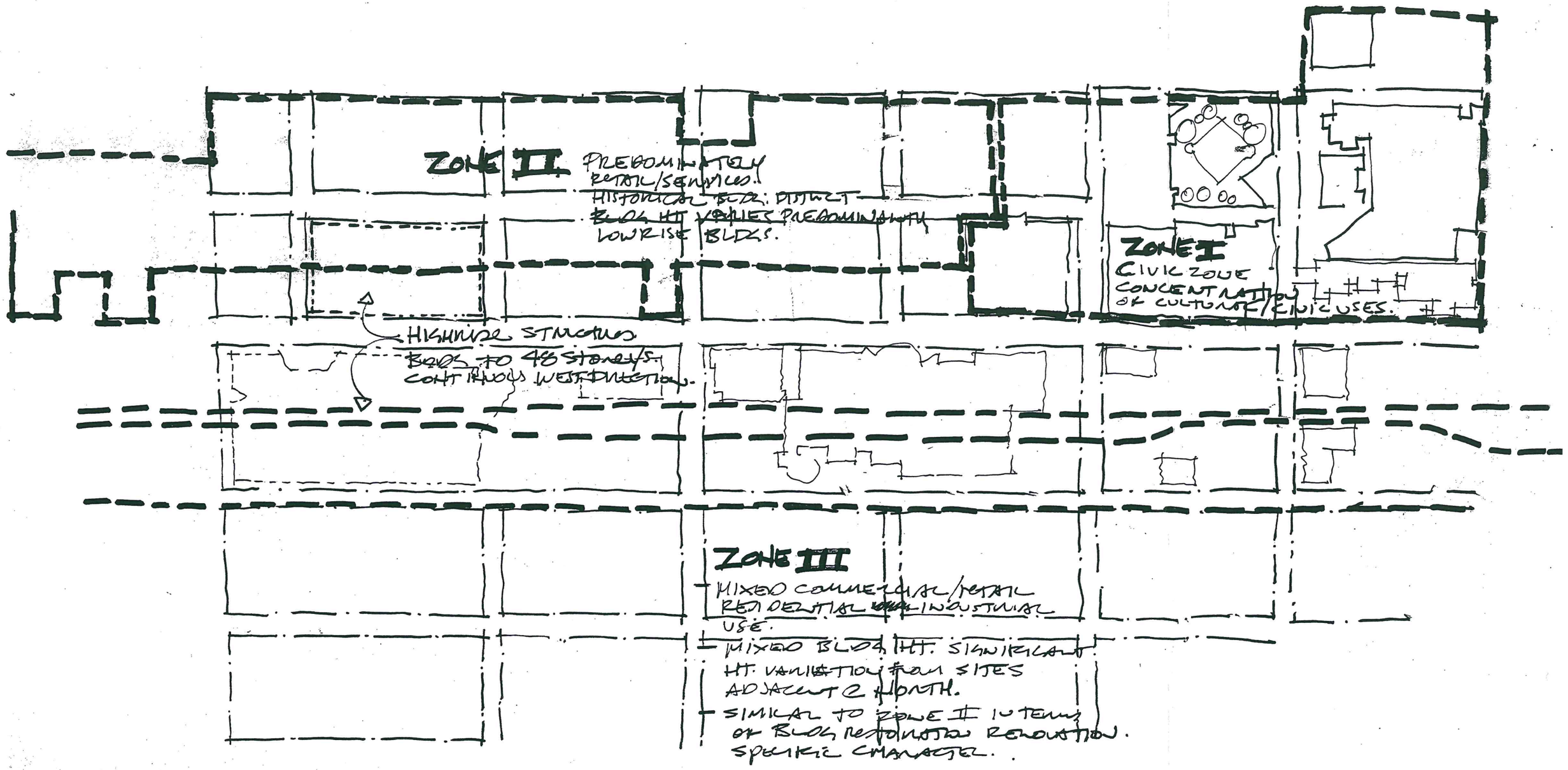
SUBMITTED BY MARK LESACK
R.A.I.C. SYLLABUS PROGRAMME STUDENT NO. AB87ON43

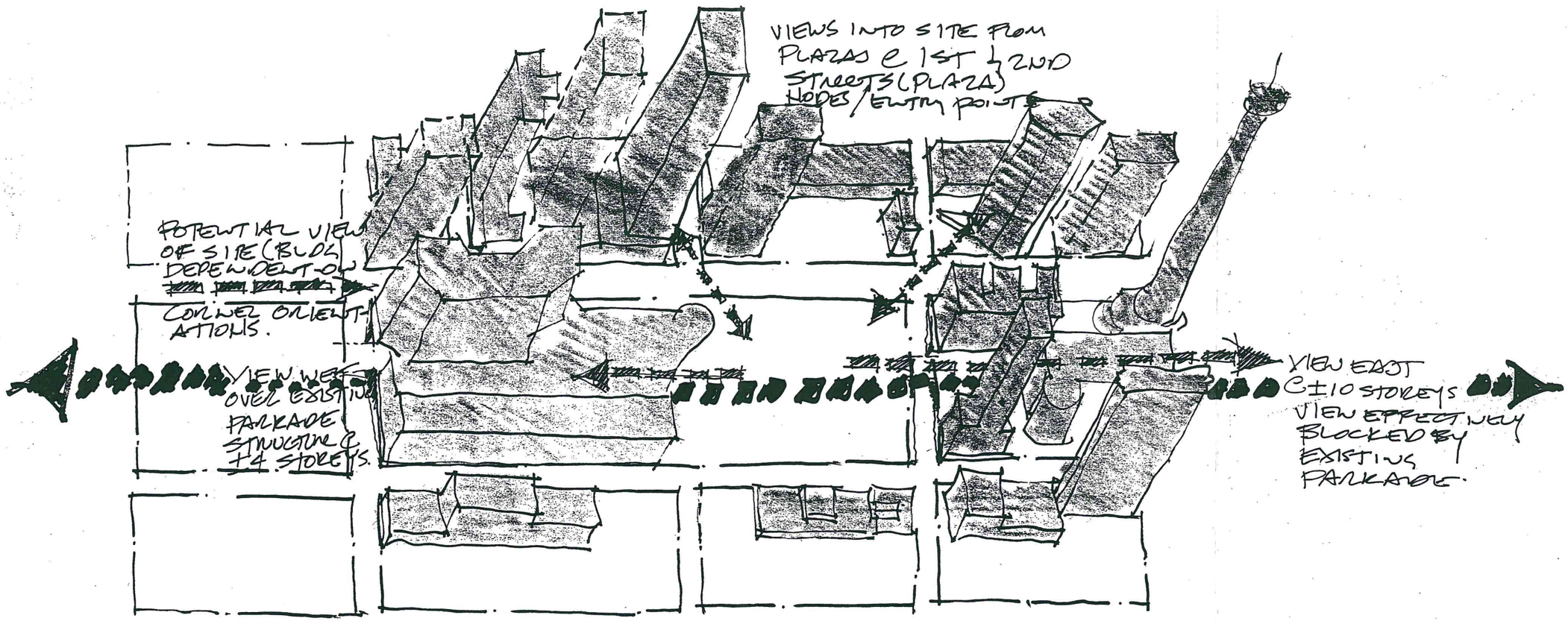

SITE AREA
PROPOSED TRANSFER POINT
LRT
RAIL
BUS, TRANSIT BUS VEHICULAR
POTENTIAL LRT
PEDESTRIAN CONNECTION TO LRT (EXISTING/PROPOSED).


MCDOUGALL HOUSE.
JAMES SHOUT.
BANKLAY MALL PEDESTRIAN LINK TO EAU CLAIRE.
OLYMPIC PLAZA.
STEPHENS AVENUE. PEDESTRIAN MALL CONNECTION TO CIVIC CORE.
CENTENNIAL PARK
+15 CONNECTION DEVONIAN GARDENS
+15 GLENBOW ATRIUM CONCERT HALL
CENTRAL MEMORIAL PARK

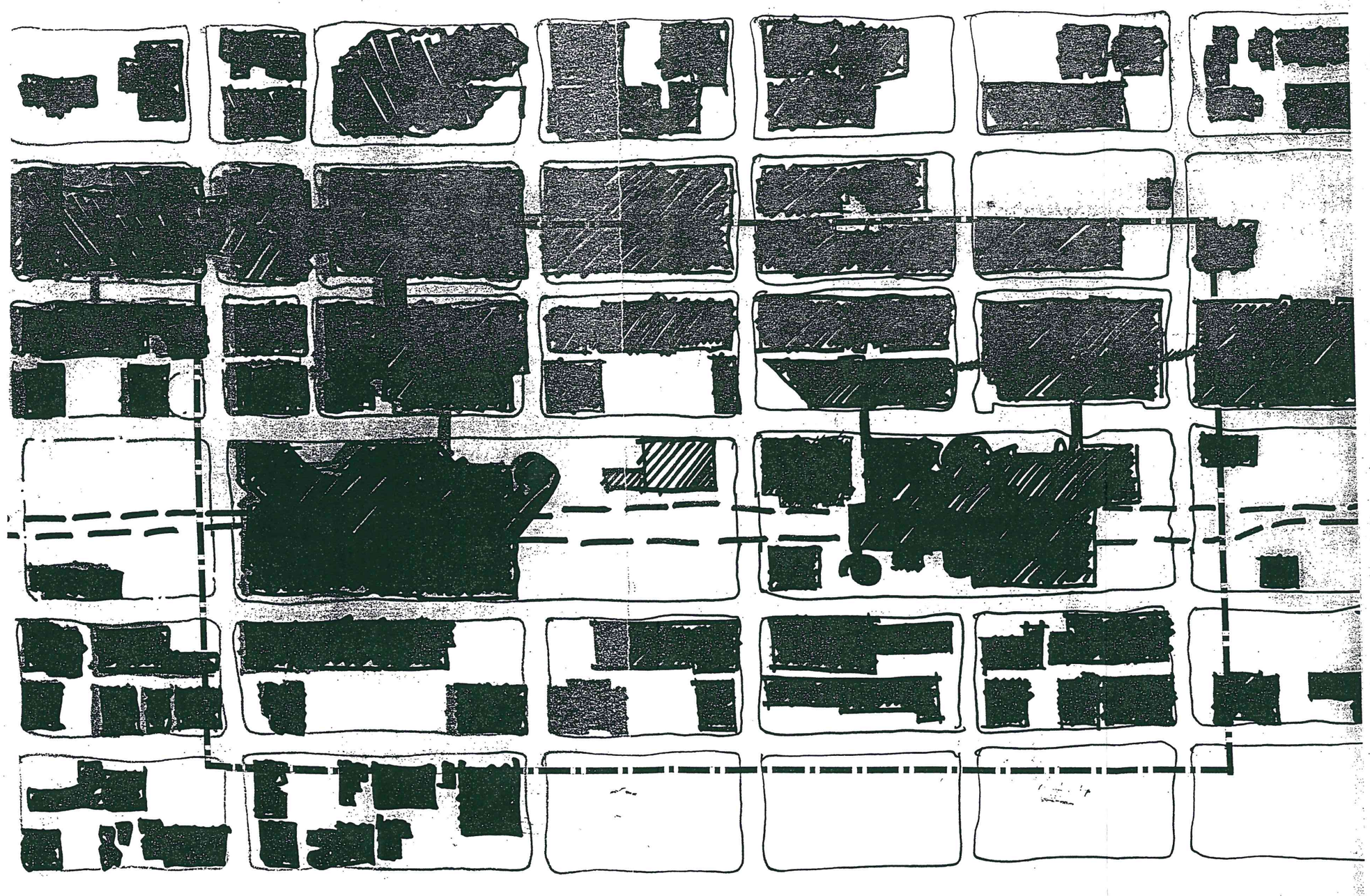

6TH
5TH
4TH
320
2ND
1ST
CENTRE
STEPHENS AVENUE MALL
SPECIAL
DESIGN
FOR PEDESTRIAN / LIMITED
VEHICULAR TRAFFIC
DESIGNED TO CREATE
UNIQUE ENVIRONMENT
MAJOR
VEHICULAR TRAFFIC
THROUGH (ONE WAY
DESIGNATION).

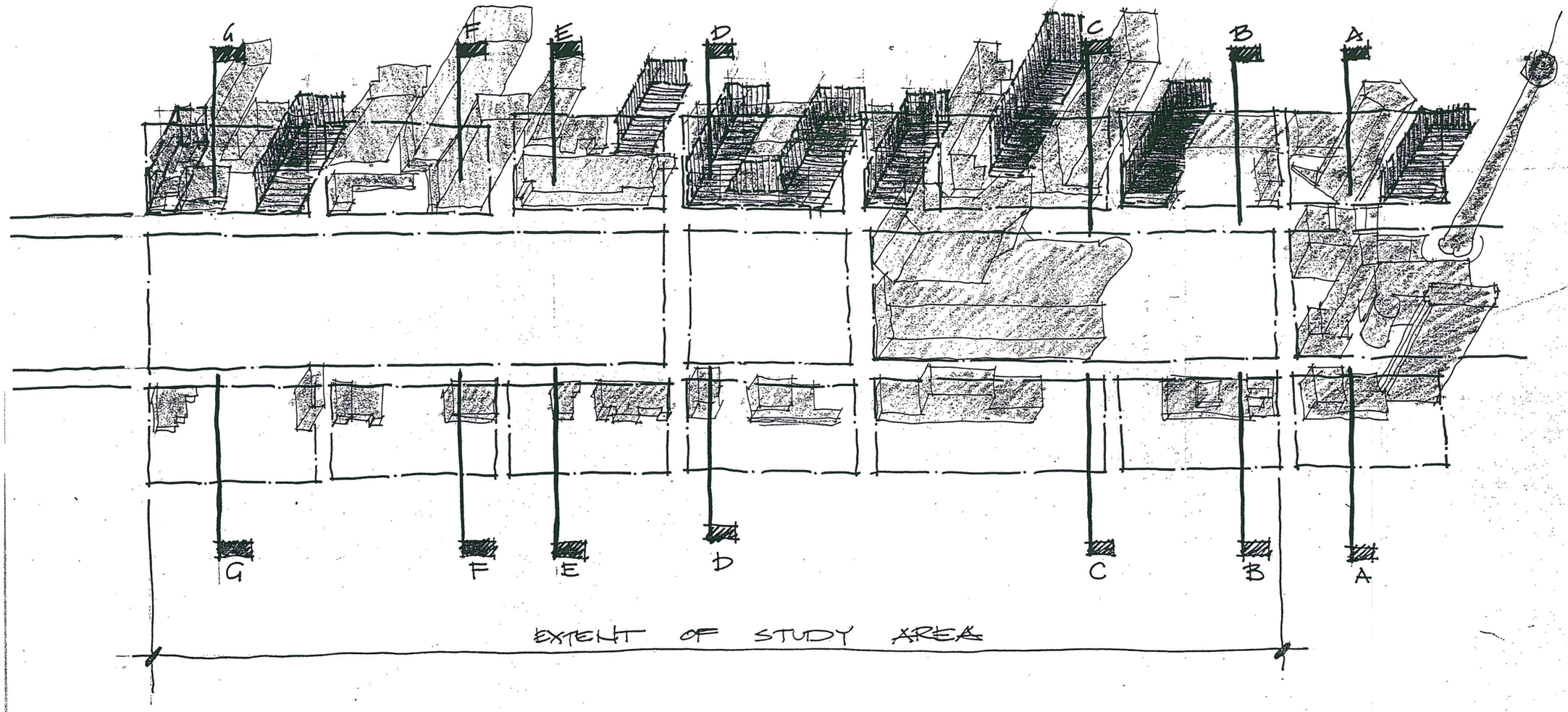

BARCLAY MALL
SPECIAL LANDSCAPING.
WIDENED SIDEWALKS/TREATMENT
SPECIAL LIGHTING.
LINK TO EAU CLAIRE MARKET.
OLYMPIC
PLAZA.
GATHERING SPACE
(YEAR ROUND)
STEPHEN AVENUE MALL
SPECIAL LANDSCAPING.
LIGHTING PERIMETER
VEHICULAR ACCESS.
SIDEWALK TREATMENT.
DEVONIAN
GARDENS
+15 CONNECTION
INTERIOR
SPACE.
SCULPTURE
PLAZA
EXISTING
PLAZA
+15 CONNECTION
THROUGH TO
JACKSON/
PERFORMING ARTS
CENTRE.
EXISTING PLAZA
@ GULF CANADA
SQUARE
POOR SUNLIGHT
PENETRATION.
PEDESTRIAN
UNDERPASS.
CONTINUATION
OF GULF CANADA
SQUARE PLAZA.
MUCH BETTER SUNLIGHT
PENETRATION. MORE
USEABLE SPACE.
PEDESTRIAN
UNDERPASS.
MINIMAL
PLAZA
@ MOST
SIGNIFICANT
LANDMARK

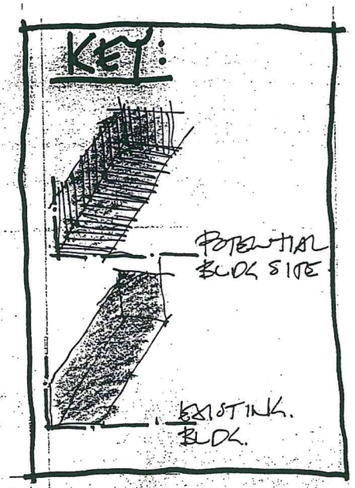

ZONE II
PREDOMINANTLY RETAIL/SERVICES.
HISTORICAL BLDG. DISTRICT
BLDG HT VARIES PREDOMINANTLY LOWRISE BLDGS.
HIGHRISE STRUCTURES
BLDGS TO 48 STORYS.
CONTINUOUS WEST DIRECTION.
ZONE I
CIVIC ZONE
CONCENTRATION OF CULTURAL/CIVIC USES.
ZONE III
MIXED COMMERCIAL/RETAIL RESIDENTIAL INDUSTRIAL USE.
MIXED BLDG HT. SIGNIFICANT HT. VARIATION FROM SITES ADJACENT & NORTH.
SIMILAR TO ZONE II IN TERMS OF BLDG RESTORATION RENOVATION. SPECIFIC CHARACTER.



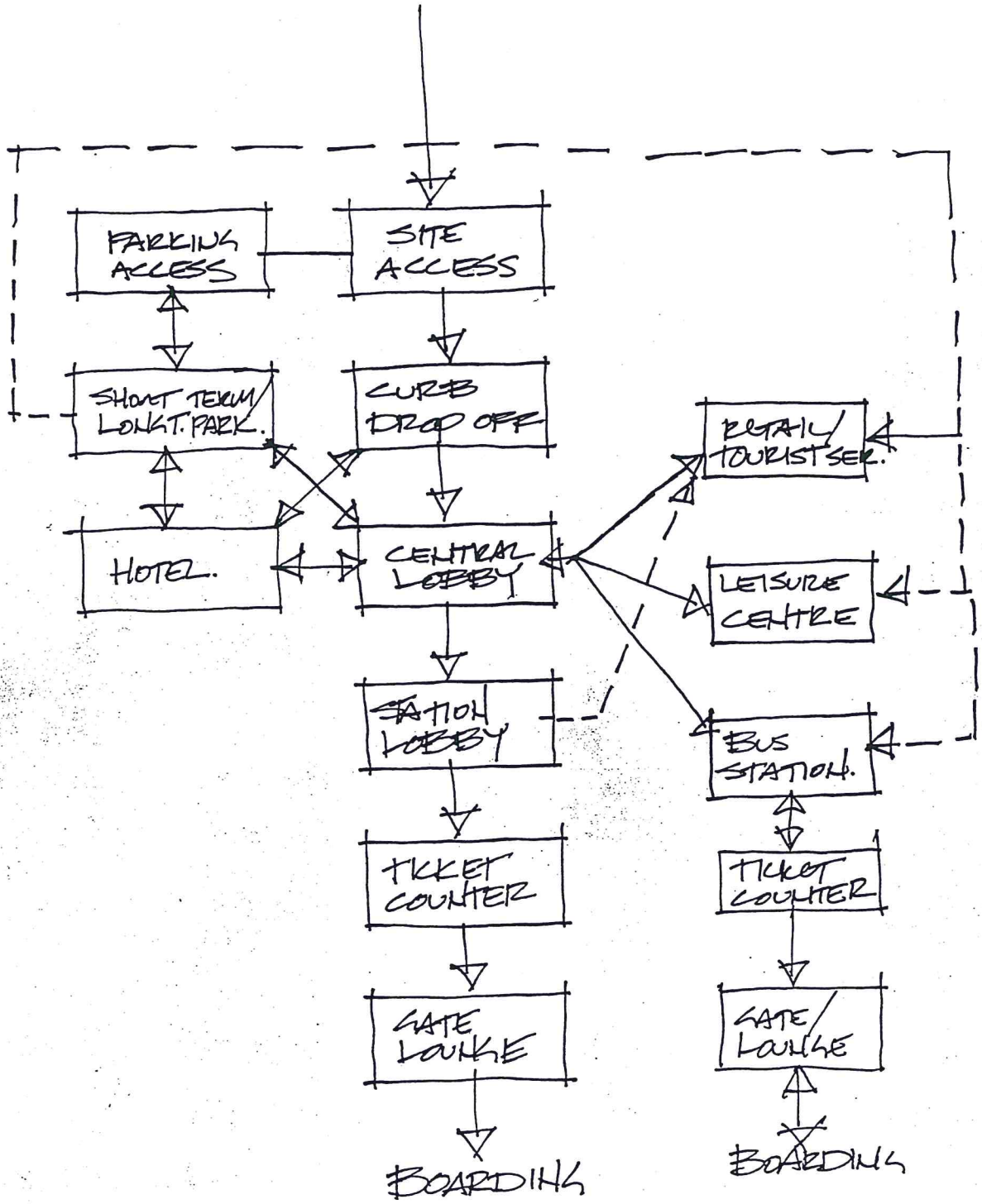
- POTENTIAL FOR SIGNIFICANT SOUTH FACING ORIENTATION.
- MASSING SYMPATHETIC TO TRANSITION FROM HIGH RISE TO LOW RISE.
- UNOBSTRUCTED SOUTH VIEW/ORIENTATION.



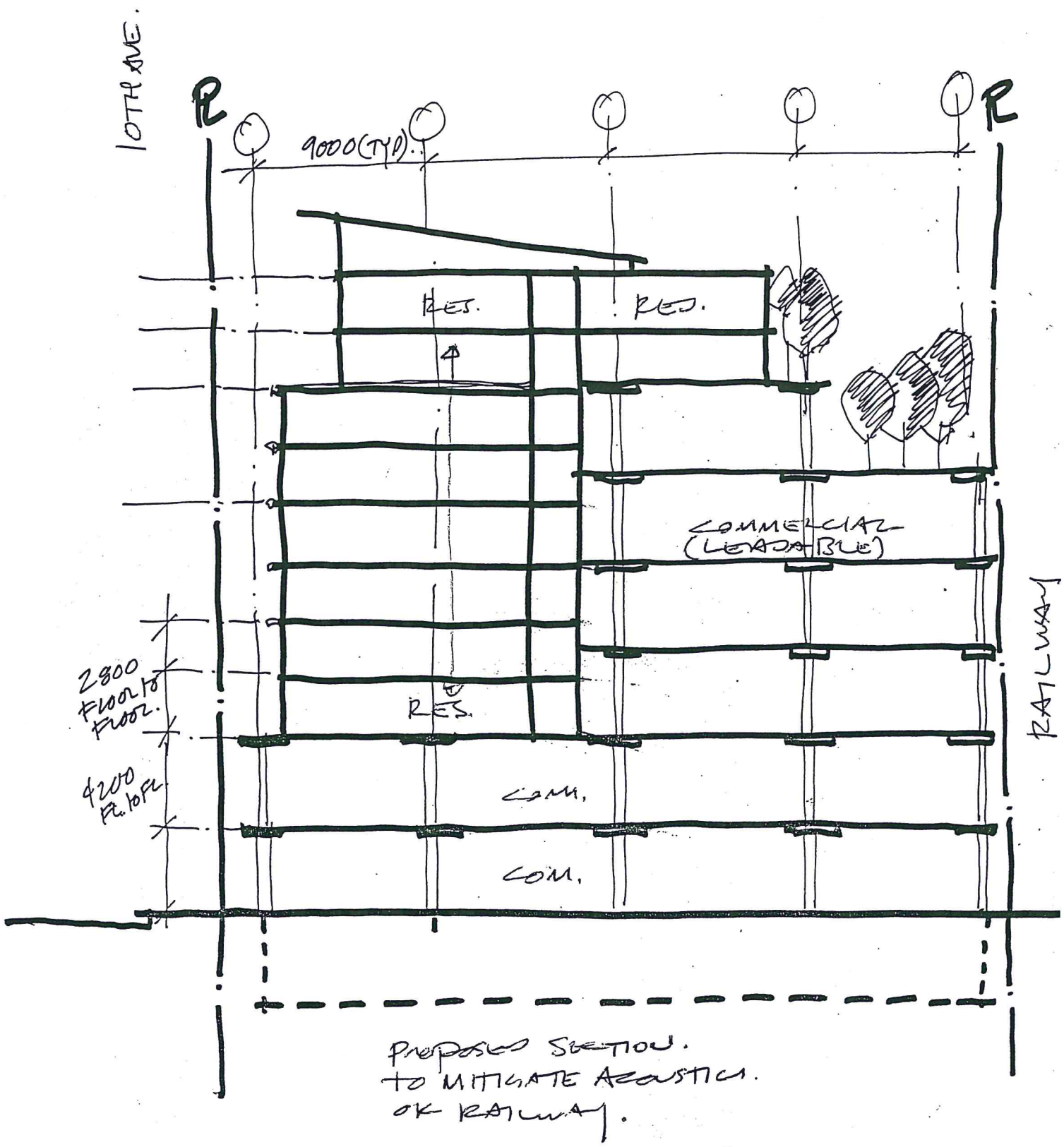




BLOCK HT. TRANSITION
INCL. POTENTIAL
FUTURE DEVELOPMENT
& AFFECT ON ADJACENT
BLOCKS/PROPERTIES

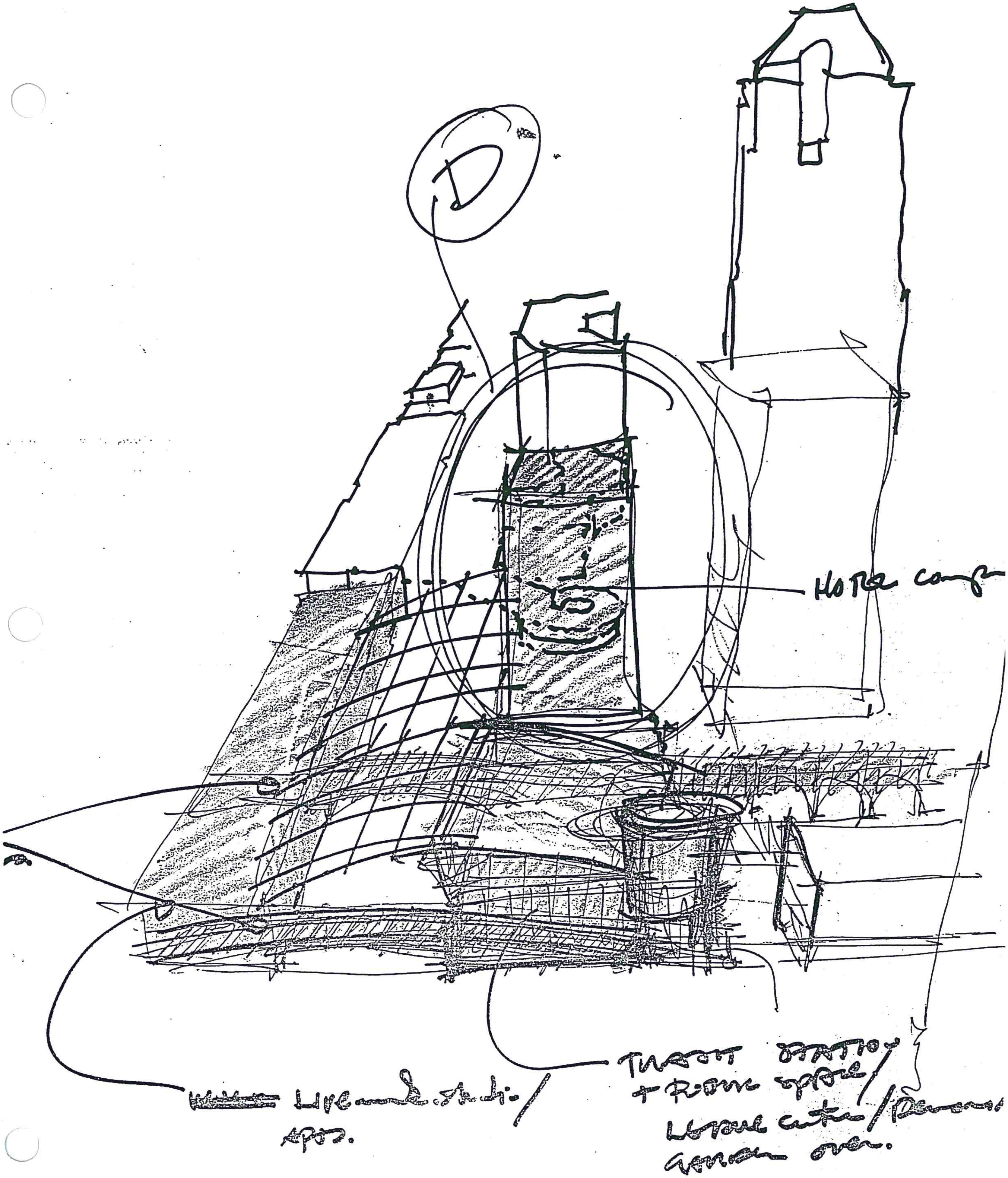


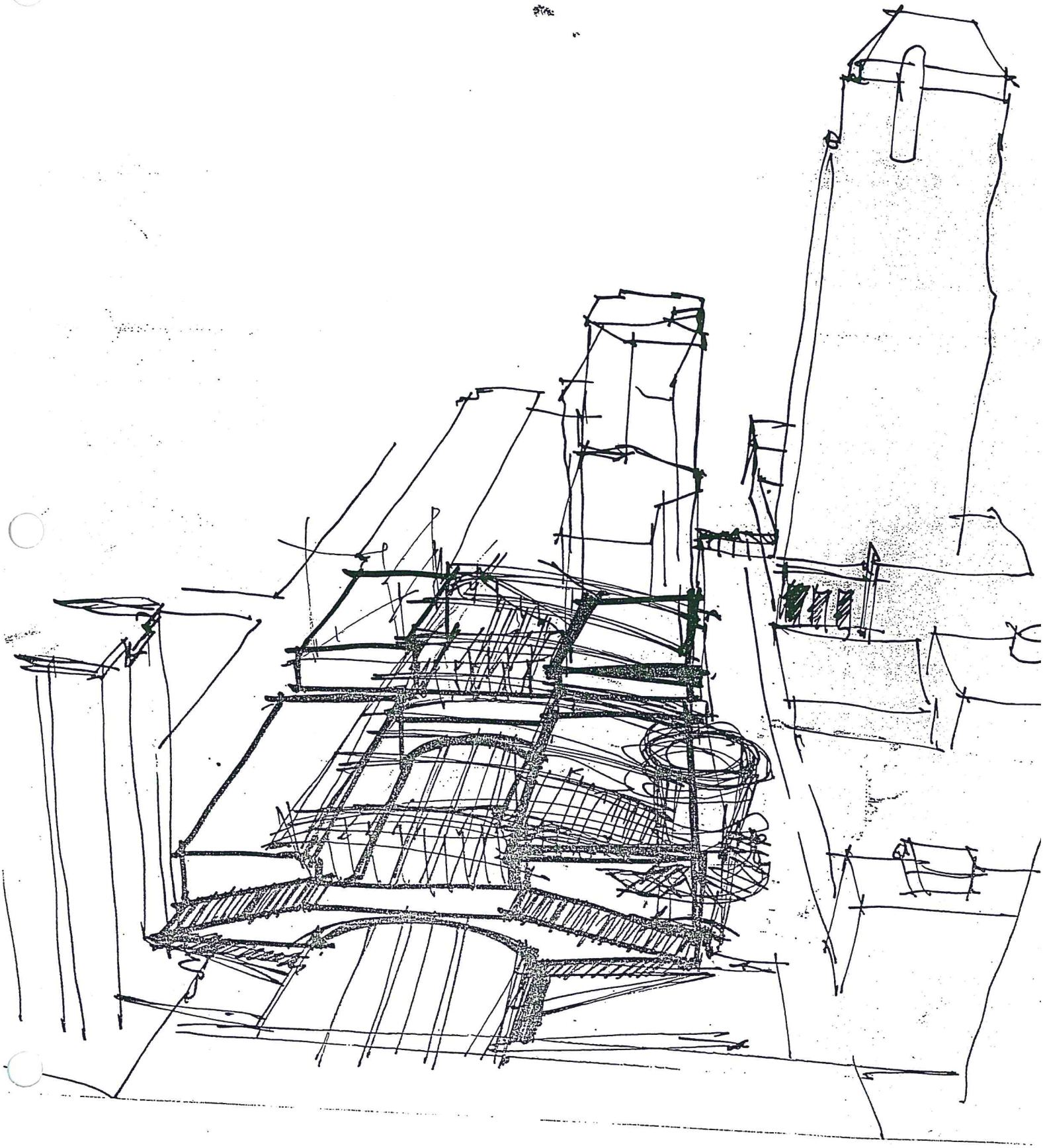
CIRC. THRU. PROVE
SOUTH SIDE 9TH AVE.

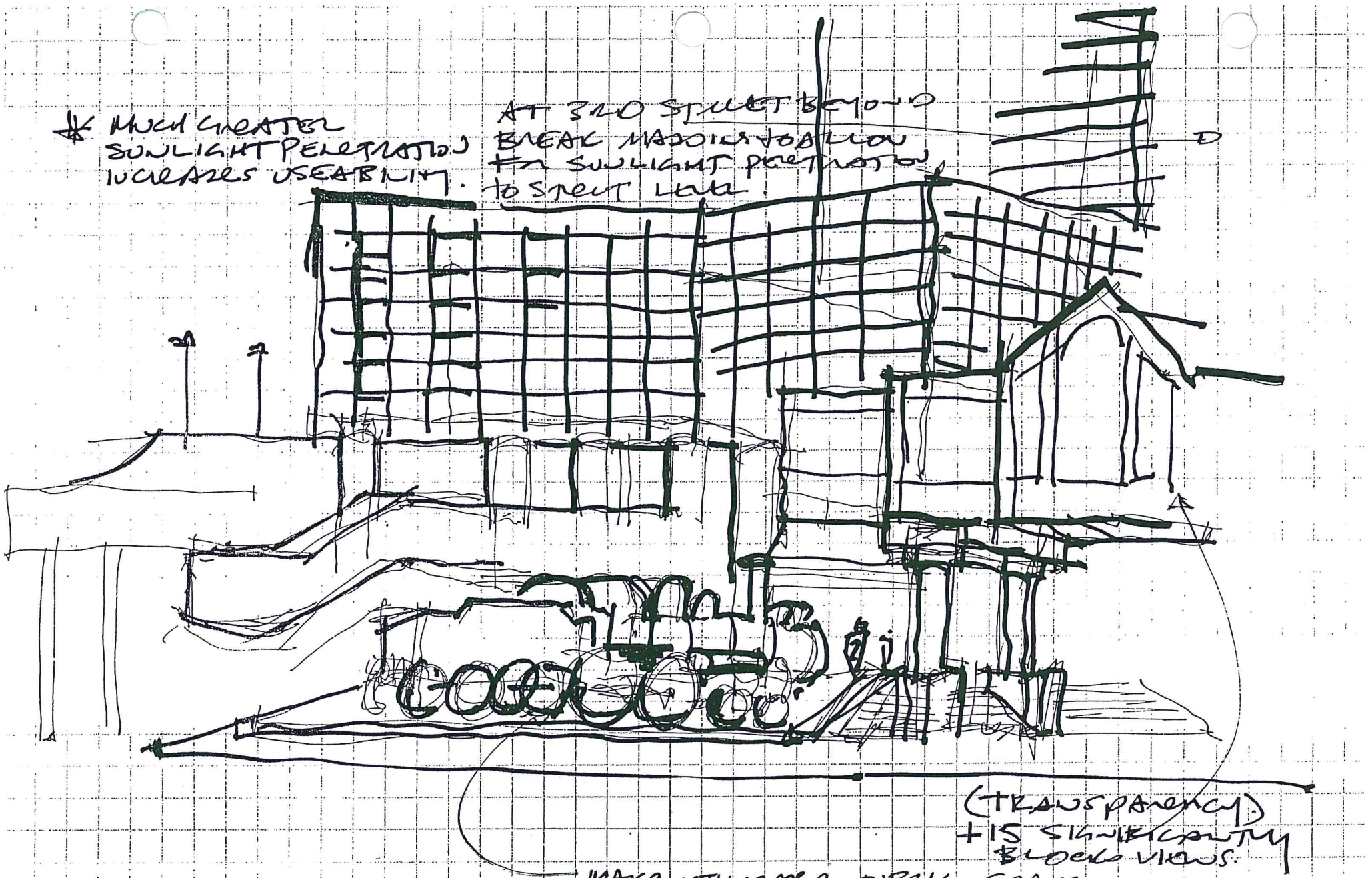


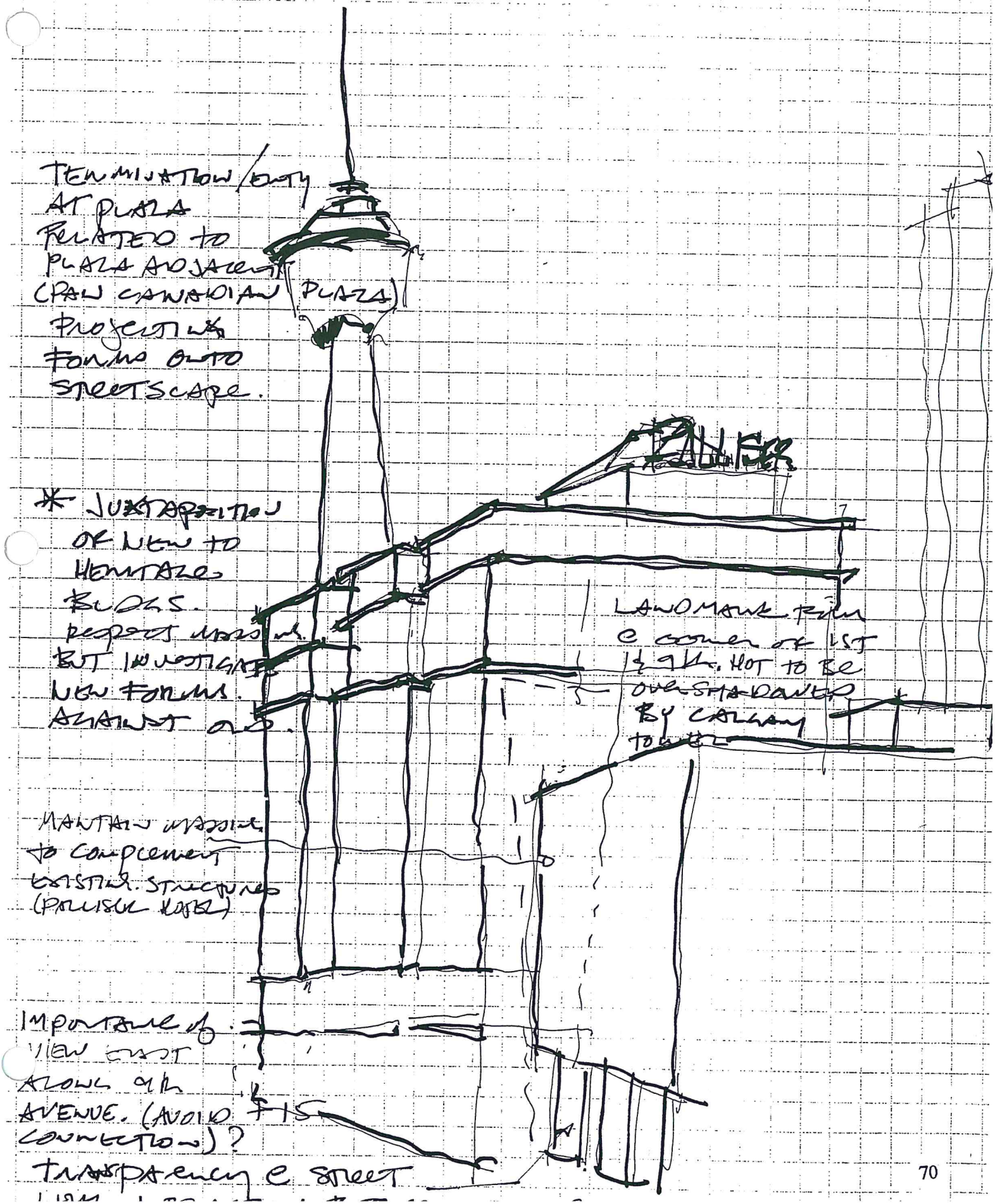
PROPOSED SECTION.
TO MITIGATE ACOUSTICS.
OF RAILWAY.

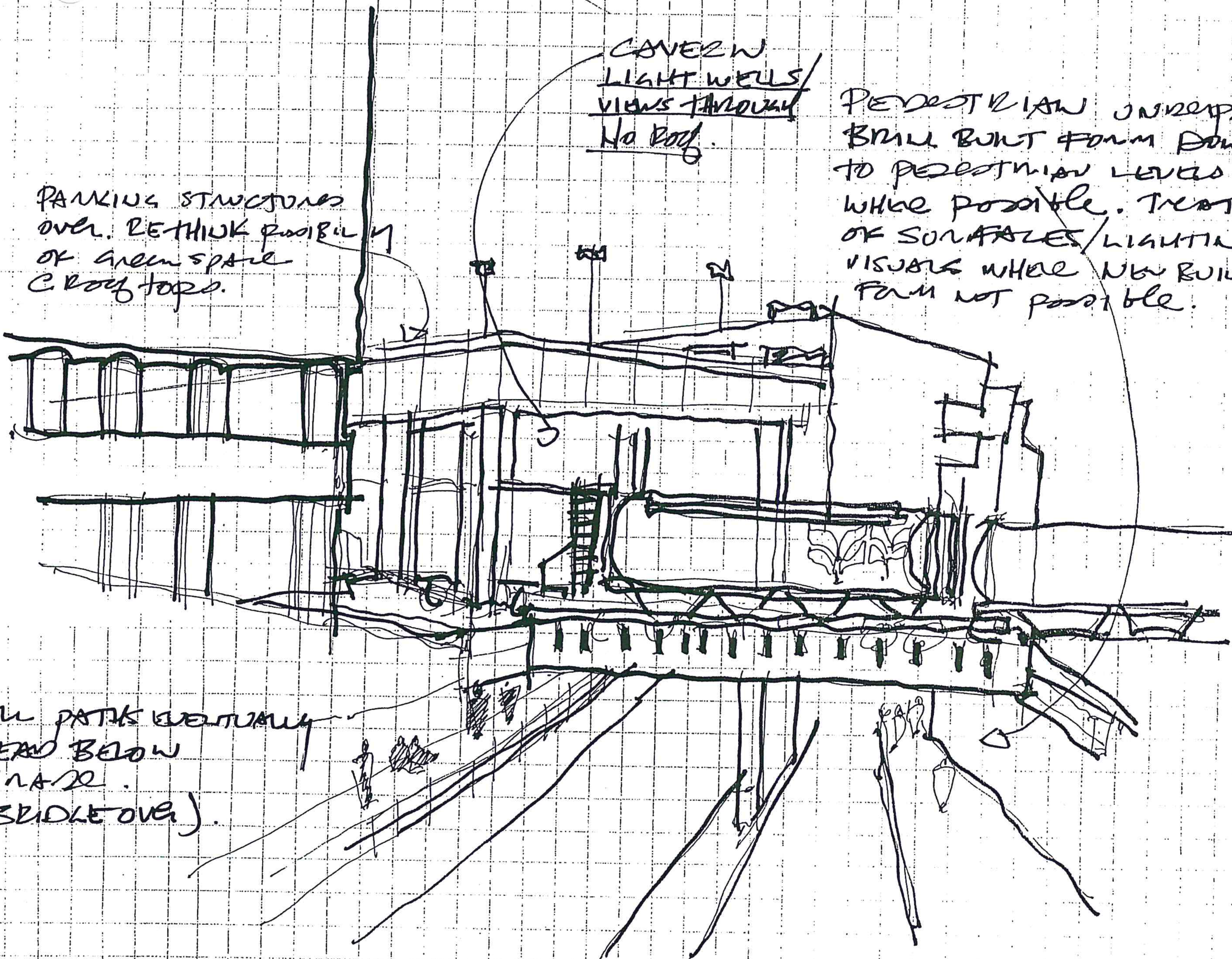

Possible future development
based upon overall
massing studies for
the site.

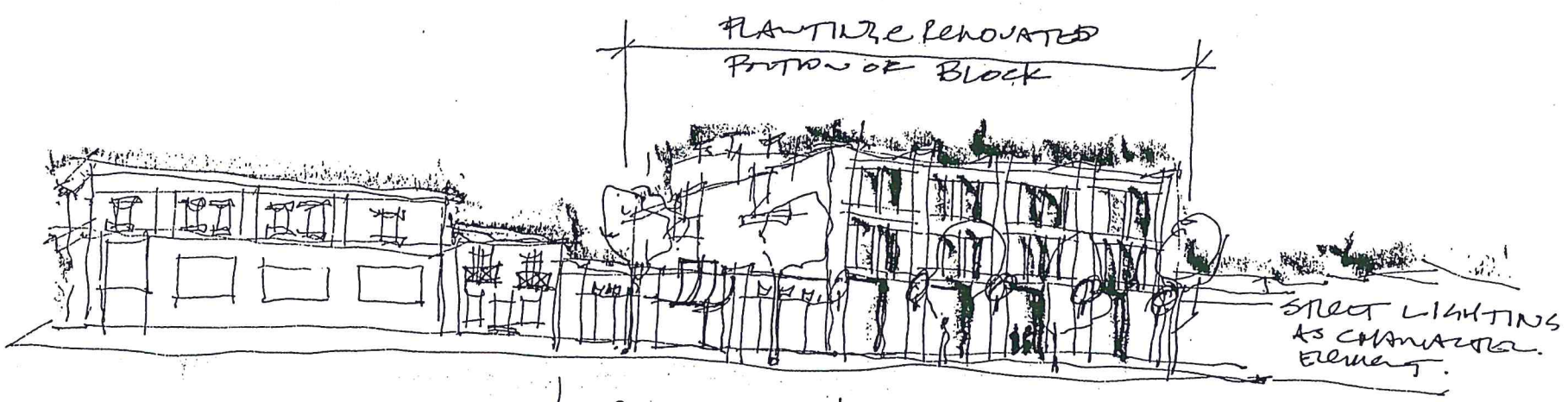

HOTEL
Live and Studio /
Apts.
Transit Station /
+ Retail Space /
Leisure Center /

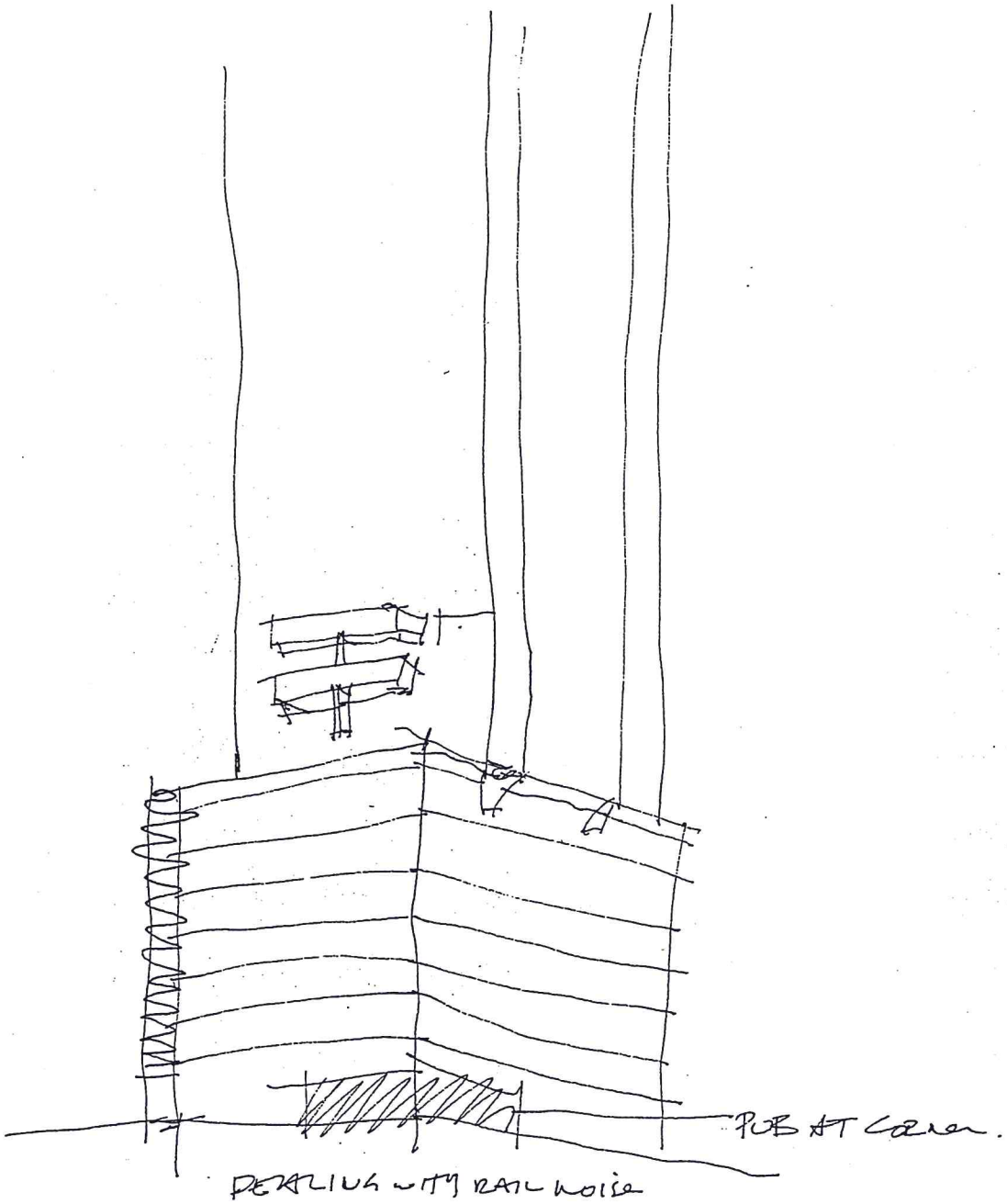



* MUCH GREATER SUNLIGHT PENETRATION INCREASES USEABILITY.
AT 3RD STREET BEYOND BREAK MASSING TO ALLOW + SUNLIGHT PENETRATION TO STREET LEVEL.
D
(TRANSPARENCY) + IS SIGNIFICANTLY BLOCKS VIEWS.
MAKE UTILIZABLE PUBLIC SPACE
1. PART OF BLDG. LANDMARK IDENTITY.


TERMINATION/ENTRY AT PLAZA RELATED TO PLAZA AND ADJACENT (CPR CANADIAN PLAZA) PROJECTING FORMS ONTO STREETSCAPE.
* JUXTAPOSITION OF NEW TO HERITAGE BLDGS. RESPECT MASSING BUT INVESTIGATE NEW FORMS AGAINST OLD.
LANDMARK. RELATE TO CORNER OF 1ST & 9th. NOT TO BE OVERSHADOWED BY CALGARY TOWER
MAINTAIN MASSING TO COMPLEMENT EXISTING STRUCTURES (PARISIEN KOBEL)
IMPORTANCE OF VIEW EAST ALONG 9th AVENUE. (AVOID F15 CONNECTION)?
TRANSPARENCY @ STREET

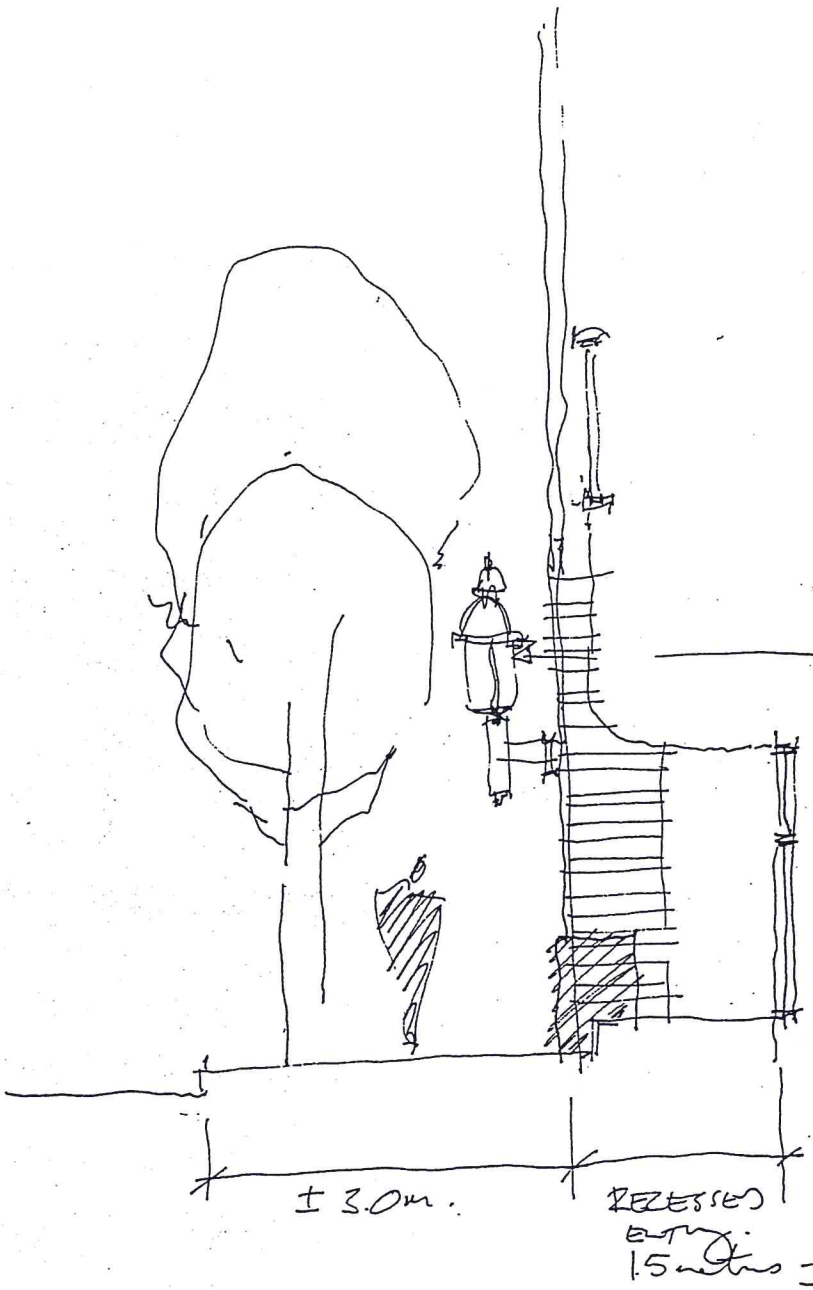

CAVERN
LIGHT WELLS/
VIEWS THROUGH
NO ROOF.
PEDESTRIAN UNDERPASSES. BRING BUILT FORM DOWN TO PEDESTRIAN LEVELS WHERE POSSIBLE. TREATMENT OF SURFACES/LIGHTING VISUALS WHERE NEW BUILT FORM NOT POSSIBLE.
PARKING STRUCTURES OVER. RETHINK POSSIBILITY OF GREEN SPACE @ ROOF TOPS.
* ALL PATHS EVENTUALLY LEAD BELOW GRADE. (BRIDGE OVER).


PLANTING RENOVATED
PORTION OF BLOCK
STREET LIGHTING
AS CHARACTER
ELEMENT.
UPDATED FACADE
OF EXISTING
BUILDING.
MacCOSHAM
BLDG.
SCALE of BLDG. ADJACENT
SOUTH SIDE 10th AVE.
1ST STREET - WEST START OF RENOVATED
EXISTING INDUSTRIAL WAREHOUSE
AREA.
CONTEXT.

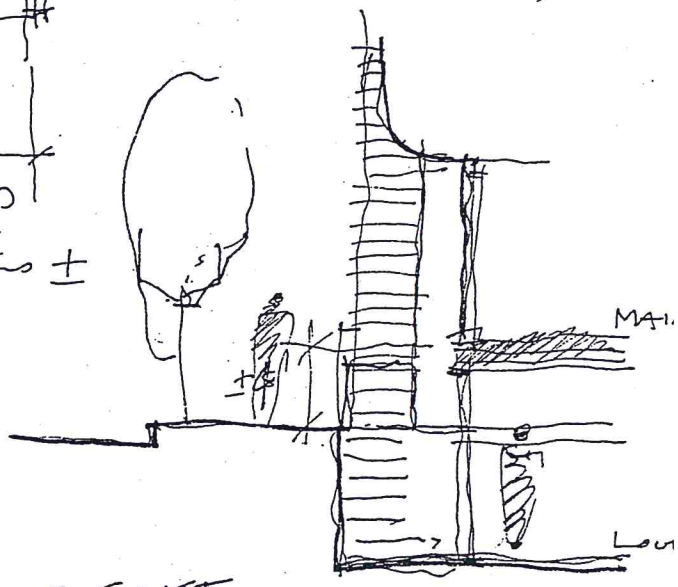


DEALING WITH RAIL NOISE
25 STOREY RESIDENTIAL
STRUCTURE over 6 STOREY
PARKING.

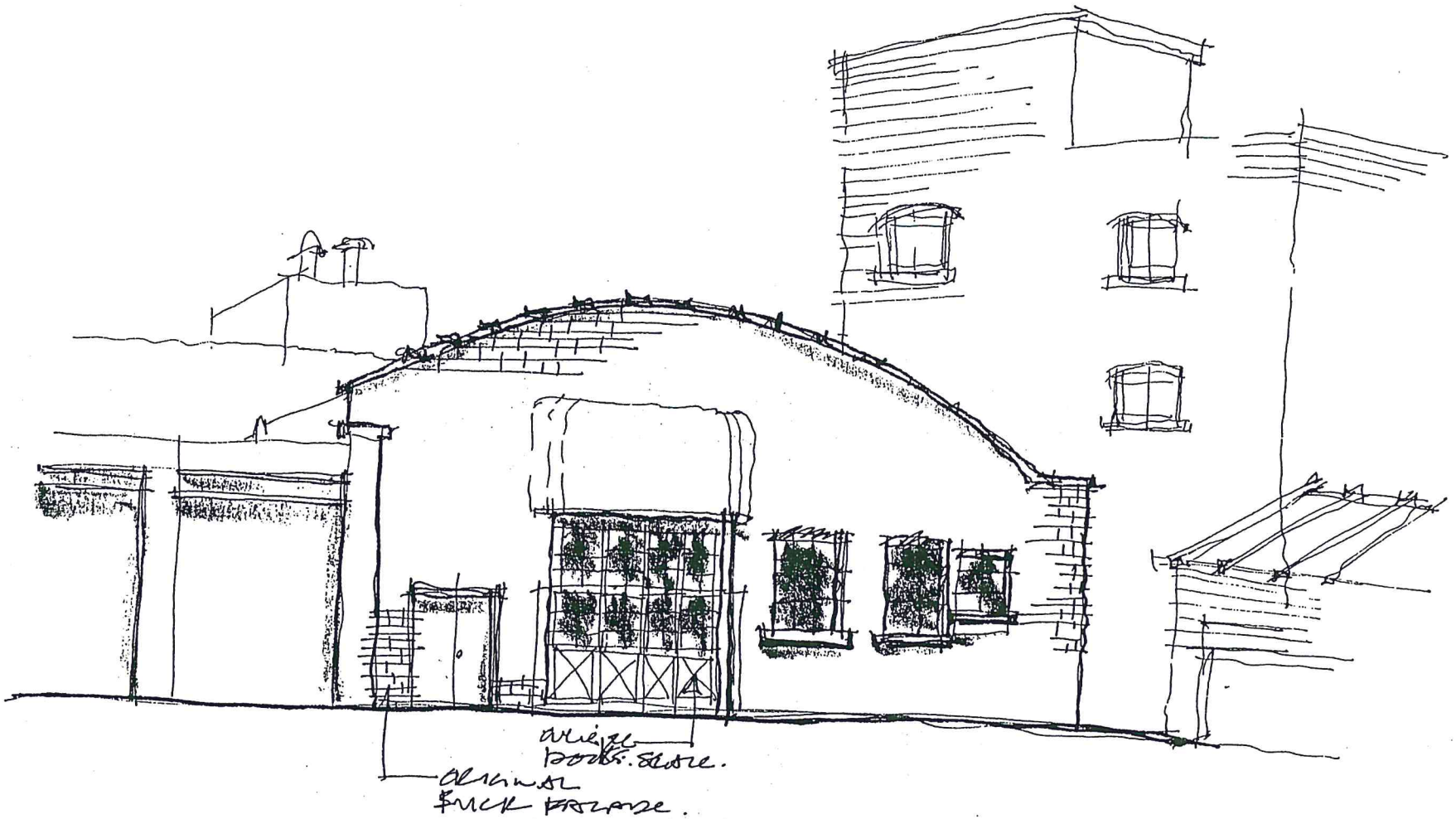
- FACTS TO ADD TO SPEECH.
SCALE of BUILDING OVERLOOKING
AS 6 STOREY CONCRETE BARRIER
C PROPERTY line.



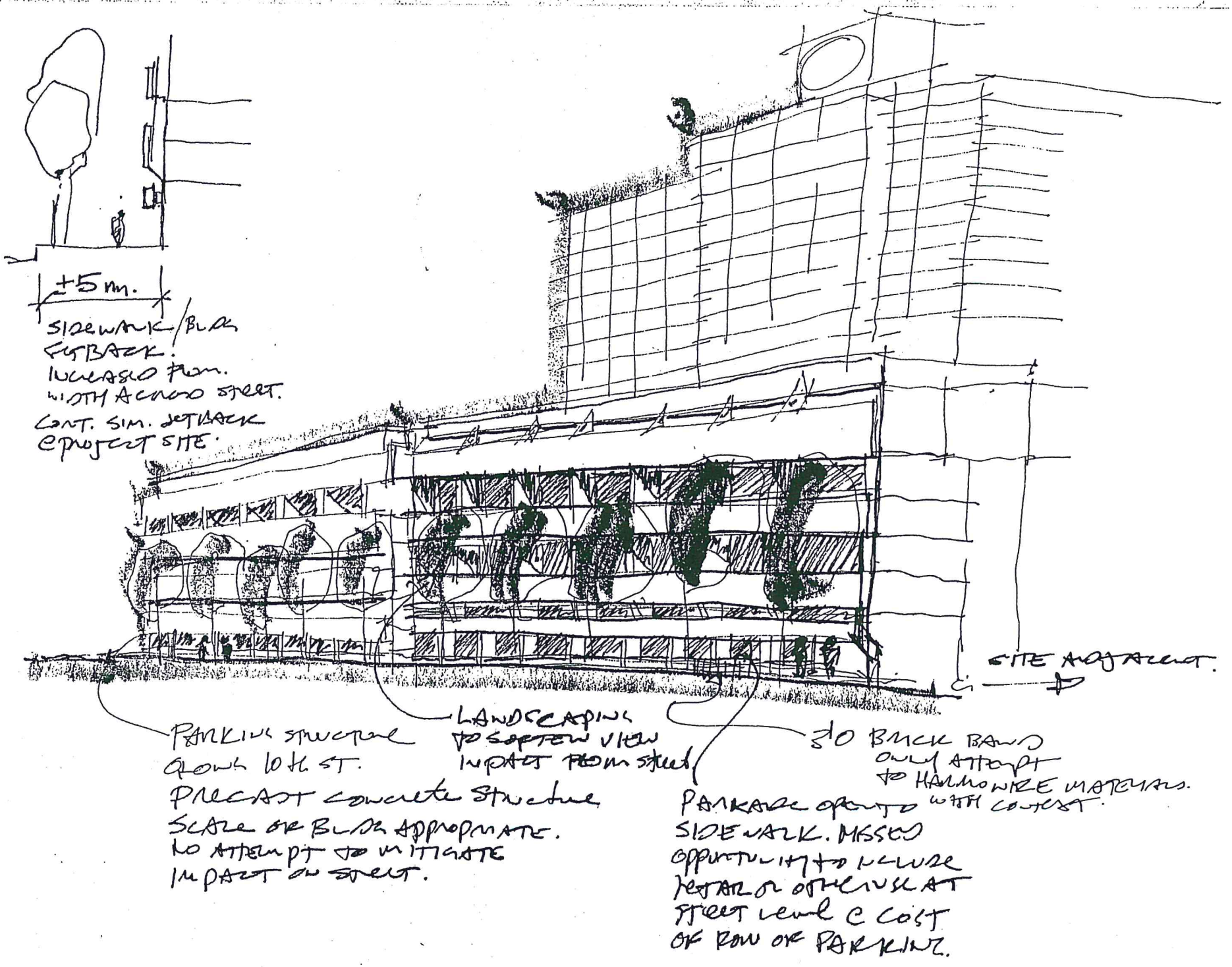
NARROW SIDEWALK
~~BEING~~ WITH RECESSED
MAIN Level gives ~~spatial~~
sense of wider space.

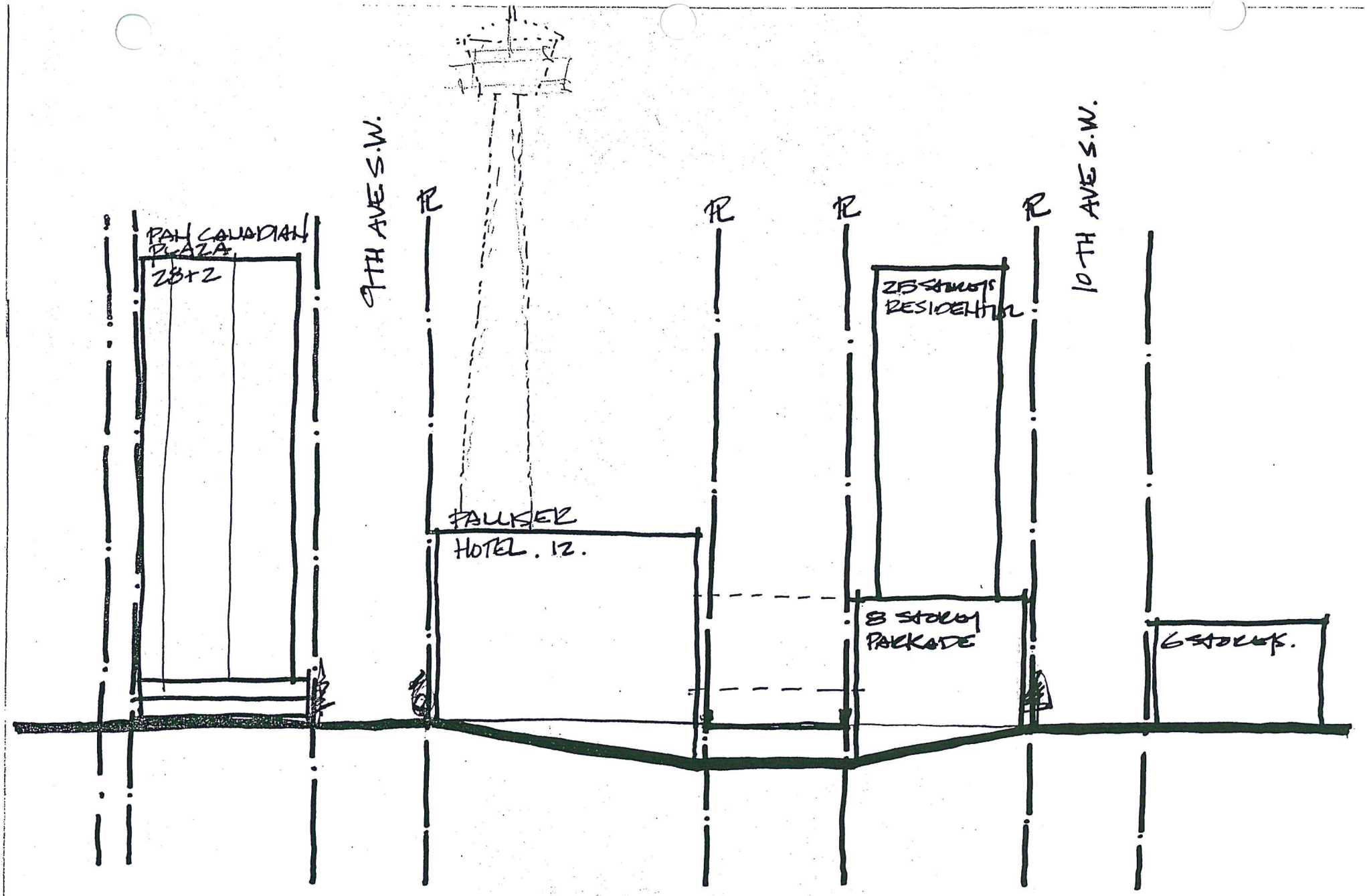


EAST WEST
BEYOND MAIN
ENTRY.
Lower level retail/commercial
space ½ FLOOR DOWN
Access from ext. stair.

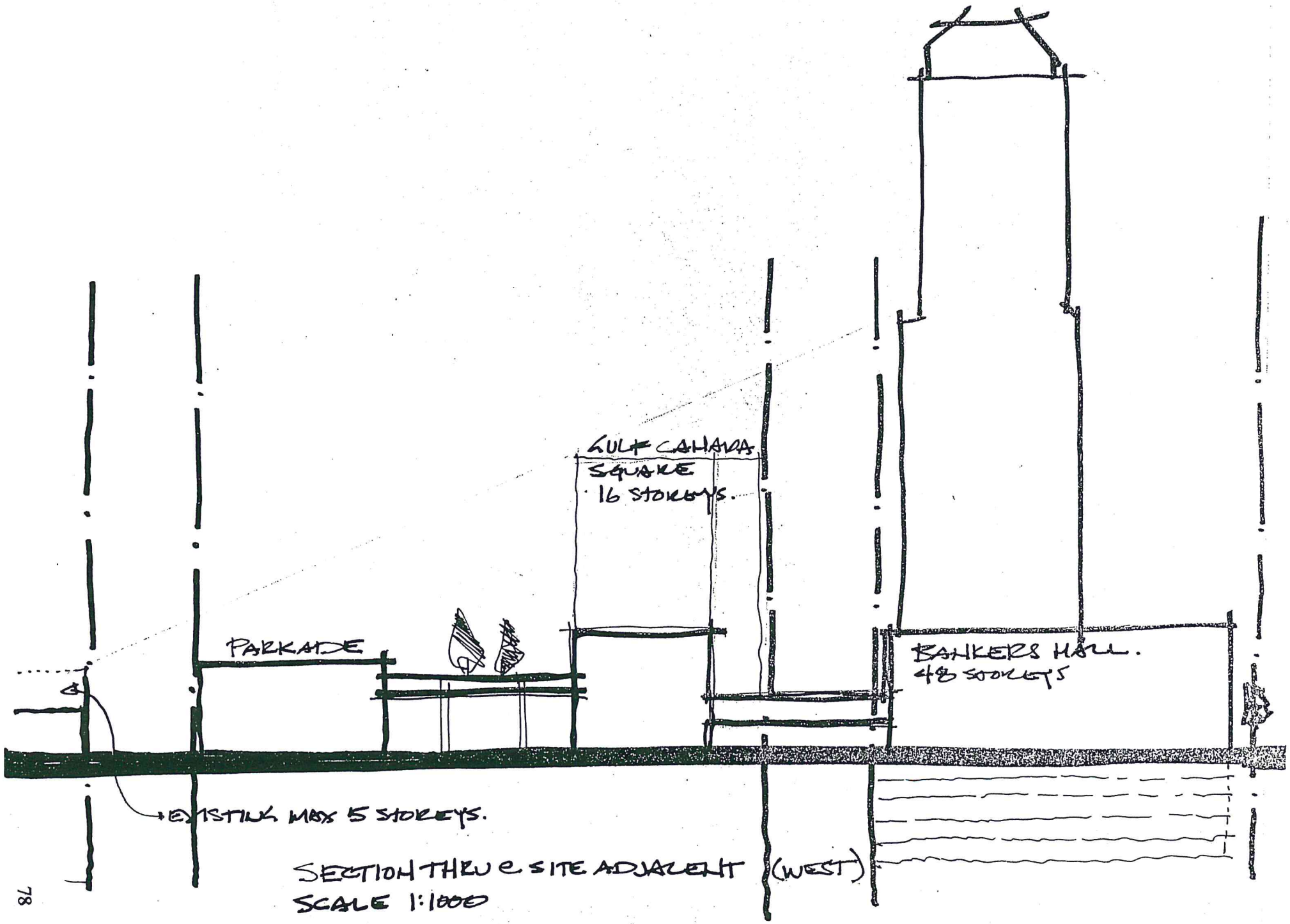


RENOVATION WAREHOUSE DISTRICT
HISTORIC / INDUSTRIAL.
CHARACTER BLDG.
2ND ST / 10TH AVE.

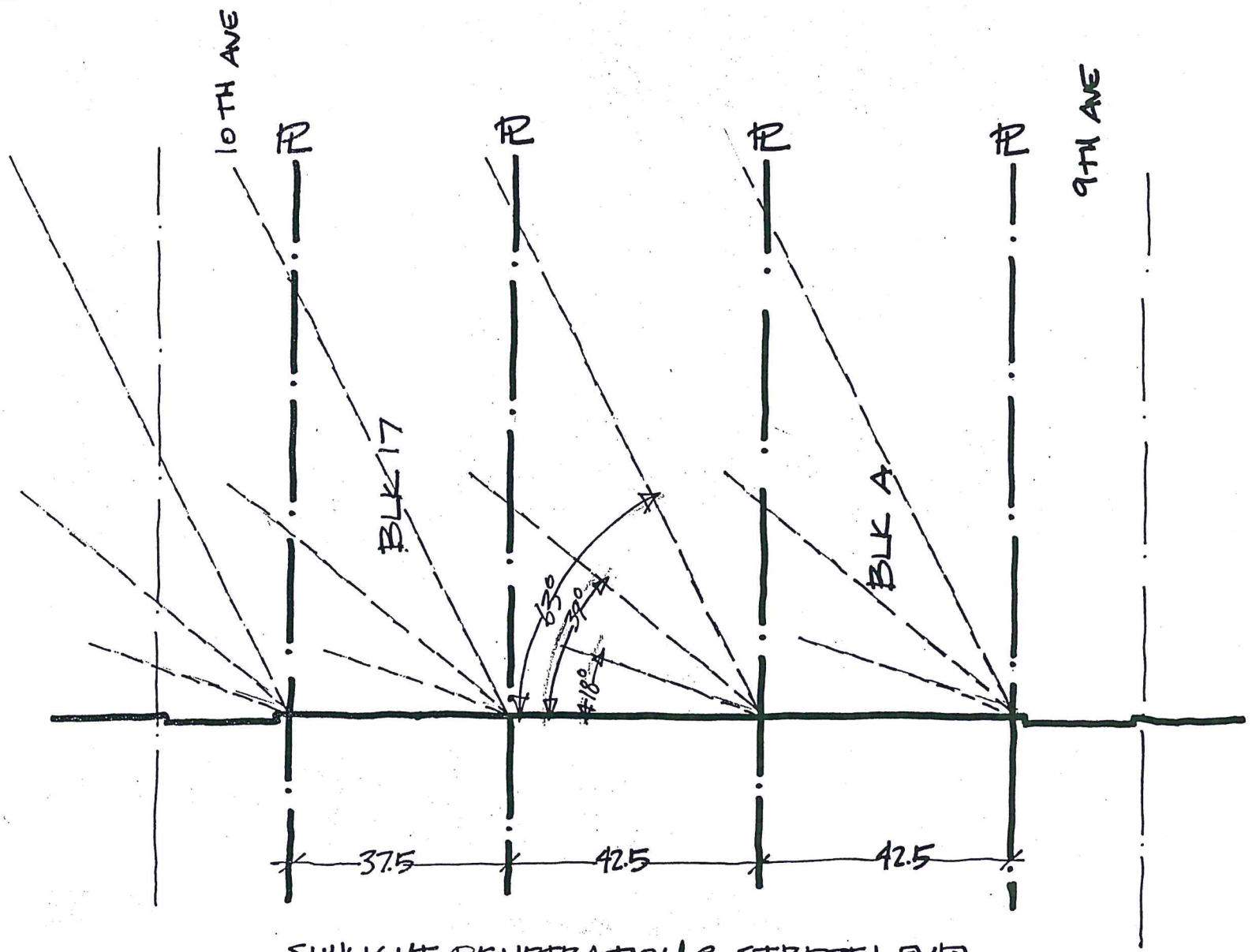

±5m.
SIDEWALK/BLDG SETBACK.
INCREASED FROM WIDTH ACROSS STREET.
CONT. SIM. SETBACK @PROJECT SITE.
PARKING STRUCTURE ALONG 10th ST.
PRECAST CONCRETE STRUCTURE SCALE OF BLDG APPROPRIATE. NO ATTEMPT TO MITIGATE IMPACT ON STREET.
LANDSCAPING TO SOFTEN VIEW IMPACT FROM STREET
PARKADE OPENS TO SIDEWALK. MISSED OPPORTUNITY TO INCLUDE RETAIL OR OTHER USE AT STREET LEVEL & COST OF ROW OR PARKING.
NO BRICK BAND ONLY ATTEMPT TO HARMONIZE MATERIALS WITH CONTEXT.
SITE ADJACENT.



SECTION THRU @ SITE ADJACENT (EAST)
SCALE 1:1000

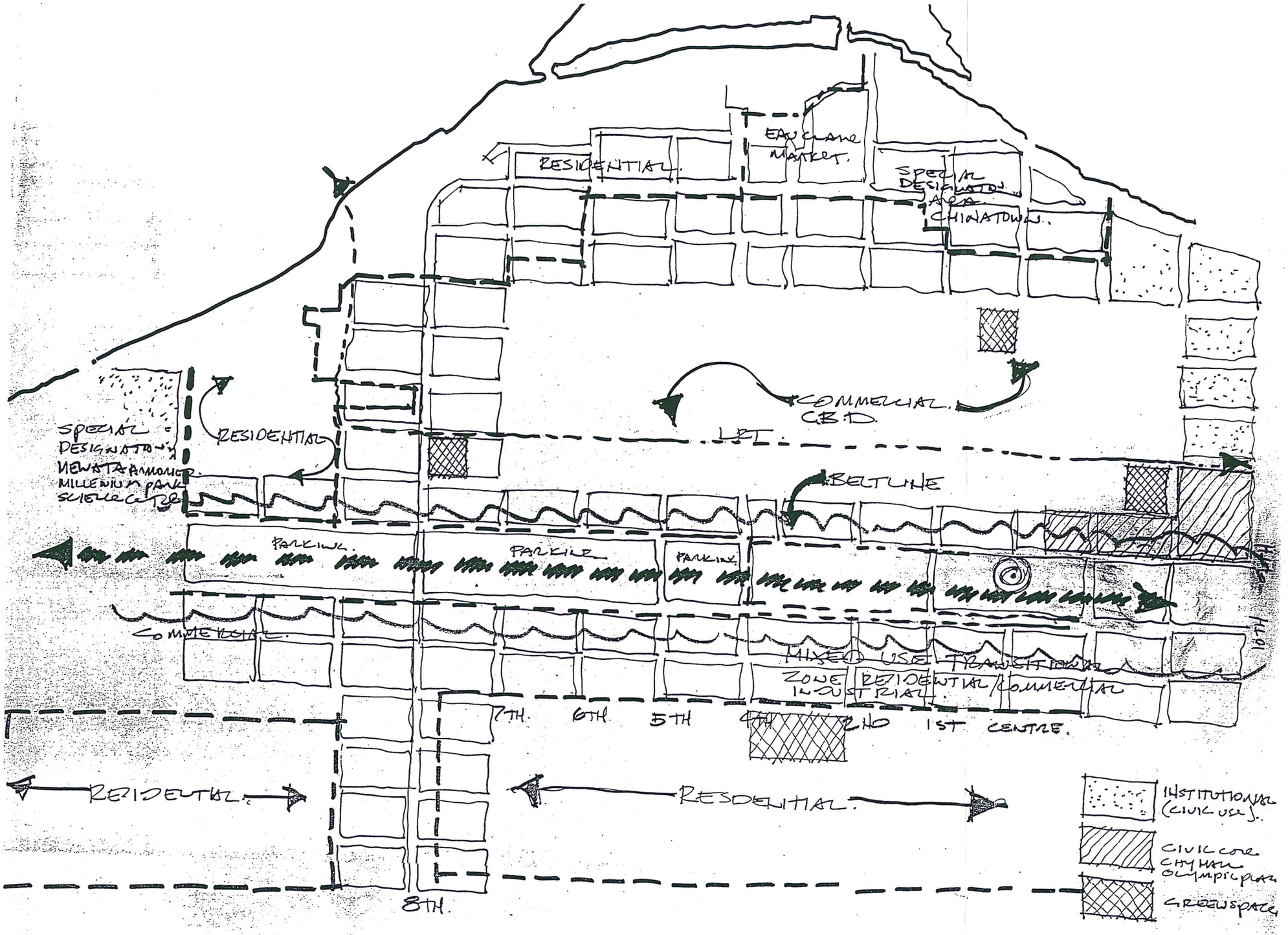


SECTION THRU e SITE ADJACENT (WEST)
SCALE 1:1000



SUNLIGHT PENETRATION @ STREET LEVEL
63° - NOON JUNE 21
39° - NOON MARCH 21 / SEPT. 21
18° - NOON DEC. 21

SUN PENETRATION
SCALE 1:1000


RESIDENTIAL.
FAIRCLANE MARKET.
SPECIAL DESIGNATED AREA CHINATOWN.
COMMERCIAL. C.B.D.
LRT
SPECIAL DESIGNATED NEWATA ARMOURY. MILLENIUM PARK SCIENCE CTR.
RESIDENTIAL
BELTLINE
PARKING.
PARKING.
PARKING.
COMMERCIAL.
MIXED USE TRANSITIONAL ZONE INDUSTRIAL
RESIDENTIAL/COMMERCIAL
7TH. 6TH. 5TH. 4TH. 2ND 1ST CENTRE.
RESIDENTIAL.
RESIDENTIAL.
8TH.
INSTITUTIONAL (CIVIC USE).
CIVIC CORE CITY HALL OLYMPIC PLAZA
GREENSPACE

ADDENDUM TO RESEARCH DOCUMENTATION AND ANALYSIS

FOR A PROPOSED MULTIMODAL TRANSIT STATION

IN DOWNTOWN CALGARY.

Introduction

The following is an addendum to the original proposal and program developed for a multi-modal transit station to be located within downtown Calgary. This document will provide greater detail and justification of the proposed building type by examining a scenario for the future of transportation systems within the city and systems impacting on the city as a destination point.

The assumption will be made for a four stage evolution of the building form at ten year increments Phase 1 being the current condition, Phase 4 being a period forty years into the future. The proposition for a site located along the existing railway remains unchanged. Concurrent with the design development of the proposed transit station will be the development of the selected site area as an urban planing study exploring the potential for connections between adjacent sites bisected by the railway. The current proposal for civic uses along with ancillary residential, hotel and commercial components as a scenario for potential land use also remains unchanged. However these elements are not assumed to be in stasis given that building uses evolve as time and needs progress, and the potential for future adaptive reuse must be taken into consideration.

Four Phase Evolution of a Transit Node

Phase 1 - Current

The train station located at Palliser Square currently serves trains running on scheduled stopovers to a maximum five times per week; Via Rail with three regular stops on a cross country run, the

Rocky Mountaineer running from Calgary to Vancouver twice weekly from May until October. Currently no provisions are made for transit buses, commercial carriers or direct linkages to the city's LRT system.

Phase 2 - Rail and Bus with Ancillary Development

This Phase assumes the incremental growth of tourism and transportation needs to the degree that commercial bus couriers will utilize the station concurrent with train services. Logistically this is justified as commercial carriers, such as the Red Arrow services, are located separately from the rail station. Consolidation allows for direct connections by users travelling to points within the province beyond Calgary. This does not preclude charter bus services from making specific pick up and drop offs within the C.B.D. but does also provide a central gathering and dispersion point for users. LRT pedestrian connections to 7th Avenue remain at this Phase. It is recognized that the Calgary International Airport remains as the major arrival point for visitors, many making bus connections through to Banff, and that this scenario is likely to remain unchanged. Given the proximity to the city's civic core the incorporation of public transit stops is justified.

Phase 3 - Train, Bus, LRT

At this Phase assumptions are made regarding Calgary's transportation system that see the evolution of the building program into a true multi-modal station.

Assumption 1: Feasibility of rail connection to Edmonton and points north. The potential for rail/high speed rail connections to Edmonton have been shown to be

economically viable given travel times. Operating speeds within city limits for high speed rail match conventional rail speeds. Therefore additional rail passenger volume can be anticipated over and above that of Phase 1 and 2.

Assumption 2: That passenger rail travel between Vancouver and Calgary has increased, the trip still considered a tourist destination in itself.

Assumption 3: A commuter link has been established between the communities of Banff and Canmore and downtown Calgary. Population increases have impacted on road systems and the commuter link has been established as a more environmentally sound means of servicing commuter needs by utilizing existing infrastructure rather than by simply increasing roadways to handle greater traffic volume.

Assumption 4: LRT expansion has extended within proximity of the International Airport. The increased population base within the northeast has warranted an extension of existing LRT lines to suburban areas. The LRT connection to the airport develops as a spur line providing an alternative means of reaching the downtown core. Two factors arise with the connection with the airport, one being the possibility of capturing a significant percentage of visitors previously bypassing downtown Calgary and two, designing a structure that

is in itself a destination or arrival point to the downtown.

Assumption 5: Commercial buslines and public transit utilizing the station remain as per Phase 2. The station remains as a stop close in proximity to the downtown cultural/civic core. Ancillary uses incorporate the proposed structure into the civic fabric.

Assumption 6: Given the increased population and need to accommodate increased vehicular traffic, LRT movement through downtown is relocated to utilize the Canadian Pacific right of way freeing 7th Avenue for vehicular traffic. The impact of this is significant in two ways: (1) by allowing increased traffic volume into downtown (the assumption that private vehicles are still the preferred means of transportation); and (2) reintroduction of vehicular traffic serves to rejuvenate business and street activity along 7th Avenue with the removal of elevated stations impeding circulation, vehicular traffic adding contributing to increased accessability to businesses currently restricted. An alternative to this being the relocation of only the Bow Trail/northeast line along the C.P. right of way, and combining LRT with vehicular use at 7th Avenue.

Assumption 7: This Phase makes the assumption that planning authorities will recognize the positive environmental aspect and contributing value towards sustainable

development of adopting a policy of increasing density within the current 1999 city limits. While not completely rejecting the existing pattern of increased suburbanization the assumption will be made that land currently vacant along the rail right-of-way will be recognized as having potential to being developed as a multi-use land zone incorporating both commercial/residential uses to a density not disproportionate to existing zones adjacent to the area within the C.B.D. Opportunities exist not only within the areas adjacent the railway but also for density increase and redevelopment within the existing areas of Victoria Park and Inglewood to the east of the current downtown core.

By making this assumption the project presupposes that while the desire to live in detached housing will still be favoured a significant percentage of the city's future inhabitants will also reside within areas of increased density close to the current C.B.D. Taking its cue from current development in other cities for example Vancouver's Yaletown redevelopment and Toronto's Lakeshore development a similar course of development and population distribution could occur in Calgary.

This justifies the expansion of transportation systems not only in the north-south directions to serve new suburban areas but also along an east-west corridor, particularly with new development along the CP right-of-way.

Given this corridors proximity to the downtown to some degree precludes the use of the automobile as an efficient means of transportation and justifies/rationalizes the expansion of the LRT to serve this area. The most rational means of extending the system would be to utilize the existing railway for LRT expansion sharing the right-of-way with freight and passenger rail service.

Phase 4 - Dissimulation of Built Form

At this Phase the evolution of transport leaves the structure as a historical artifact for adaptive reuse. This Phase assumes the relocation or replacement of freight/passenger rail service with alternative modes of transportation. A remnant of the railway is left to explain the origins of the built form and the impact of rail on Calgary's city structure. The LRT corridor remains as mass transit is still required the building being adapted while maintaining public transportation services within.

Conclusion

The project therefore will focus specifically on a design meeting the criteria established in Phase 3. The final design proposal will illustrate incremental growth from Phase 1 to Phase 3 with a proposed schematic design for Phase 4 illustrating potential for the space when transportation is no longer its main generating use.

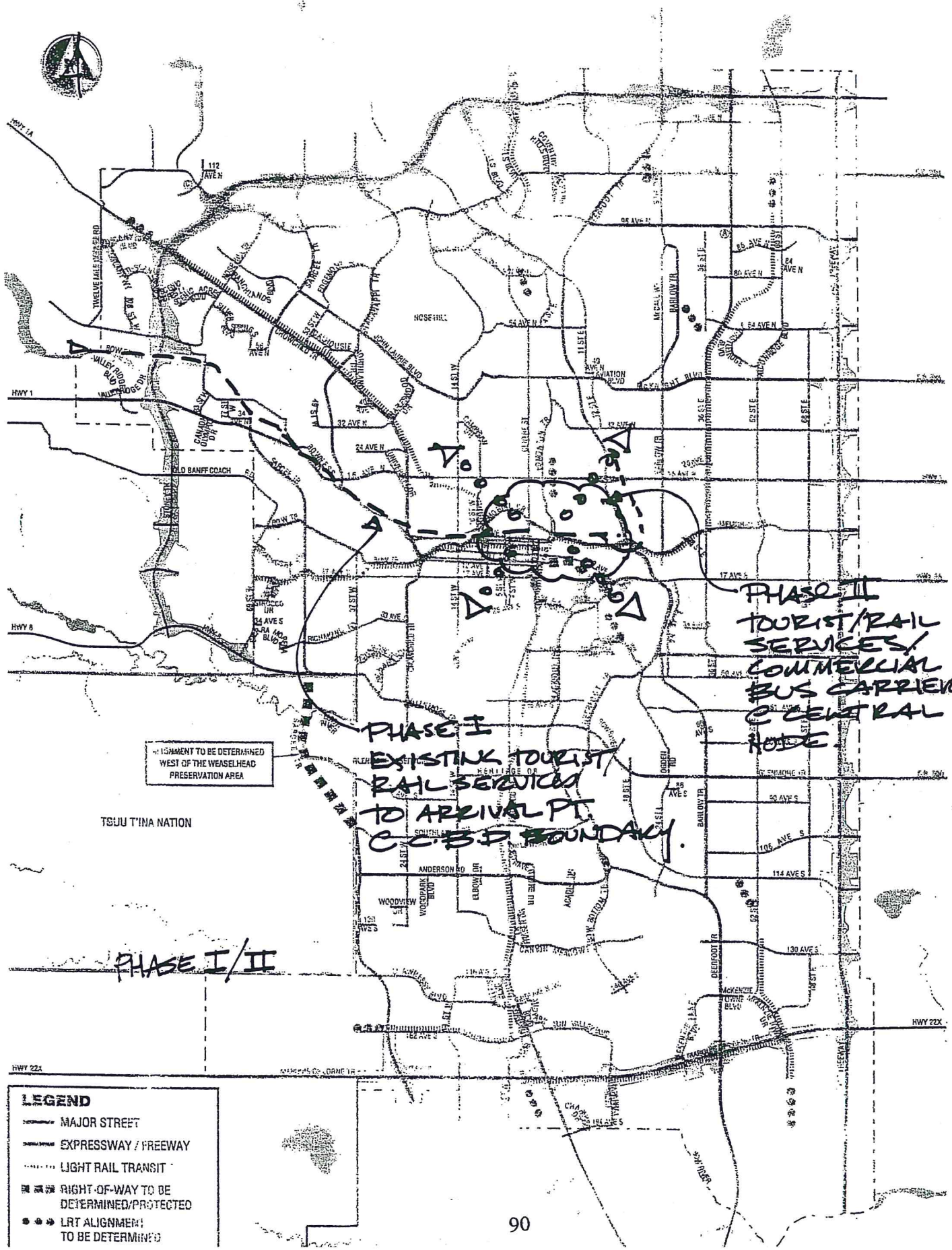
Site Reselection

The site proposed for this project has been relocated from 9th Avenue and 1st Street S.W., west of the Palliser Hotel, to the site directly east of the Hotel occupied by Palliser Square and the Calgary Tower. A major mitigating factor for this relocation was the difficulty in accommodating commercial and transit buses within the previous site. The relocation east of the Palliser Hotel provides additional area to accommodate a greater number of buses and greater ease of circulation. This is also the site of Calgary's most prominent landmark, which however, is without functions that enervate the space at street level. The introduction of the proposed program responds to this condition and conversely this site serves to provide immediate legibility to the location of the intended project.

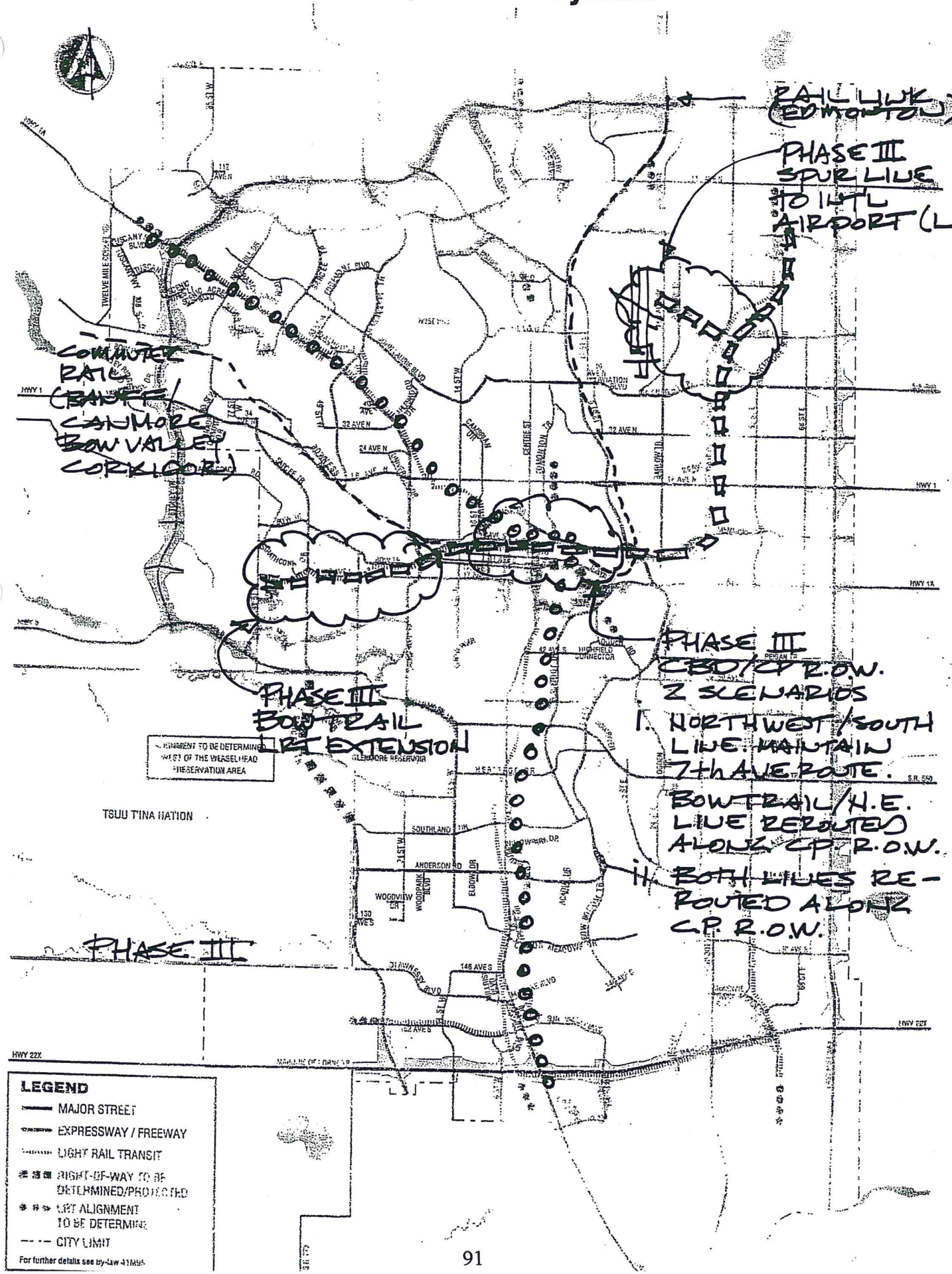
This relocation also echoes the original concept put forward in the Mawson Plan for the Future of Calgary. Certain aspects of this plan were adopted, particularly the alignment of Centre Street as a major access to downtown which was to terminate in a CPR station and plaza. The current railway station falls far short of this vision. Similarly the Calgary Tower serves as a dominant visual structure but fails as a civic space. The intent through this relocation is in part to try and regain some of this lost vision.

LIST OF ILLUSTRATIONS

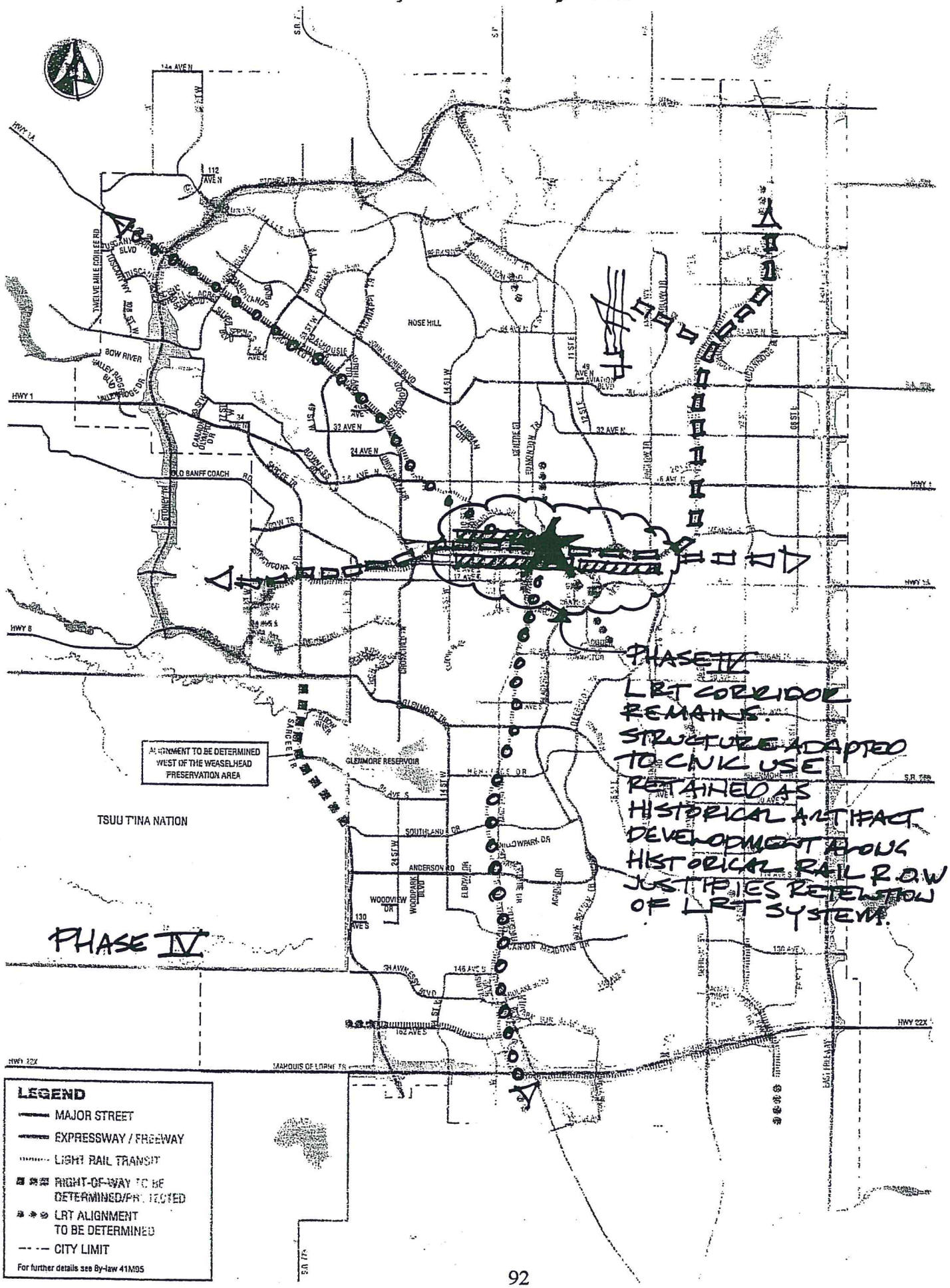
Transportation System



Transportation System



Transportation System



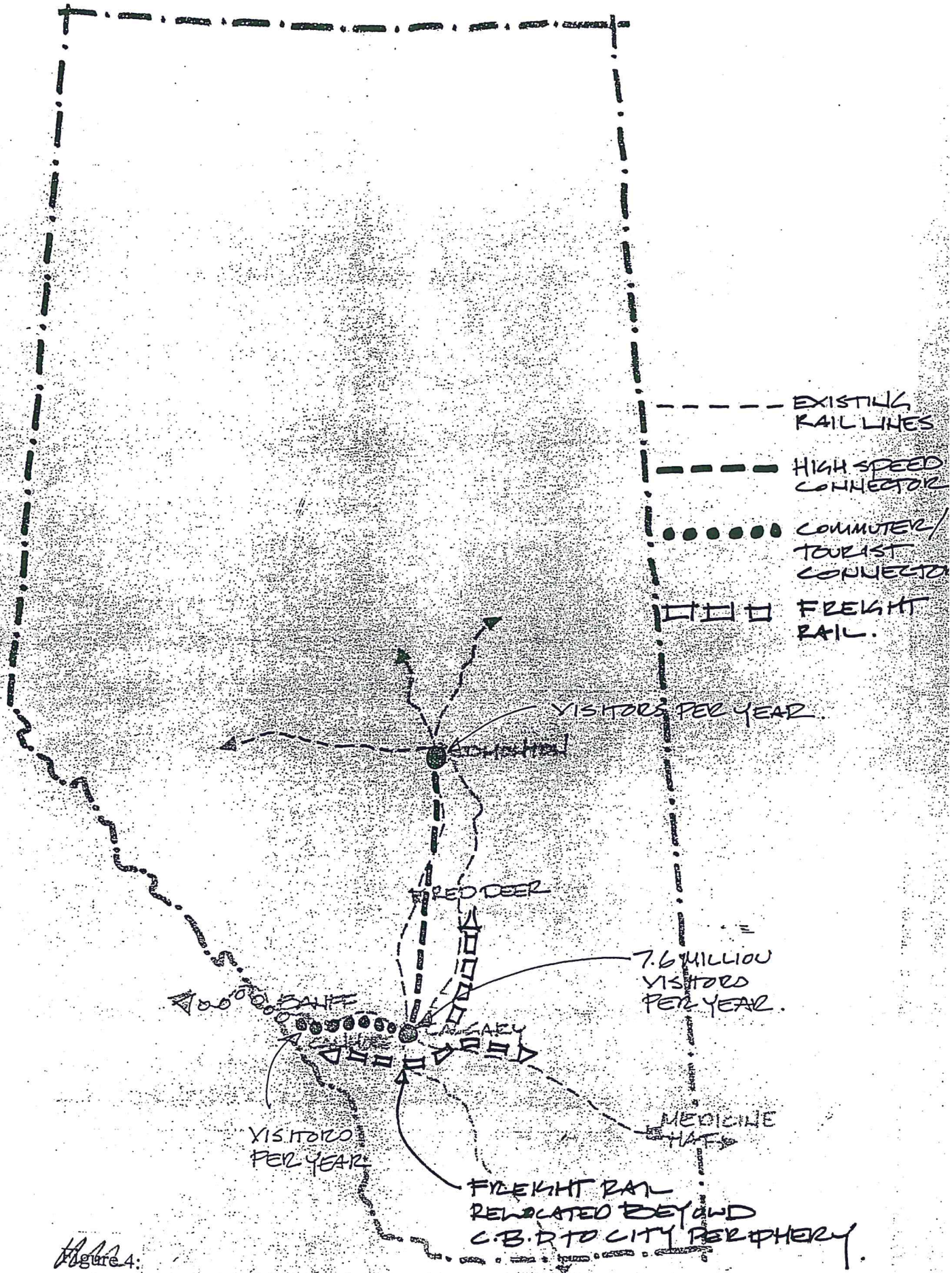
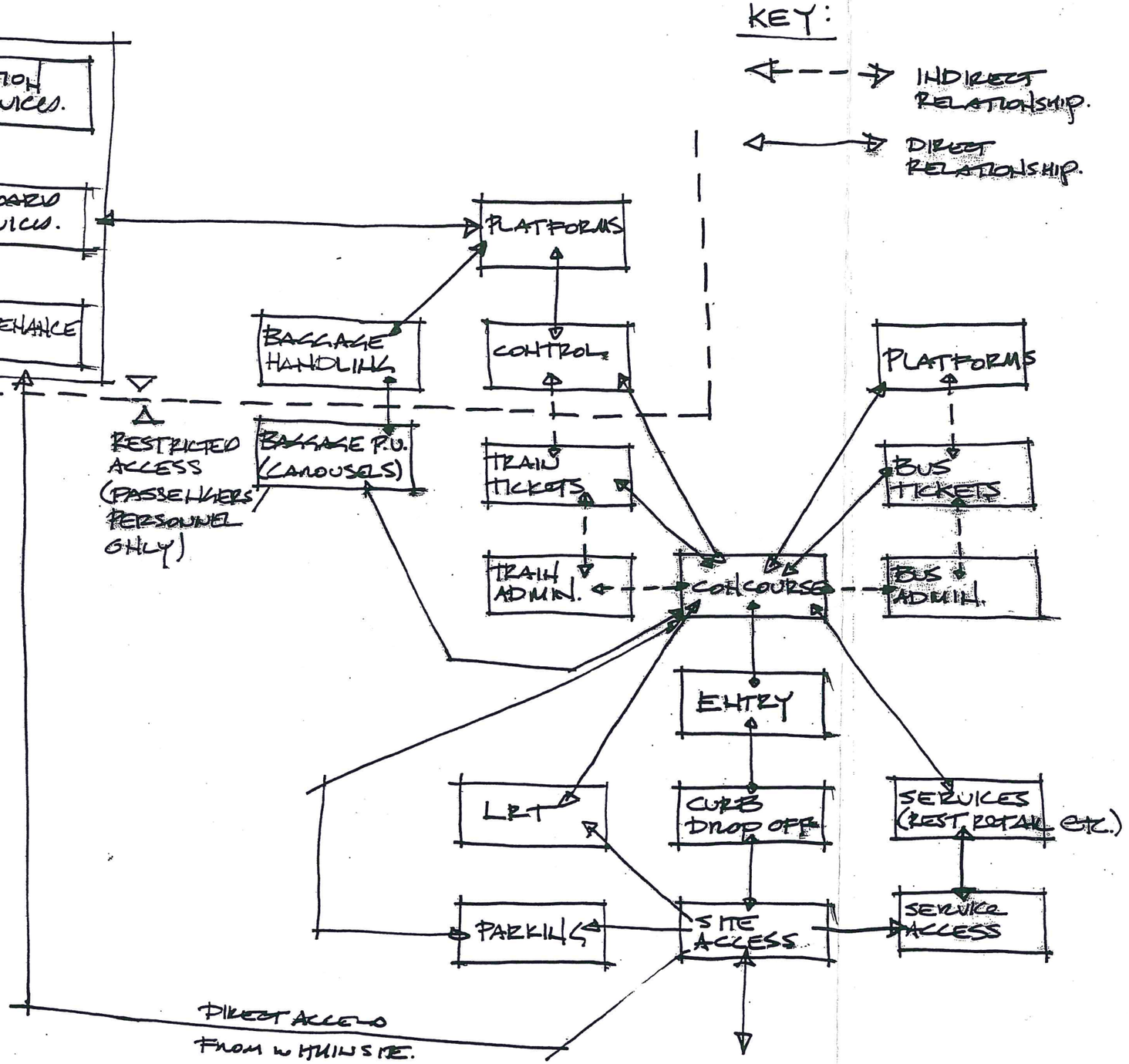
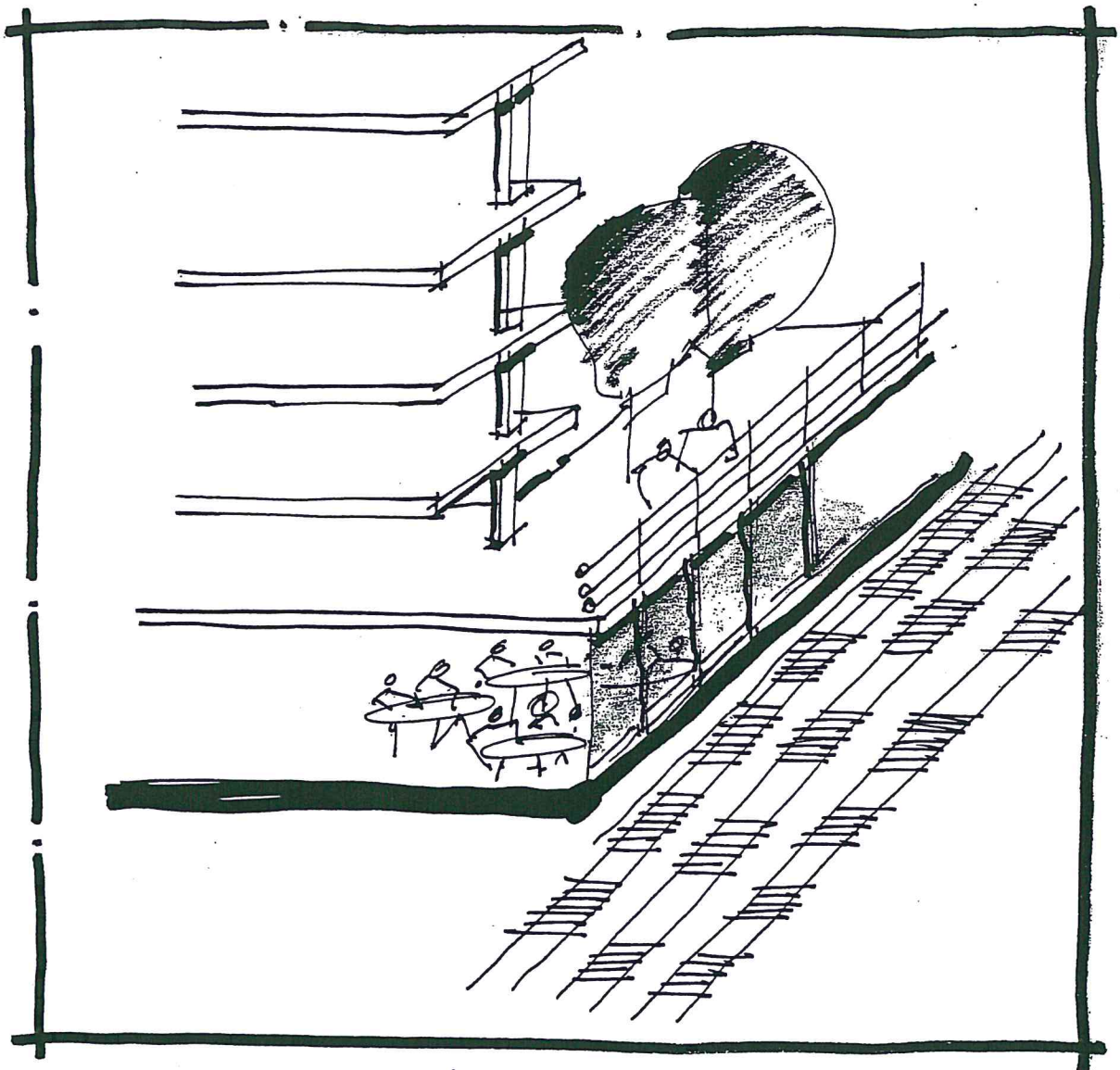

EXISTING RAIL LINES
HIGH SPEED CONNECTOR
COMMUTER/ TOURIST CONNECTOR
FREIGHT RAIL.
VISITORS PER YEAR.
EDMONTON
RED DEER
7.6 MILLION VISITORS PER YEAR.
CALGARY
MEDICINE HAT
VISITORS PER YEAR
FREIGHT RAIL RELOCATED BEYOND C.B.D TO CITY PERIPHERY.

Figure 4.

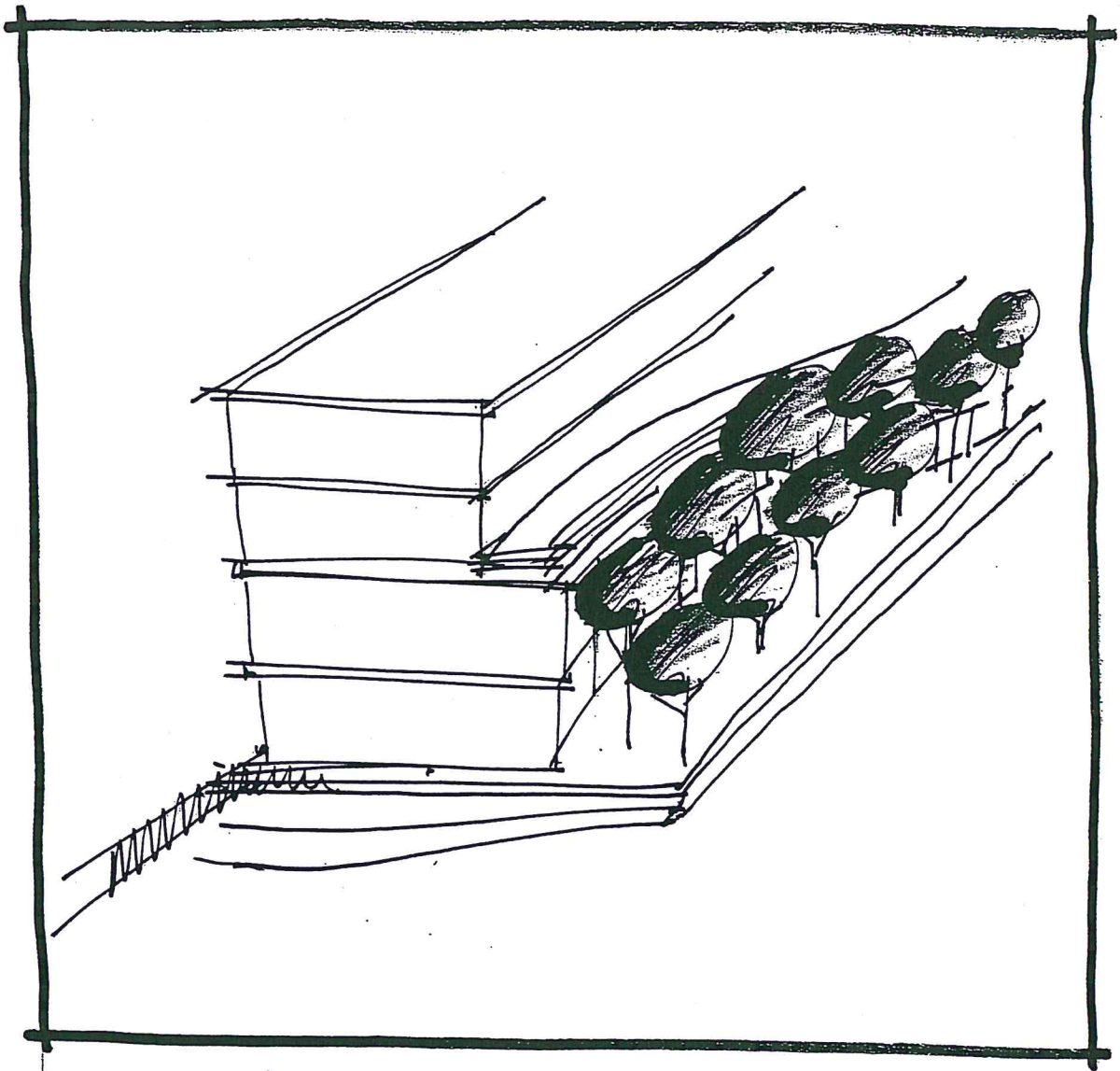

KEY:
INDIRECT RELATIONSHIP.
DIRECT RELATIONSHIP.
STATION SERVICES.
ONBOARD SERVICES.
MAINTENANCE
RESTRICTED ACCESS (PASSENGERS/ PERSONNEL ONLY)
BAGGAGE HANDLING
BAGGAGE P.U. (CAROUSELS)
PLATFORMS
CONTROL
TRAIN TICKETS
TRAIN ADMIN.
CONCOURSE
PLATFORMS
BUS TICKETS
BUS ADMIN.
ENTRY
LRT
CURB DROP OFF
SERVICES (REST ROOMS etc.)
PARKING
SITE ACCESS
SERVICE ACCESS
DIRECT ACCESS FROM WITHIN SITE.



OUTDOOR VIEWING / INTERIOR VIEWING

OUTDOOR VIEWS/SPACES OHOTRACKS

SPACES FOR THE VICARIOUS TRAVELLER



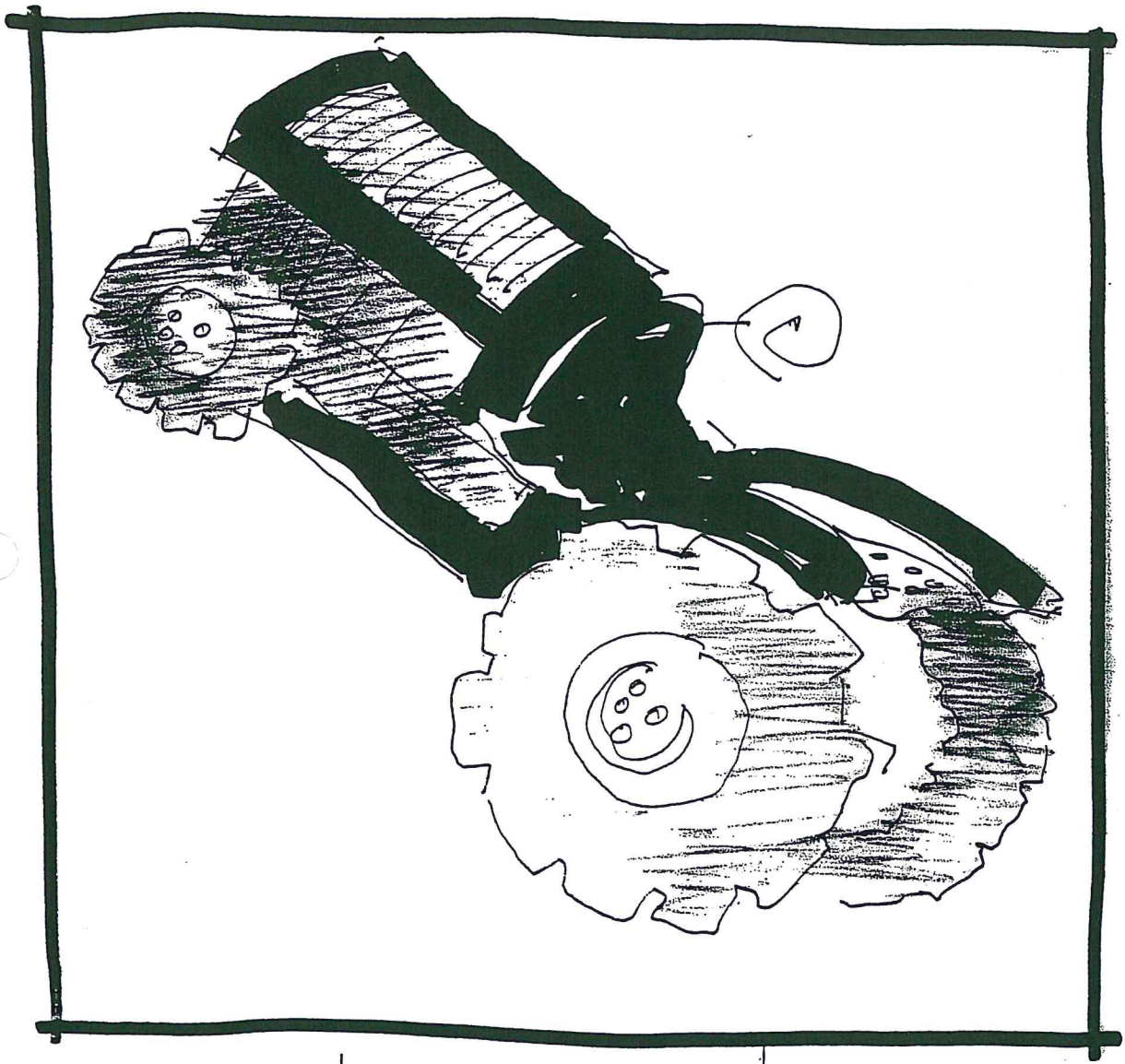
PEDESTRIAN STREETS.

1. 9TH AVENUE: HOLD BACK BLK FACADE FULL PEDESTRIAN FROM PROXIMITY TO ONE WAY STREET.

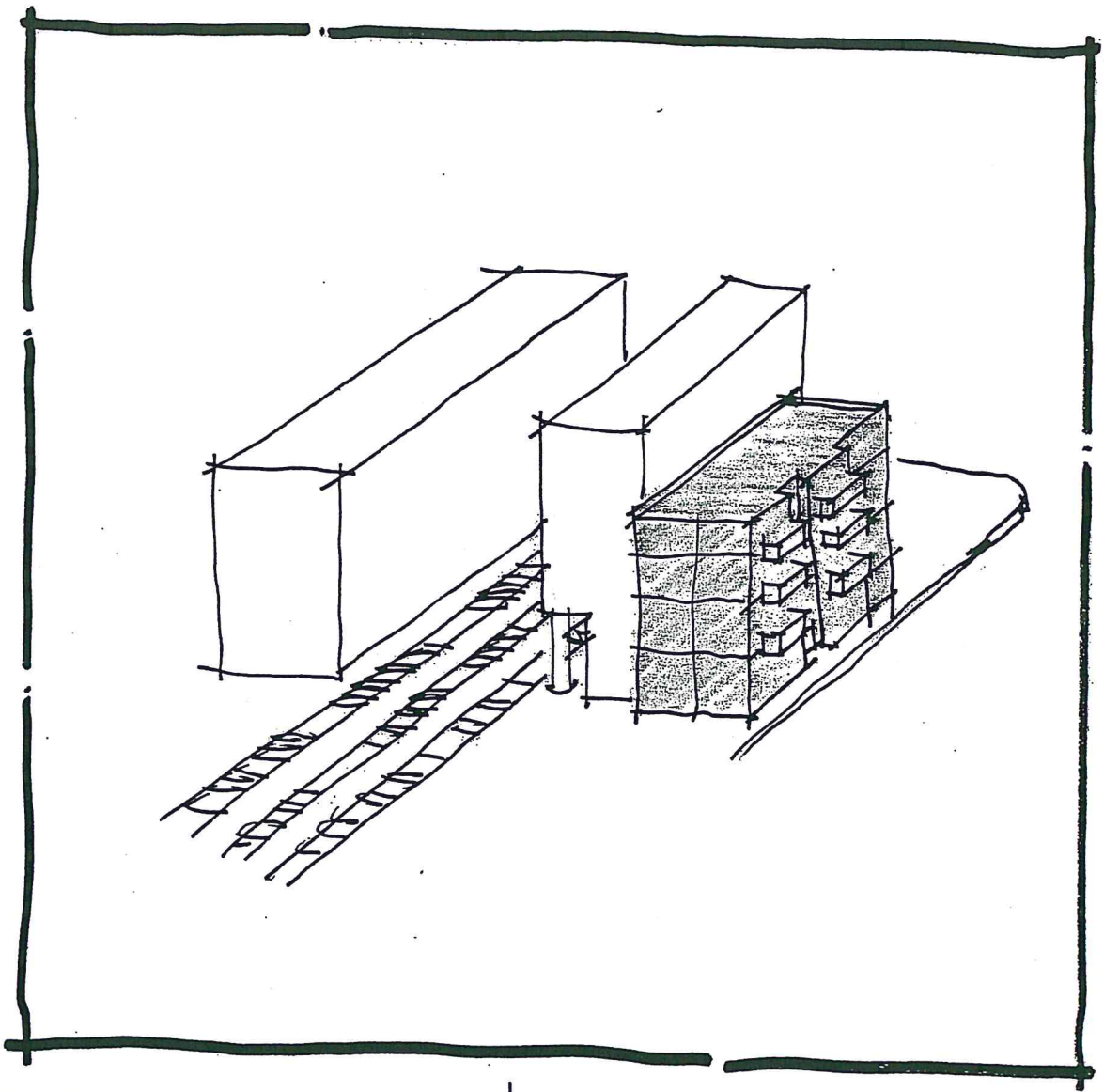
2. SCALE

3. CANOPIES.

4. FLATIRON

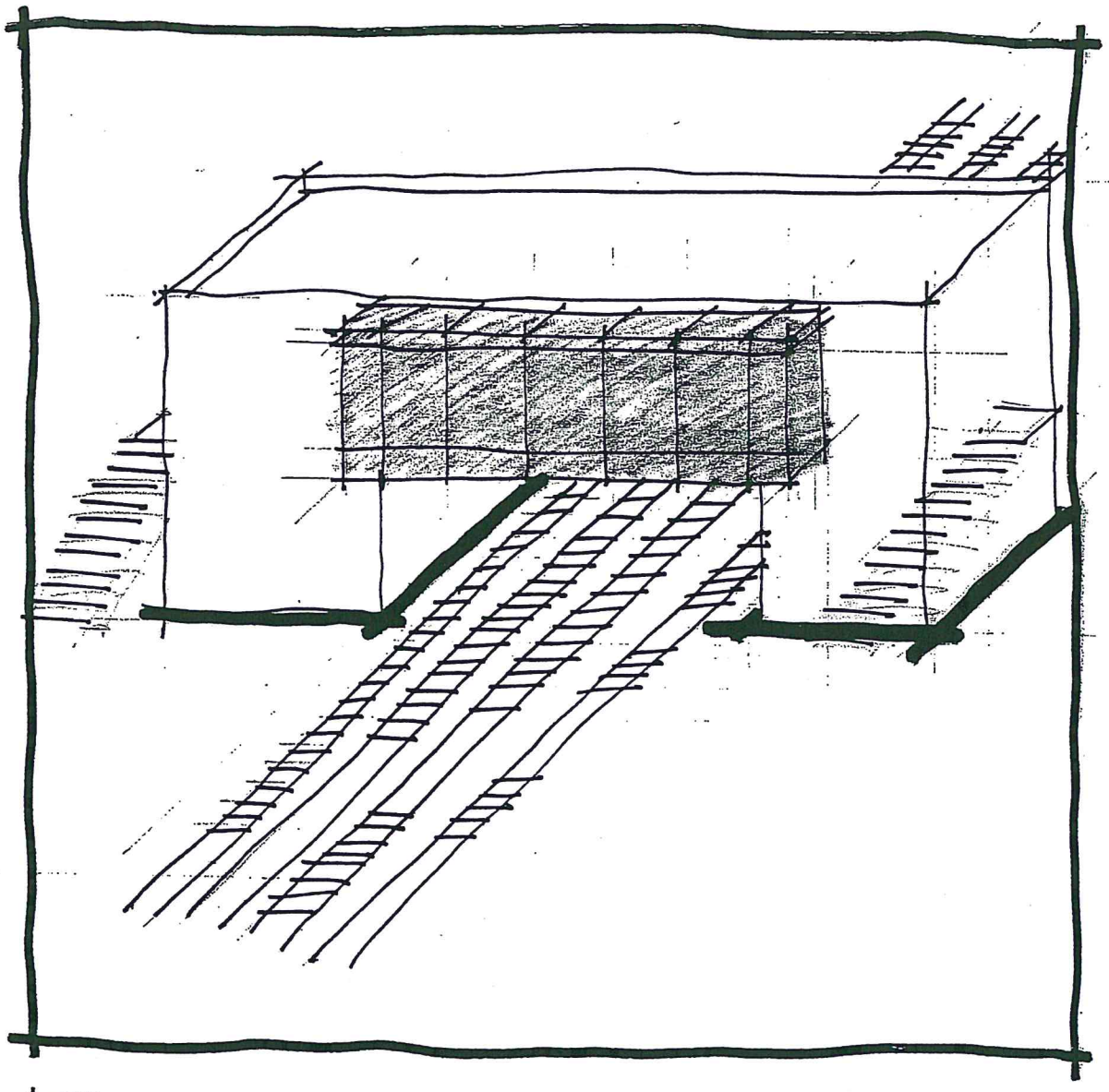


CELEBRATION OF TRANSPORTATION

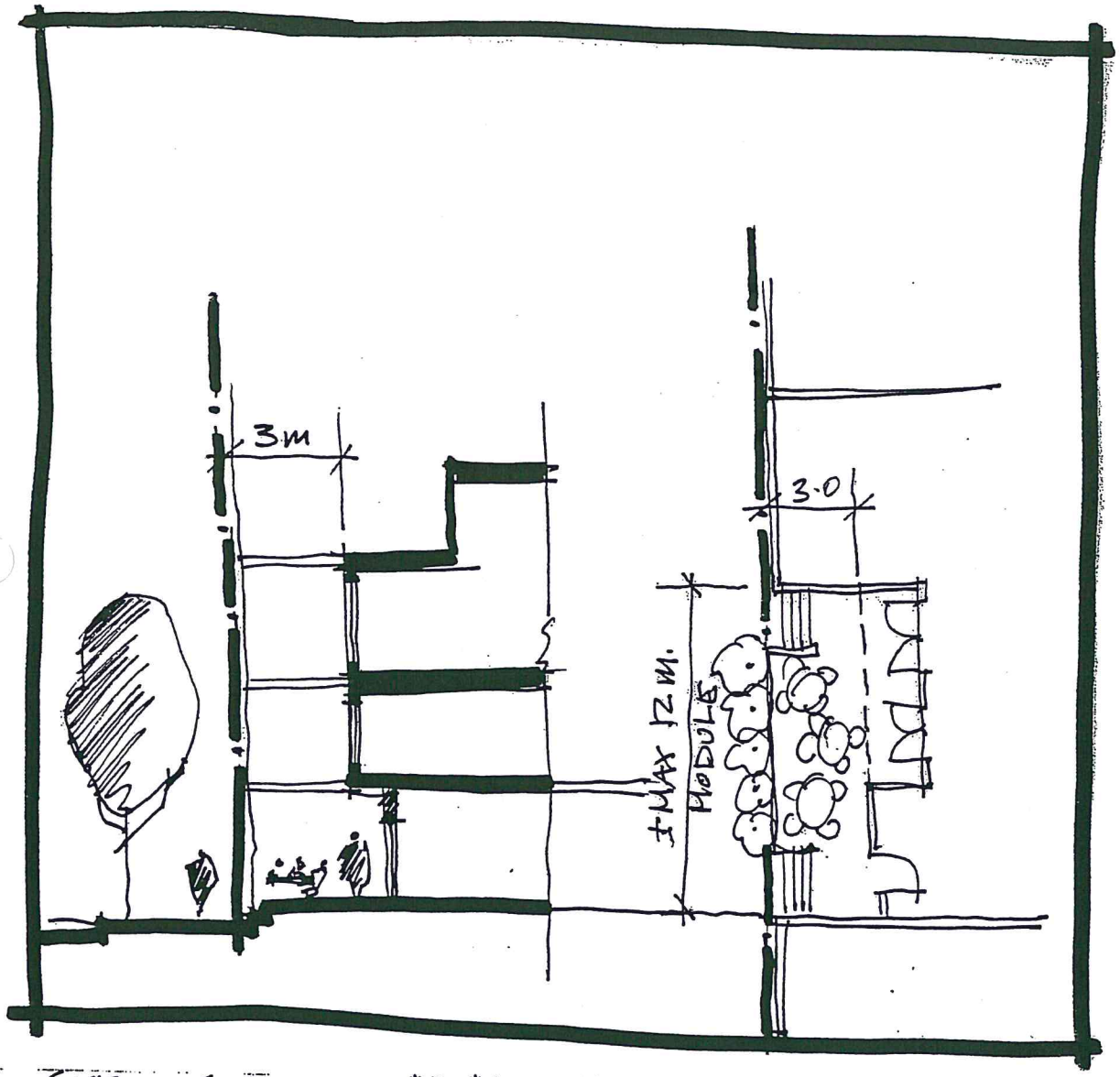


ACOUSTIC SEPARATION.

RESIDENTIAL SPACE FROM DIRECT INTERFACE WITH RAILWAY

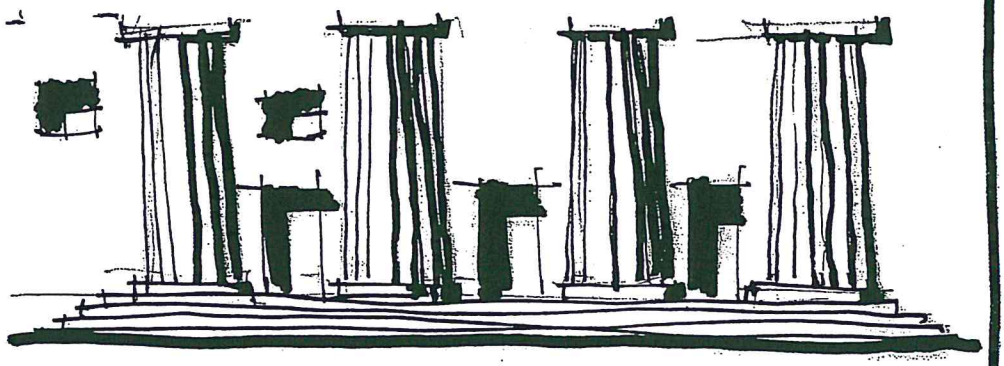


BRIDGE OVER TRACKS
UTILIZE VIEW OPPORTUNITIES



STREET WALL CONTINUITY

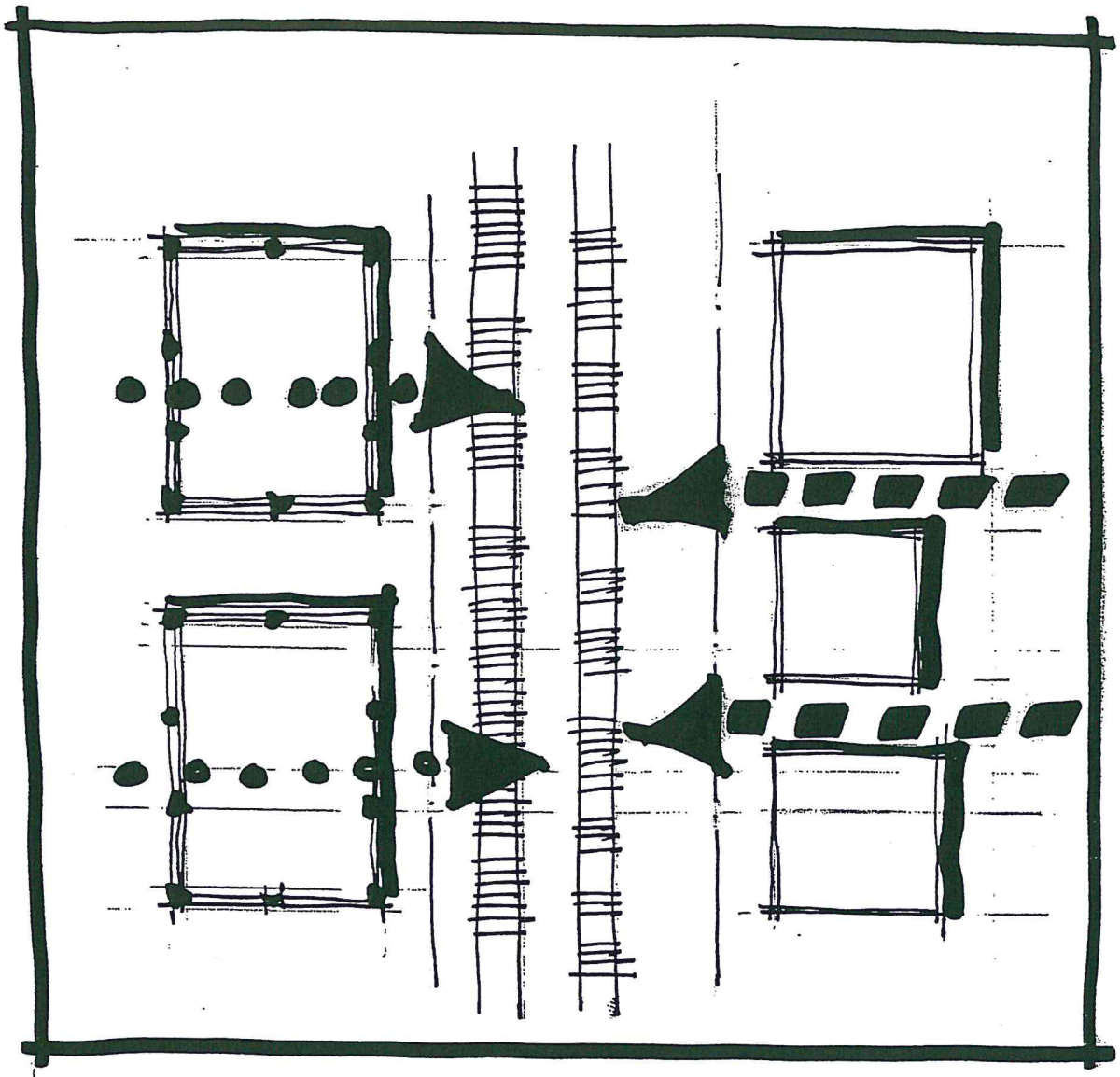
WITH MODULE SETBACK



SKETCH FACADE

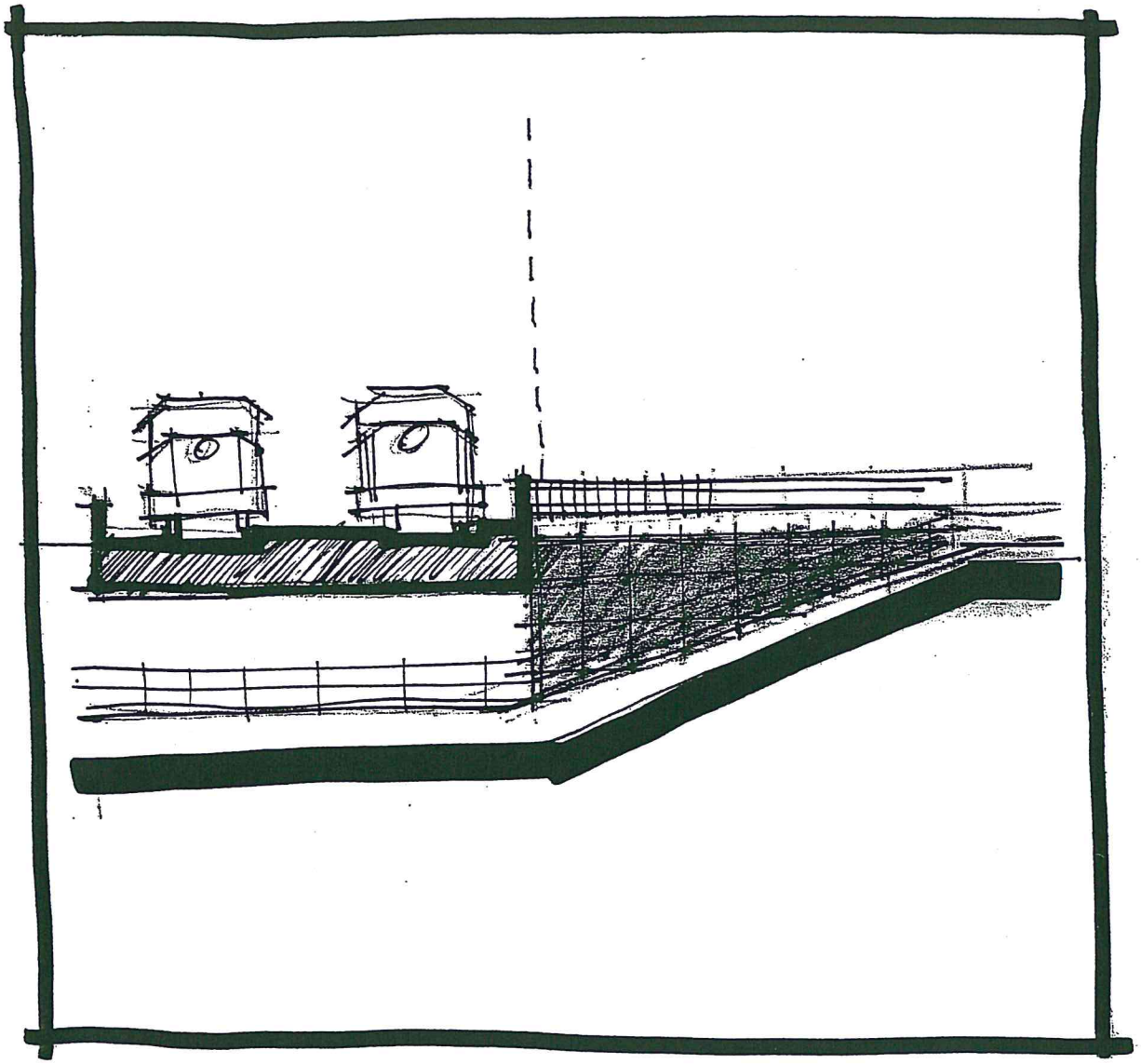
ENTRY TO HOTEL/TRAIN STATION

HISTORICAL INTERPRETATION

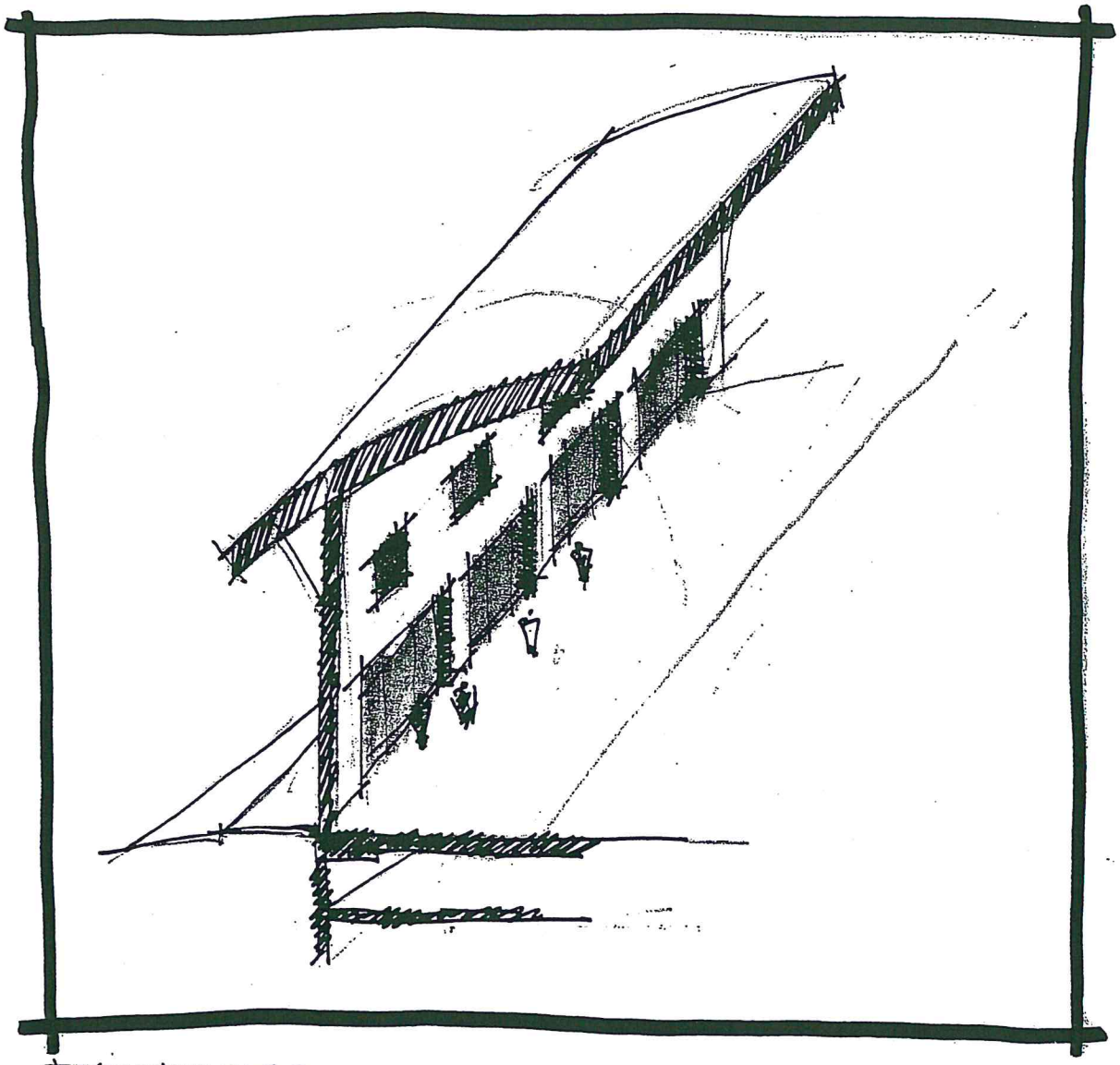


TRANSPARENCY

I. VIEWS THRU BUILDING (9th AVE)
VIEWS AROUND BUILDING/THRU
II. MASSING

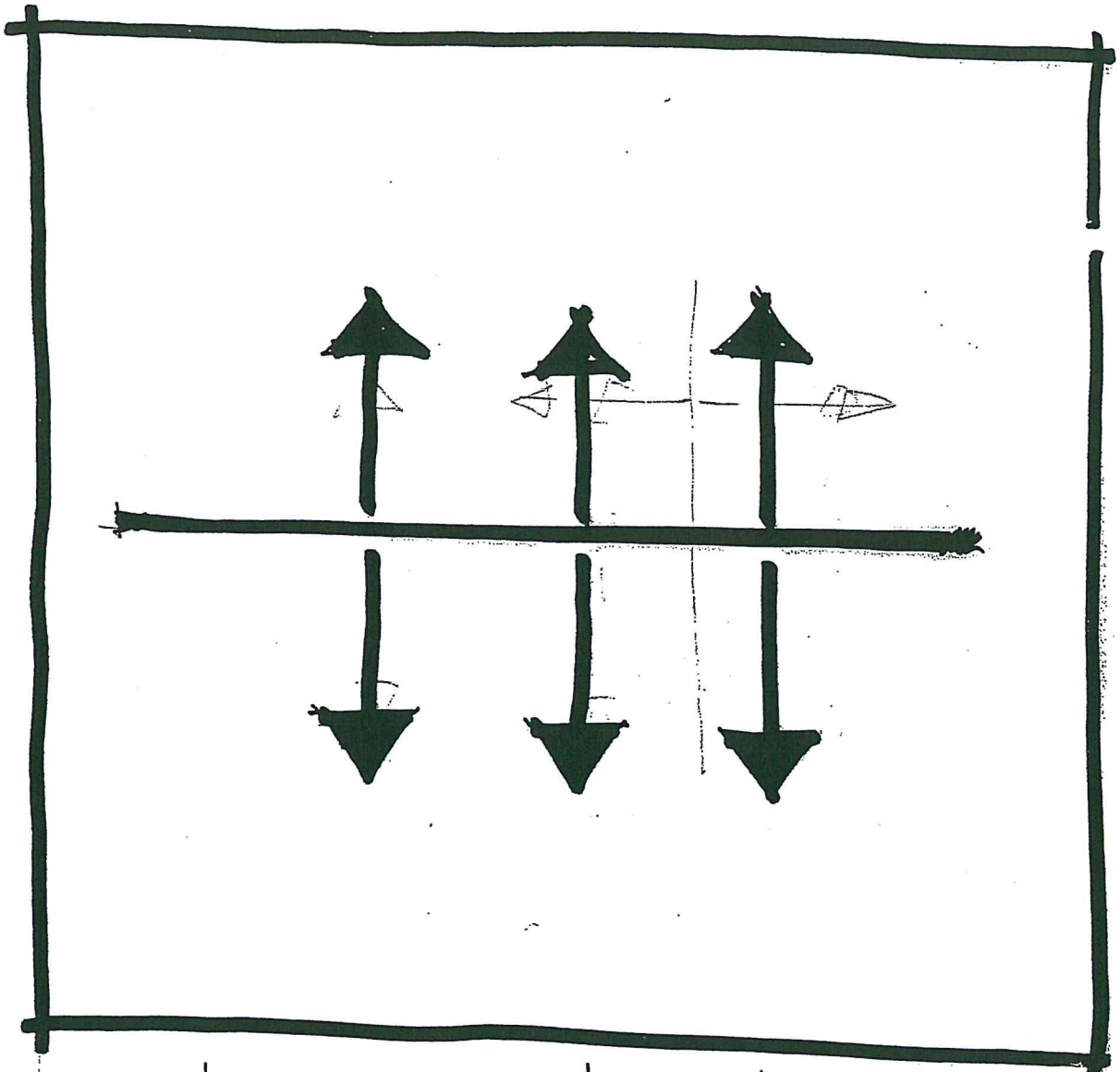


VIEWS INTO NEW STRUCTURE C.
PEDESTRIAN UNDERPASS
ALLEVIATE IMPACT OF EXISTING CONC. COLUMN



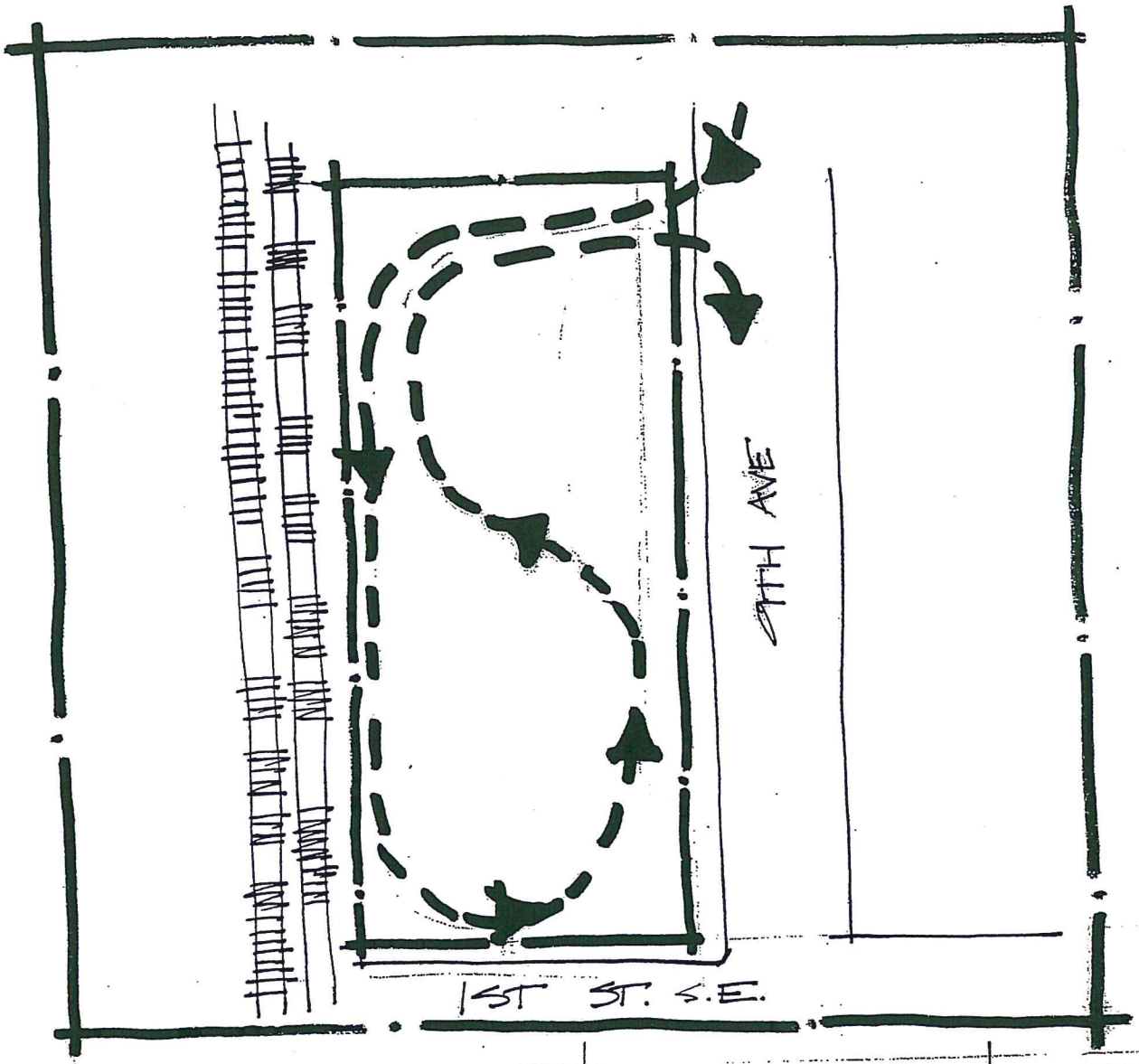
VOLUMETRICS.

SCALE OF INTERIOR SPACES RAILWAY STATION/ HOTEL LOBBY. MAJOR CIRCULATION SPACES



RATIONAL CIRCULATION PATTERNS

VEHICULAR/PEDESTRIAN

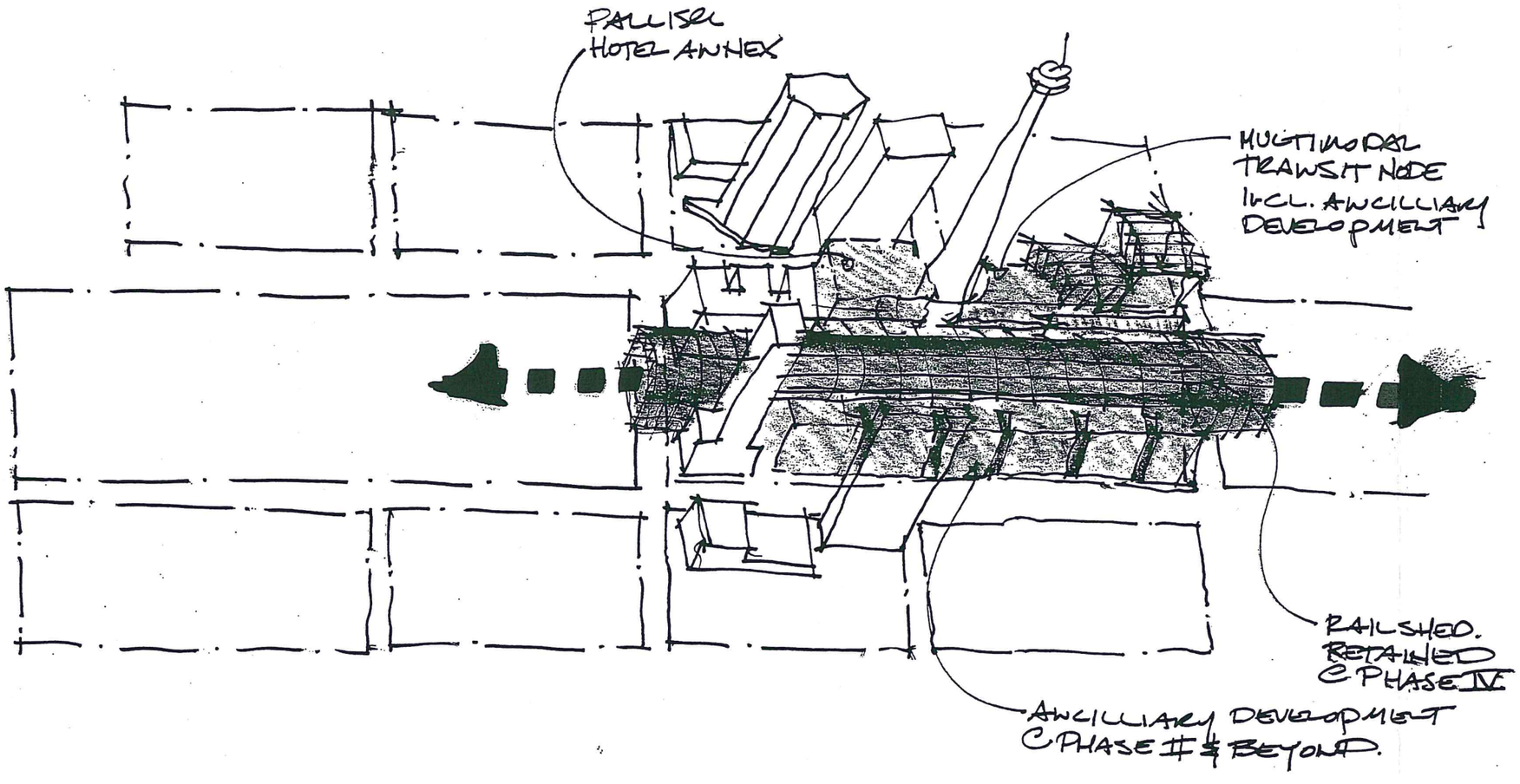


VEHICULAR CIRCULATION/BUS CIRCULATION

I. AVOID SURFACE CIRCULATION BUSES AND SERVICE VEHICLES: BELOW GRADE

II. SURFACE DROP OFF PRIVATE VEHICLES.

III. MAINTAIN ADEQUATE DISTANCE IST AND 9TH.


PALLISER
HOTEL ANNEX
MULTIMODAL
TRANSIT NODE
INCL. ANCILLIARY
DEVELOPMENT
RAILSHED.
RETAINED
C PHASE IV.
ANCILLIARY DEVELOPMENT
C PHASE II & BEYOND.

THE CITY OF CALGARY
PLANNING & BUILDING
PLANNING SERVICES

Downtown Calgary

Plus 15 System

POTENTIAL RETENTION OF N/W/S LRT ROUTE @ 7TH AVE (BOW TRAIL EXTENSION RELOCATED)

FUTURE REROUTING OF LRT @ RAIL R.O.W. WITH DEVELOPMENT OF RAIL LANDS/MARKET/ C.B.D. EXPANSION SOUTH.

POTENTIAL REROUTING OF LRT ALONG 7TH AVE CORRIDOR (SURFACE CONNECTION)

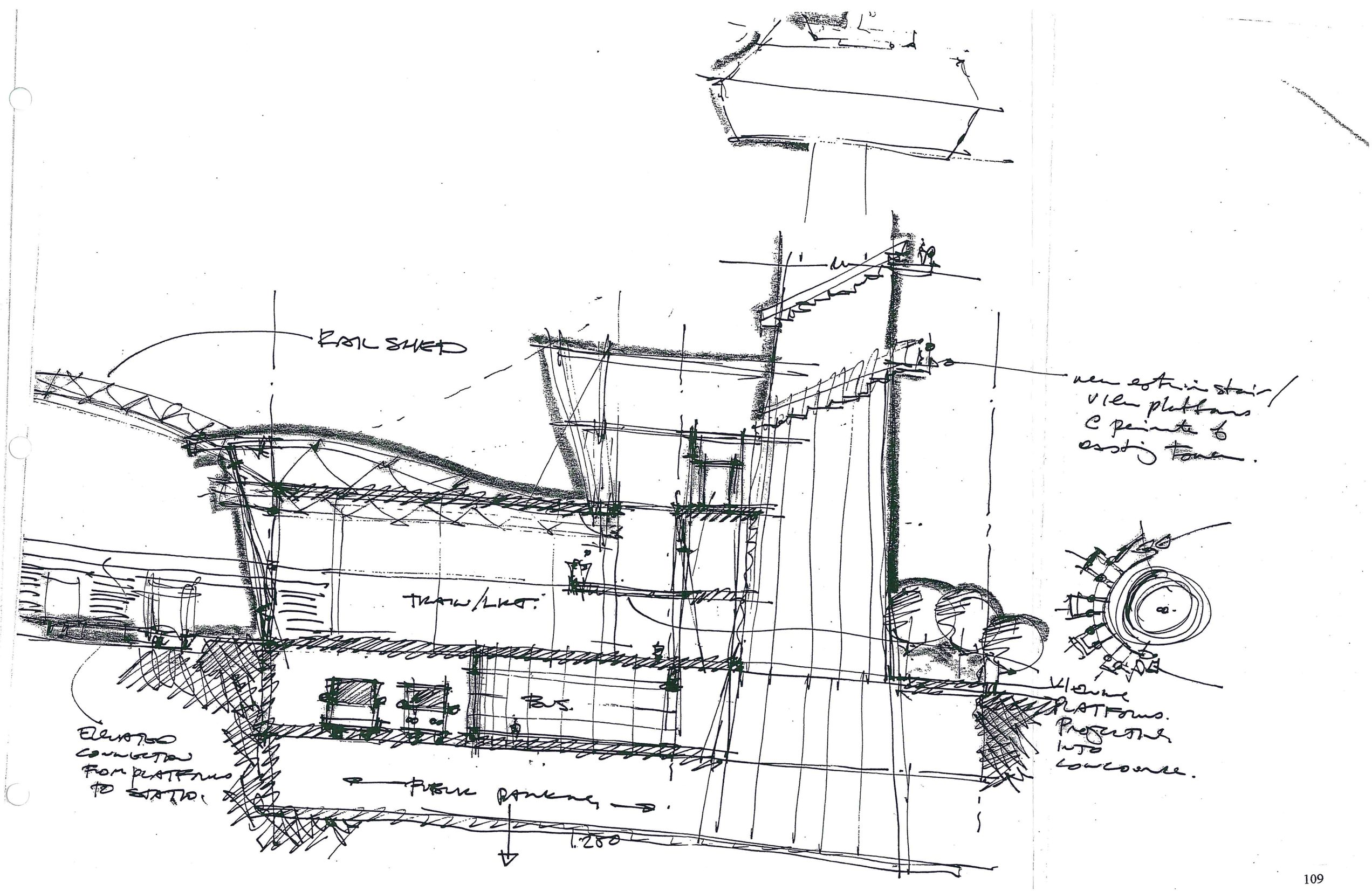
NORTHWEST LINE

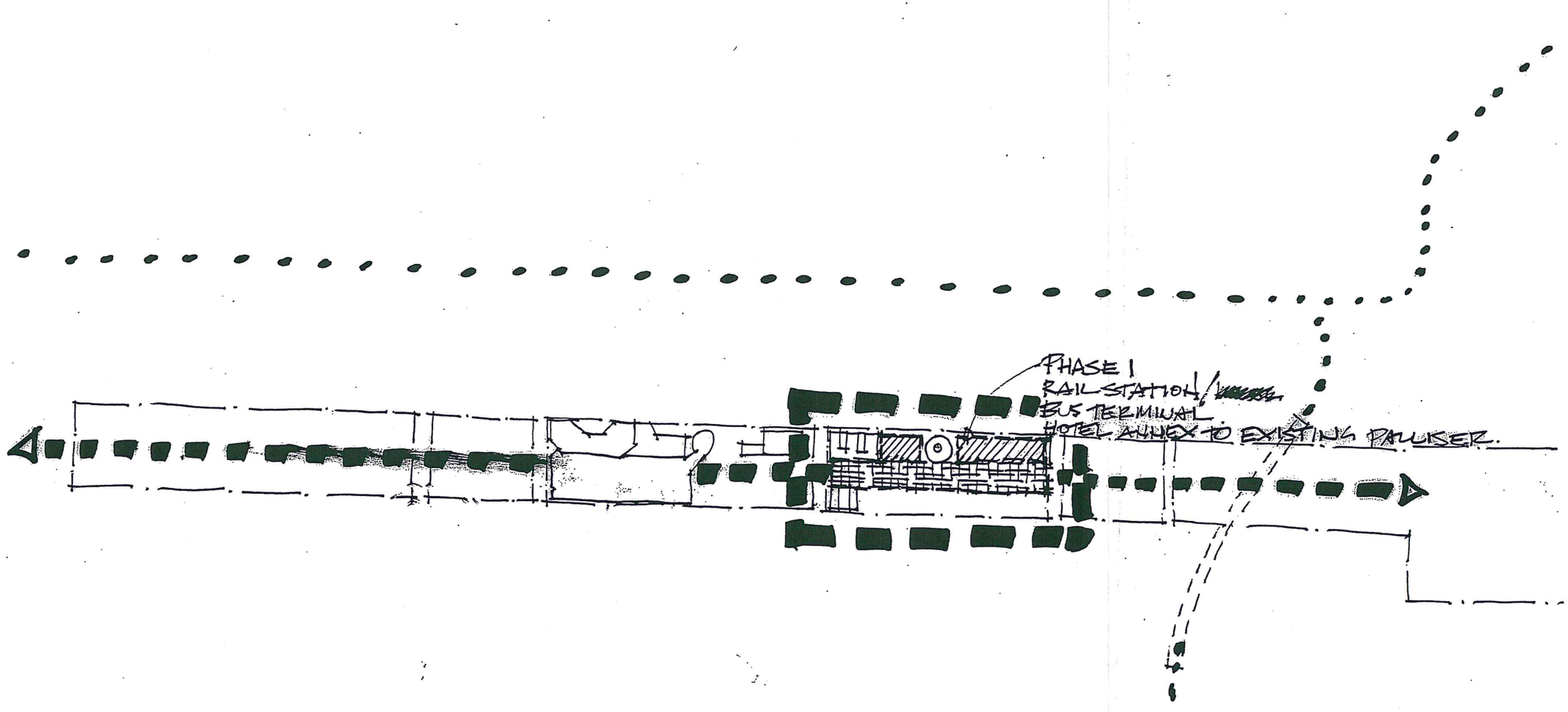
BOW TRAIL EXTENSION

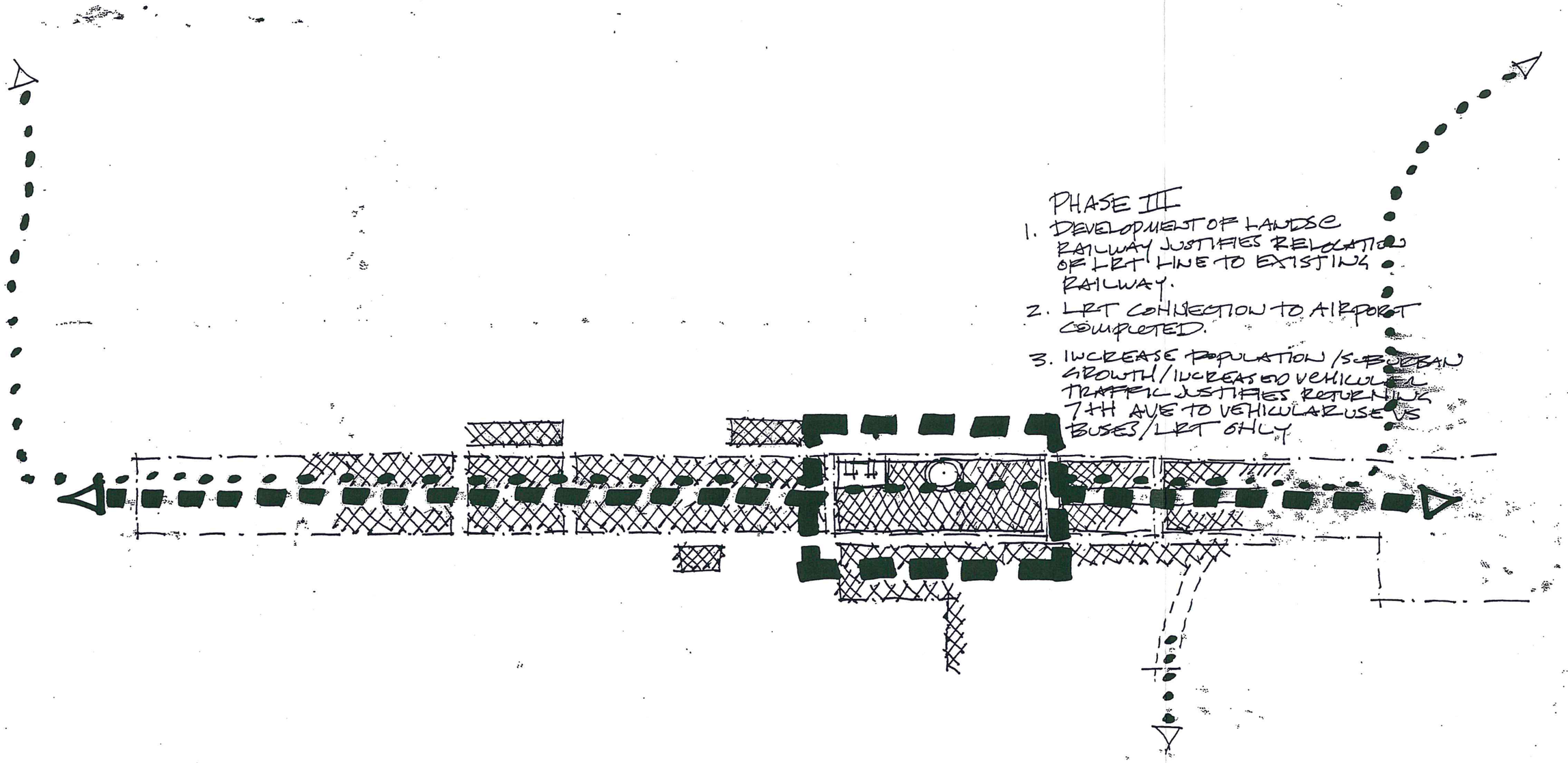
* BOW TRAIL EXTENSION RELOCATION ECONOMICALLY COST EFFECTIVE AS SURFACE RELOCATION TO EXISTING CP R.O.W. AS OPPOSED TO EXTENSION OF 8TH AVE TUNNEL BELOW GRADE STATIONS

POTENTIAL REROUTING OF LRT AT 4TH ST. S.E. (SURFACE RAIL. BOW TRAIL EXTENSION.

EXISTING TUNNEL FOR PROPOSED 8TH AVE LRT EXTENSION.


RAIL SHED
TRAIN LIKE.
BUS.
ELEVATED CONNECTION FROM PLATFORMS TO STATION.
PUBLIC PARKING
1:200
new entrance stair / view platforms & points of existing tower.
VIEWING PLATFORMS PROJECTING INTO CONCOURSE.


PHASE I
RAIL STATION/
BUS TERMINAL
HOTEL ANNEX TO EXISTING PALISER.


PHASE III
1. DEVELOPMENT OF LANDSC RAILWAY JUSTIFIES RELOCATION OF LRT LINE TO EXISTING RAILWAY.
2. LRT CONNECTION TO AIRPORT COMPLETED.
3. INCREASE POPULATION/SUBURBAN GROWTH/INCREASED VEHICULAR TRAFFIC JUSTIFIES RETURNING 7TH AVE TO VEHICULAR USE AS BUSES/LRT ONLY

PHASE IV

1. DEVELOPMENT OF VACANT LANDS COMPLETE.

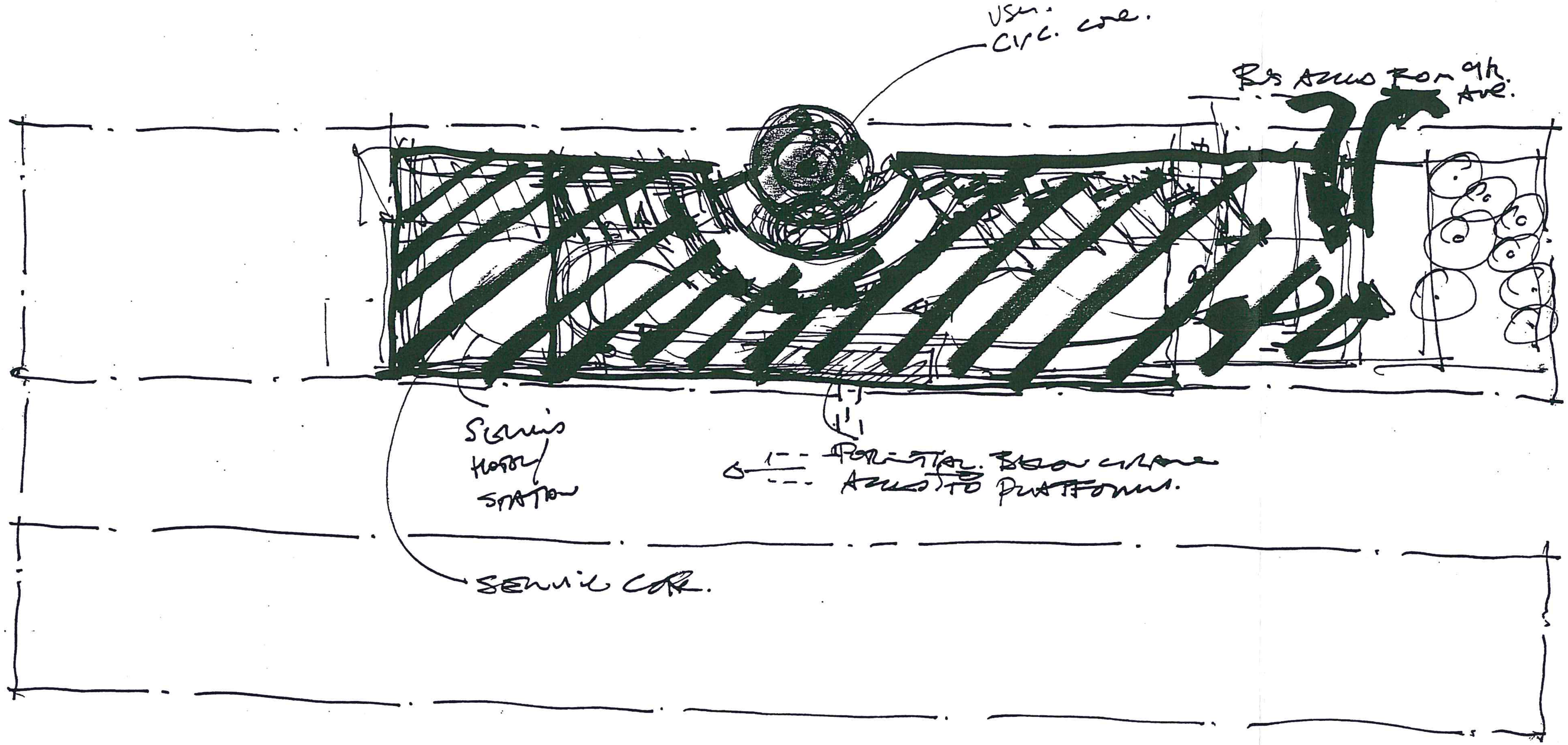
EVOLUTION OF HIGHSPEED RAIL/ALTERNATIVE MODES OF TRANSPORTATION WARRANTS RELOCATION/REMOVAL OF RAILWAY FOR USES OTHER THAN PUBLIC TRANSIT/LRT

2. ALTERNATIVE MODES OF TRANSPORTATION WARRANTS RELOCATION/REMOVAL OF RAILWAY FOR USES OTHER THAN PUBLIC TRANSIT/LRT

3. BLDG FUNCTIONS AS LRT MAIN STATION & DOWNTOWN.

4. RAIL USES OBSOLETE. BLDG EDIFICE MAINTAINED AS HISTORICAL ARTIFACT. BLDG USE ADAPTED TO OTHER CIVIC USES IN CONJUNCTION WITH DOWNTOWN CIVIC ZONE.

5. BLOCKS ADJACENT TO RAIL TURN SIGNIFICANTLY OUTWARD TO FORM PEDESTRIAN STREET SHARED WITH REMAINING LRT FUNCTION.


STATION
ACCESS TO PLATFORMS.

ARCHITECTURAL PROGRAM

BUS TERMINAL LEVEL 1

Lounge/Waiting	-	9420 s.f. = 875 m^2
Ticket Sales	-	355 s.f. = 33 m2
Baggage Handling	-	1132 s.f. = 105 m^2 (± 12% of seating area)
Locker Storage	-	645 s.f. = 60 m^2
Entry/Concourse	-	6740 s.f. = 626 m^2
Retail	-	2 at 1162 s.f. = total 2325 s.f. = 215 m^2
Public Transit Waiting/Vestibule	-	1550 s.f. = 144 m^2
Washrooms	-	1000 s.f. = 93 m^2
Freight	-	162 s.f. = 15 m^2

TOTAL NET AREA = 23,047 s.f. = 2141 m^2

BUS TERMINAL LEVEL 2
Retail/Restaurant Space

Retail Services	-	12,730 s.f. = 1183 m^2
Washrooms	-	1000 s.f. = 93 m^2
Services	-	162 s.f. = 15 m^2
Administrative Offices	-	810 s.f. = 75 m^2

TOTAL NET AREA = 14,710 s.f. = 1366 m^2

BUS TERMINAL LEVEL 3

Leasable Area	-	11,690 s.f. = 1086 m^2
Mechanical Room/ Services Storage	-	2875 s.f. = 267 m^2

TOTAL NET AREA = 14,565 s.f. = 1353 m^2

TRAIN STATION LEVEL 1

Waiting Area	-	10,500 s.f. = 976 m^2
Ticket Area	-	387 s.f. = 36 m^2
Administration	-	662 s.f. = 61.5 m^2
Baggage Collection	-	1290 s.f. = 120 m^2
Baggage Handling/Storage	-	1890 s.f. = 175 m^2
Washrooms	-	1184 s.f. = 110 m^2
Retail/Services	-	2422 s.f. = 225 m^2

TOTAL NET AREA = 17,335 s.f. = 1610 m^2

Additional area incorporates as primarily circulation space to LRT and train platforms

TRAIN STATION LEVEL 2

Retail Services	-	9080 s.f. = 843.6 m^2
Washrooms	-	970 s.f. = 90 m^2

TOTAL NET AREA = 10,050 s.f. = 933.6 m^2

TRAIN STATION LEVEL 3

	Leasable Space	-	10,226 s.f. = 750 m^2
	Services/Mechanical Room	-	1205 s.f. = 112 m^2
			TOTAL NET AREA = 11,430 s.f. = 1,062 m^2

GROSS FLOOR AREAS

Bus Terminal	Level 1	-	30,023 s.f. = 2789 m^2
	Level 2	-	19,590 s.f. = 1820 m^2
	Level 3	-	19,505 s.f. = 1812 m^2
Train Station	Level 1	-	33,810 s.f. = 3141 m^2
	Level 2	-	14,827 s.f. = 1377.5 m^2
	Level 3	-	12,637 s.f. = 1174 m^2
Concourse		-	12,915 s.f. = 1200 m^2
Parking	Level 1 & 2	-	204,950 s.f. = 19,040 m^2

DESIGN SOLUTION ANALYSIS

Conceptually the final design of the project satisfies both the practical requirements for a multimodal facility that functions on a daily basis as an efficient arrival/dispersal/connection point for users of both public and private transportation systems and secondly as a significant structure and urban design solution to the idea of gateway.

Functioning on a practical level the project proposes linking public transit, private buses, light rapid transit, rail carriers and future rail commuters within one facility. Utilizing the existing rail one-way right of way the project proposes regrading the existing railway lines to a depth of 9000m below existing grade along the site area, the reconfiguration of the railway lines themselves allowing for two platforms serving three rail lines with a dedicated line for freight rail. Bus transportation along 9th Avenue is routed in two directions, private motor coach carriers through the west side below grade to arrive through an upgrade at the proposed terminal at the east end of the site. Along the north side of the site city transit buses are routed east at grade into the bus terminal from midpoint along the site travelling parallel to 9th Avenue, a one-way street. The functional requirements of the program are split into two building forms either side of the Calgary Tower joined by a connecting concourse partially encompassing the Calgary Tower which serves as a focal point to the site from both the north and south direction..

The rationale for this design solution is three fold. Dividing the functions clarifies the circulation in that entry and exit to both elements occurs at grade. Secondly, rather than establishing a perceived

hierarchy of one form over the other all functions are given equal significance. Thirdly, a pedestrian link is established from the south downtown to the city core with the Calgary Tower as a landmark perceptible from outside the buildings themselves and accessible at grade. Initially it had been the intent of the design to include additional civic functions within the program including a children's museum and science centre as well as a hotel complex. Evolution of the programmatic requirements leading to a reduction of elements has seen the program reduced to concentrating primarily on the transportation facilities focusing on the idea of arrival and movement (see Appendix Project Redesign July 28, 2000). To this end the program has been simplified, although the final design areas dedicated to uses other than transportation meet the requirements for areas previously dedicated to civic uses.

The following discussion will focus on each of the specific project elements as follows: bus terminal, rail station, adjacent development at south end of railway.

As stated bus circulation is split with the terminal centrally located. Main access is at grade adjacent to the Calgary Tower following the east/west axis established by the site configuration. Sequentially ticket sales and baggage handling areas are the focal point upon entry with waiting areas and bus bay access being visible along the length of the building. Essentially the building is a large half shed structure running along an east/west axis opening south onto the railway right of way. The main floor plate is dedicated to the bus terminal requirements, two upper levels of retail, commercial use being allocated to the north half of the shed. A major design intention has been achieving a transparency of building envelope. Locating upper floor uses to the north side allows for views south

to the railway, maximizing transparency at grade along the longitudinal access is achieved by providing continuous floor to ceiling glazing were possible. Glazing is used at all other elevations, where allowable by building program.

Pedestrian circulation from private carriers to public transit is directly through the bus terminal. Circulation from terminal to station can take place at grade across the public plaza or through a connection at grade also encompassing the Calgary Tower.

The rail terminal serves both LRT and rail service. Entry to the building is off of the plaza in front of the Calgary Tower with drop off and pick up adjacent. Although similar in construction to the bus terminal the rail station is of a different configuration as the major requirements for circulation take place over the tracks. Upon entry into the building one enters into a large open space trapezoidal in shape, vision being directed toward the ticket area and access to train platforms. Circulation is at the perimeter of the centrally located main seating area, similar to the traditional configuration. LRT access is at opposite sides to the rail access with automatic ticket dispensing within a separate vestibule. Access to the LRT platforms can also be made directly from the exterior mitigating the need to circulate through the station if approaching from a southerly direction. This separation also occurs as control is not required for the functioning of the LRT while a limited degree of control is required at the train function. All platforms are served by escalators and stairs with elevators included for accessibility and baggage handling.

Similar to the bus terminal proposal services are provided at the ground floor level with additional

services at leasable space at two floor levels over.

Following the presentation of the design solution concern was raised regarding 3 main points which failed to be addressed in the final design. One, that crossover circulation from one building to the other required either crossing the open air plaza or moving below grade through an enclosed walkway at the parkade level, two that the open air connection between 9th Avenue and 10th Avenue S.W. was not in fact a visual link between the downtown core and the south downtown and third that although the design did to a degree satisfy the requirements of multimodality the concept of gateway and public space was not adequately addressed.

In response to these criticism the final design solution incorporates a connection between the enclosed concourse space connecting the rail station and terminal functions. The result of this enclosure satisfies the concerns on a number of levels.

Enclosure allows for a controlled environment for cross circulation between functions which is particularly critical given the nature of Calgary's extreme environmental conditions. The retention of large glazed overhead doors allows for visual and spatial continuity when open with security for when either station or terminal is closed. LRT access during periods of closure take place with a transition from an exterior sheltered space created by the continuation of the roof form over the bridge structure above the tracks. Furthermore the enclosed connection between rail and bus functions below grade, clarifying circulation to a much greater extent.

Pedestrian linkage between 9th and 10th Avenues along the north-south axis remain, the addition of the enclosed space not an obstruction along the route, but both a gathering space, a point of interest along the way, and in winter time a welcome respite from the elements.

Visually the link between both avenues is not affected to any more a degree than the prior design solution. The mass of the Calgary Tower base is not such as to allow for a visual connection except at certain oblique angles. Given the fact that the design response has been to flank the tower on either side by building mass further restricting possible views through, the addition of the connecting structure does not detract from the design solution but does indeed enhance it. A significant concern has been how to treat the tower base with the removal of the existing structure. The addition of the connection serves to mitigate the impact of the mass of the tower with the addition of the solid roof structure on the one hand and with the juxtapositioning of the visually light structure around the heavy base.

Finally the enclosure of the "in between" space creates a neutral public space dedicated neither to the train/LRT station nor bus terminal solely, but to both of these functions and the city as a whole. The scale of the space at 1120m^2 creates a significant interior gathering space, accommodating both visitors, and city inhabitants. The addition of the tourist information centre, access through to the Calgary tower plus a second floor cafe facility brings in public/civic uses that can only enhance the useability of the space. The volume of the space with its 12m maximum ceiling height is compressed relative to the LRT and rail functions but is at a scale worthy to give it significance with room for graphic and visual displays both floor and ceiling mounted creating the opportunity for a

hub not only for the project but more fully a focal point for the project.

In addition to the current proposal for a pedestrian +15 connection through from the bus terminal to the Glenbow Museum, future expansion of the system could see the connection of the rail station to the Palliser Hotel and the current undeveloped site on the north side of 9th Avenue S.W. This future expansion of the rail terminal could occur by dedicating current LRT access to rail passengers as required. This expansion could see the construction of a 'T' junction linking all three components at the current second floor level of the station at the walkway currently dedicated as an access to exit. This would see the need for modification of the current Palliser Hotel floor plate which falls beyond the scope of the project. However even in the future with the development of high speed rail and regular commuter service to major centres these developments may be beyond the life time of the building given the population base required.

The urban planning proposal for the development along 10th Avenue south is conceptual only. It is a response to the potential of an increase in numbers of individuals desiring to be urban dwellers, as well as a conceptual design as to how a future development may respond to the possibility of access at grade across the railway right of way.

Commercial development at street level as well the potential for future development within the south downtown area would provide a destination for users of the walkway. The proposed plan develops a series of activity nodes meant to enhance the use of the thoroughfare. The inward curvilinear shape pulls the main buildings off of the street front creating a sense of invitation into the site along a series

of nodes. The south facing orientation of the site ensures the enhancement of these nodes with sun orientation that could be retained with judicious planning of future development along the south side of 10th Avenue. Furthermore, the massing of the built forms is such as to not only provide nodes viewing onto the tracks but also to reduce, in part, the impact of acoustical problems arising from proximity to the rail lines. Being controlled in part by the rail sheds and the trench reconfiguration, this along with the stepped back massing should serve to reduce to a degree noise deemed detrimental to residential construction along a railway the residential component is divided into two types, a lowrise loft configuration and highrise units to diversify the housing types. The addition of a large resident population can only enhance the project in bringing to bear a permanent population to the overall scheme.

The final programmatic element is the construction of a new tourist information centre at the base of the Calgary Tower. The initial design concept had proposed that this function be located at the base of the Calgary Tower as a stand alone structure, the intention being to provide an element reducing the mass of the base. Given the implementation of the enclosed connection between the two major building elements this function, although still within the same location has now been incorporated into the larger connecting structure. As previously stated the intent of this location is to provide a focal point from within and without as well as enhancing the space with its guaranteed frequency of use. Most certainly its location at the base of the Calgary landmark also ensures it a recognizable location; "meet me at the tower". The intention of locating it at this location is twofold. First, that the frequency of use will further enliven the new plaza and secondly the design adds a scaled element to the base reducing its overall mass.

REPRODUCTION OF DRAWINGS

LIST OF ILLUSTRATIONS

CONTEXT PLAN
SCALE 1:2500

NORTH

CENTRE ST.

1ST. ST. S.E.

9TH AVE. S.W.

+15 WALKWAY

PUBLIC TRANSIT ENTRY

PUBLIC TRANSIT EXIT

EL.1036.22

225.54m

EL.1035.10

EL.1034.81

PUBLIC DROP OFF /PICK UP

CALGARY TOWER

BUS ACCESS

RAIL/LRT STATION

BUS TERMINAL

PUBLIC PARKING/ LOADING

BUS EXIT

56.87m

1ST ST S.W.

NEW STREET LEVEL CROSSING

32.00m

RESIDENTIAL/ COMMERCIAL

RESIDENTIAL/ COMMERCIAL

33.50m

EL.1033.88

EL.1036.5

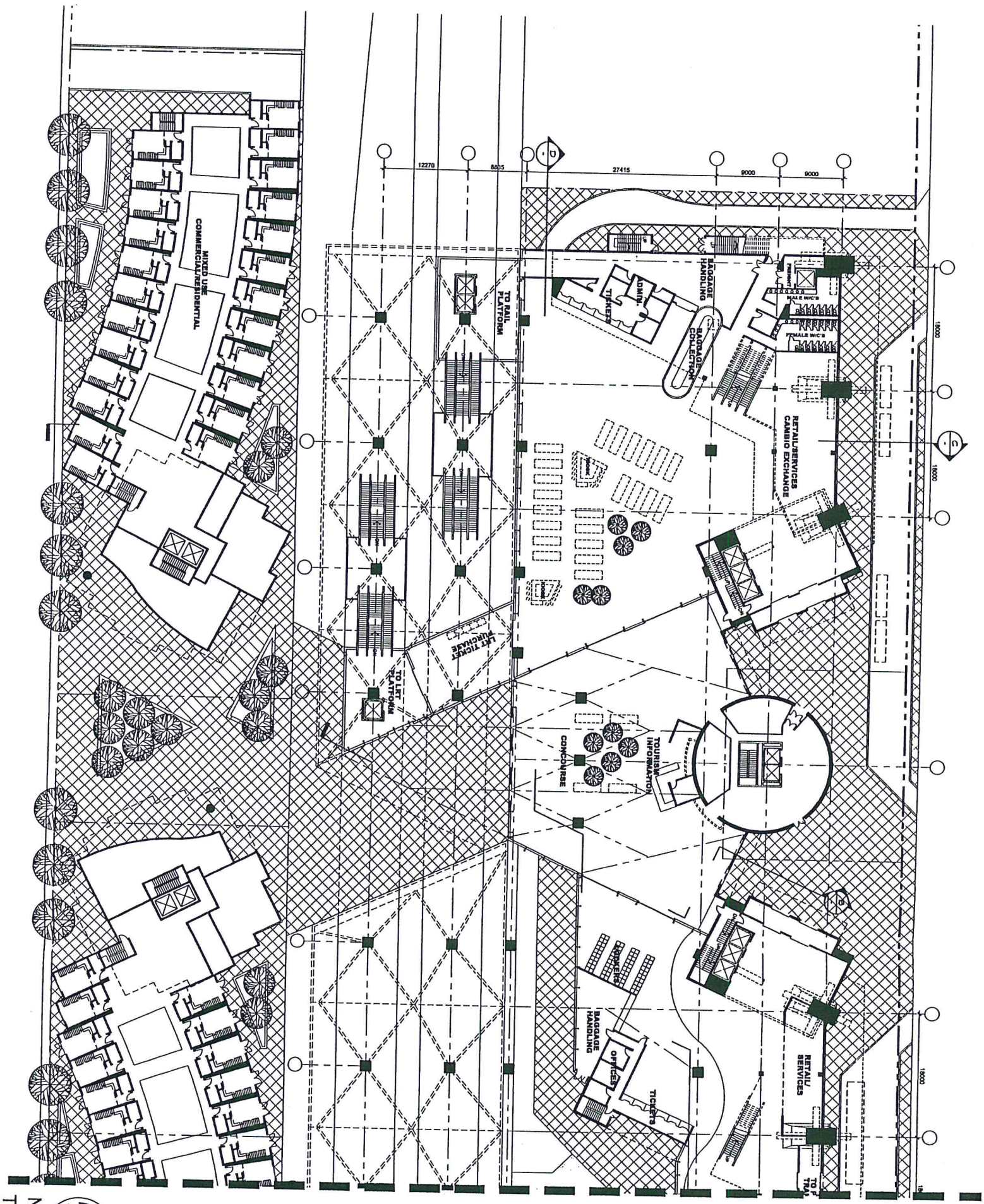
260.54m

EL.1035.40

10TH AVE S.W.

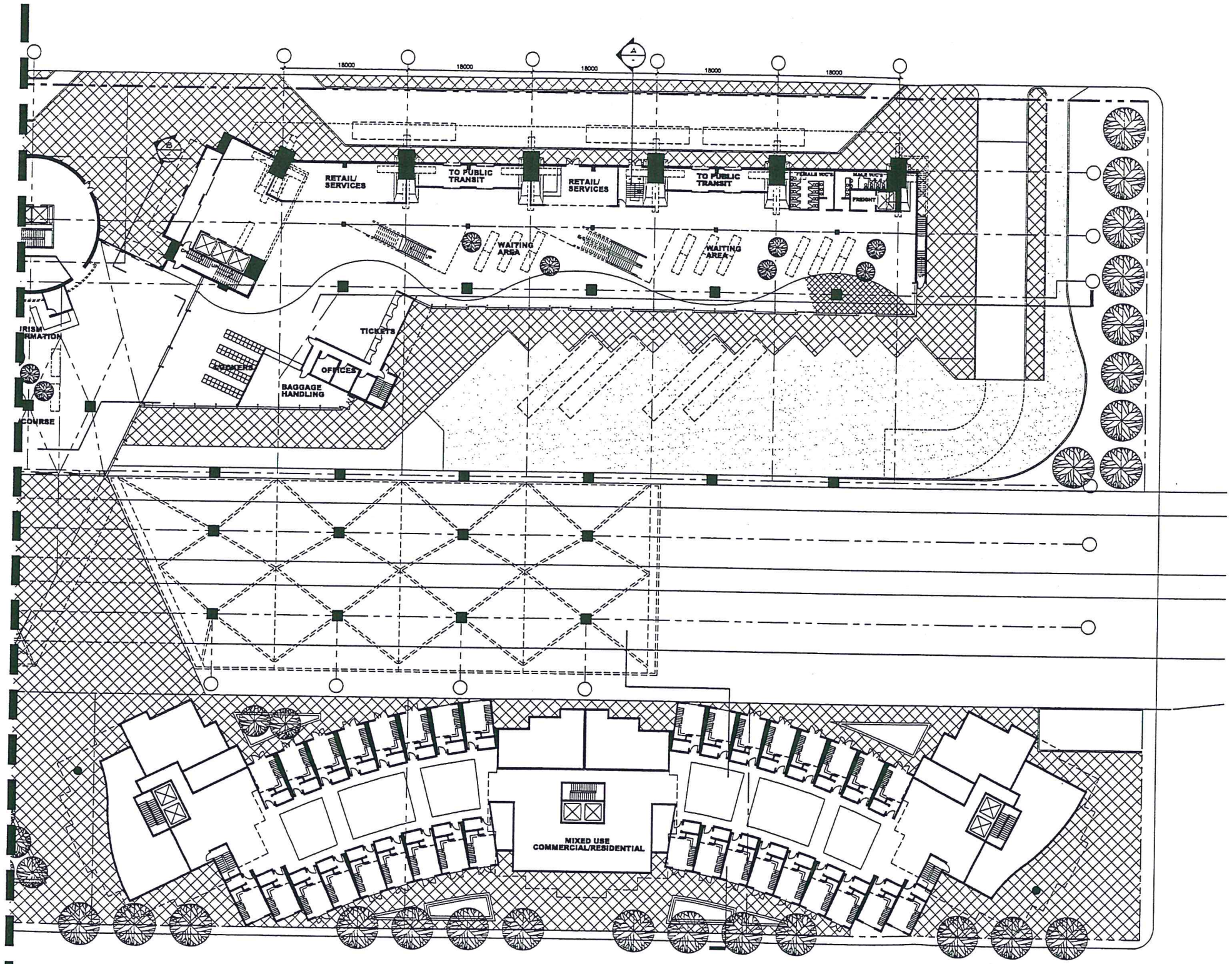
SITE PLAN
SCALE 1:500

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



TRAIN/LRT STATION PLAN LEVEL 1
AND CONCOURSE
SCALE 1:200

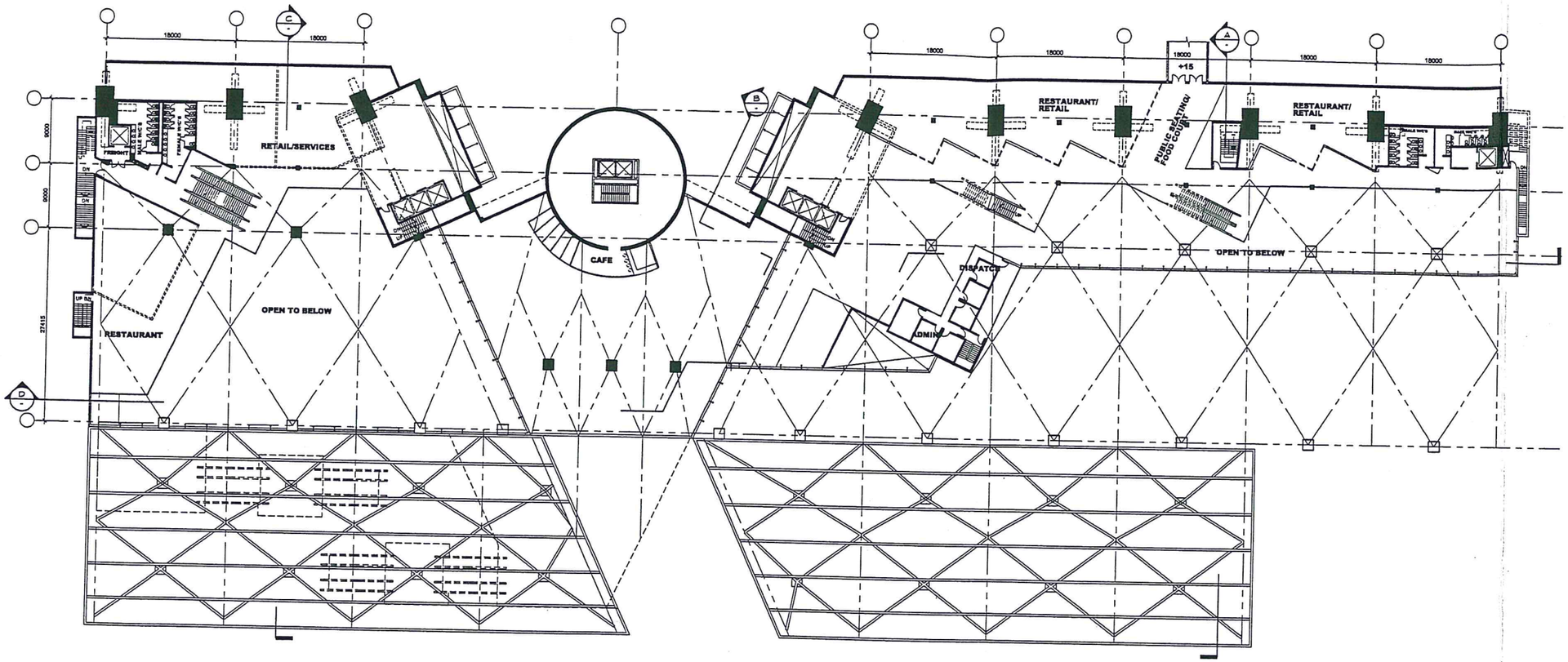
multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



NORTH

BUS TERMINAL PLAN LEVEL 1
SCALE 1:250

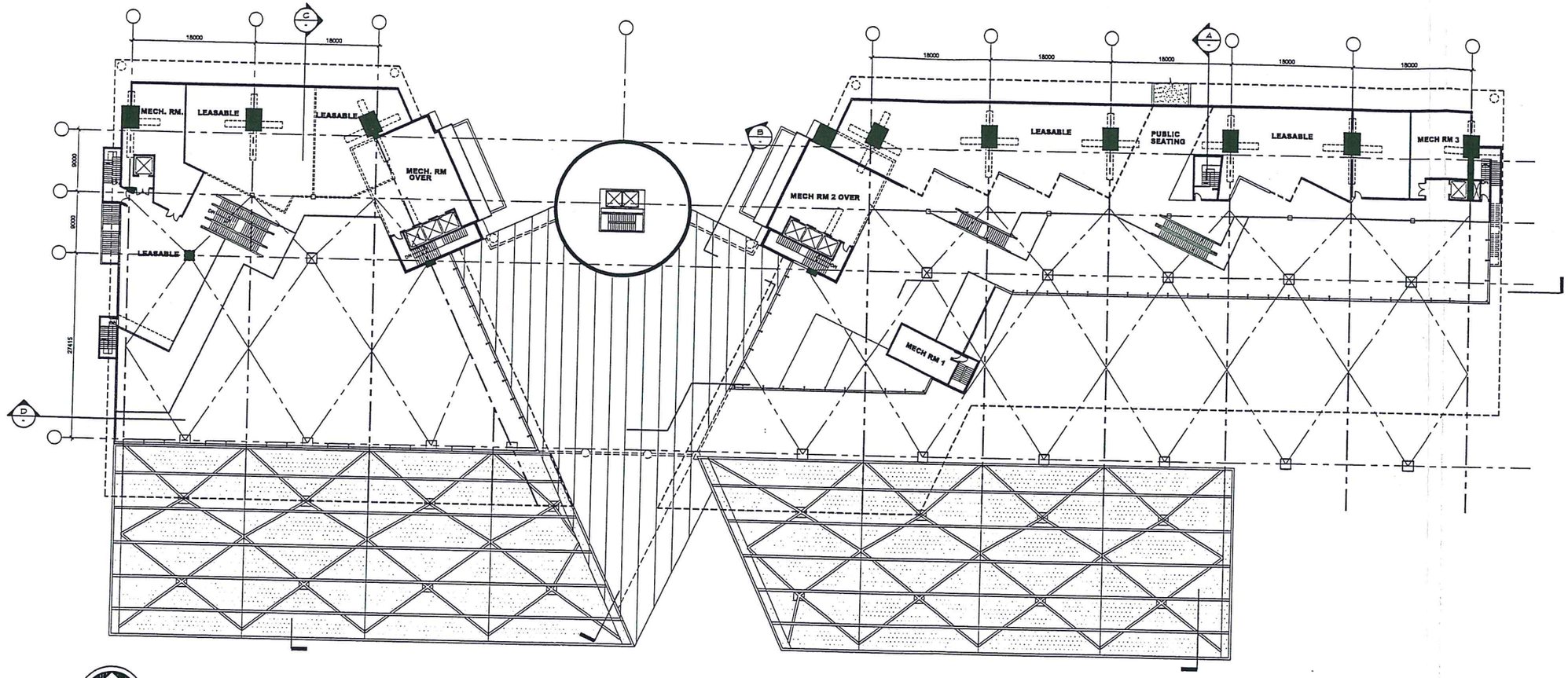
multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



TRAIN/LRT STATION AND BUS TERMINAL PLAN LEVEL 2
SCALE 1:250

NORTH

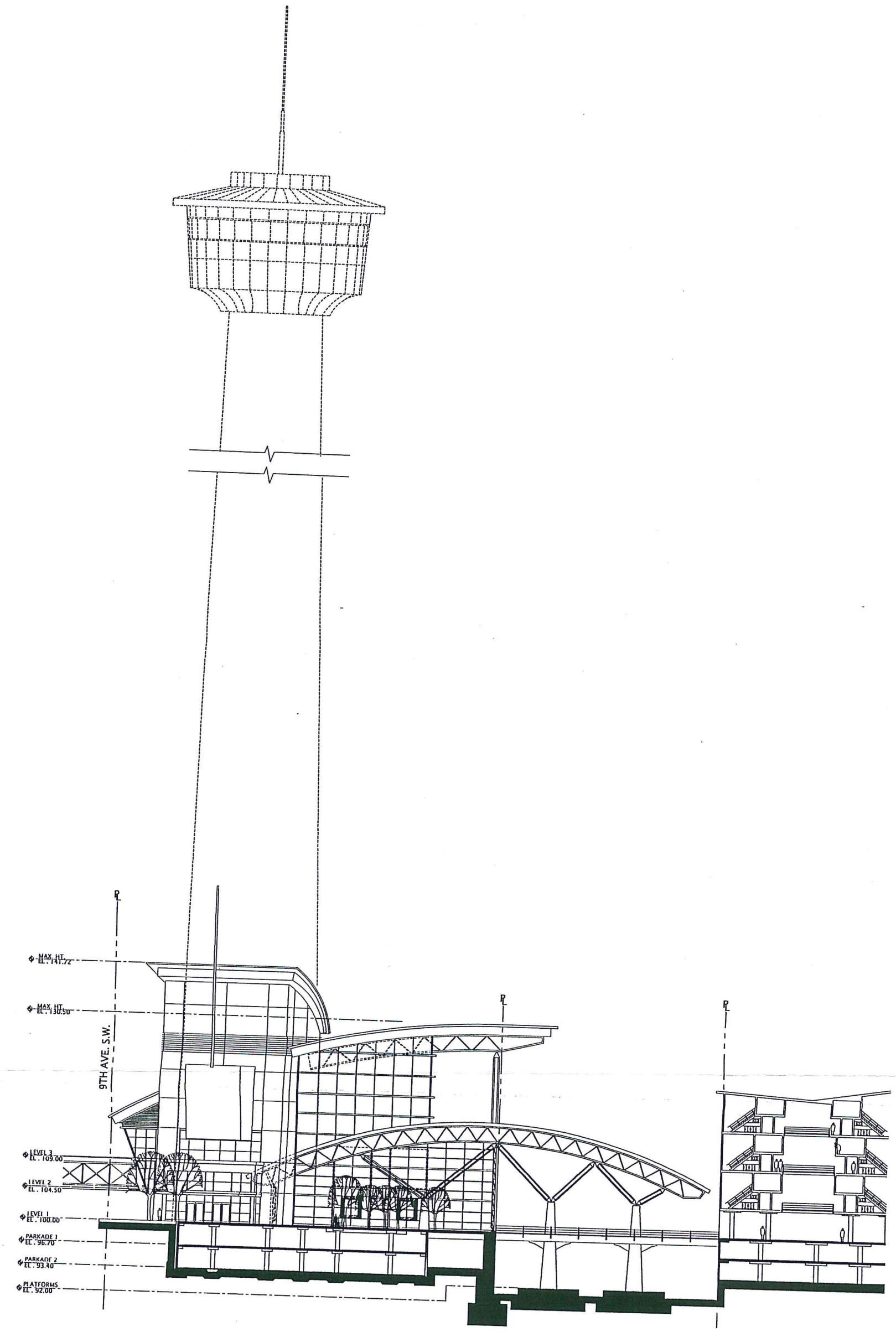
multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



TRAIN/LRT STATION AND BUS TERMINAL PLAN LEVEL 3
SCALE 1:250

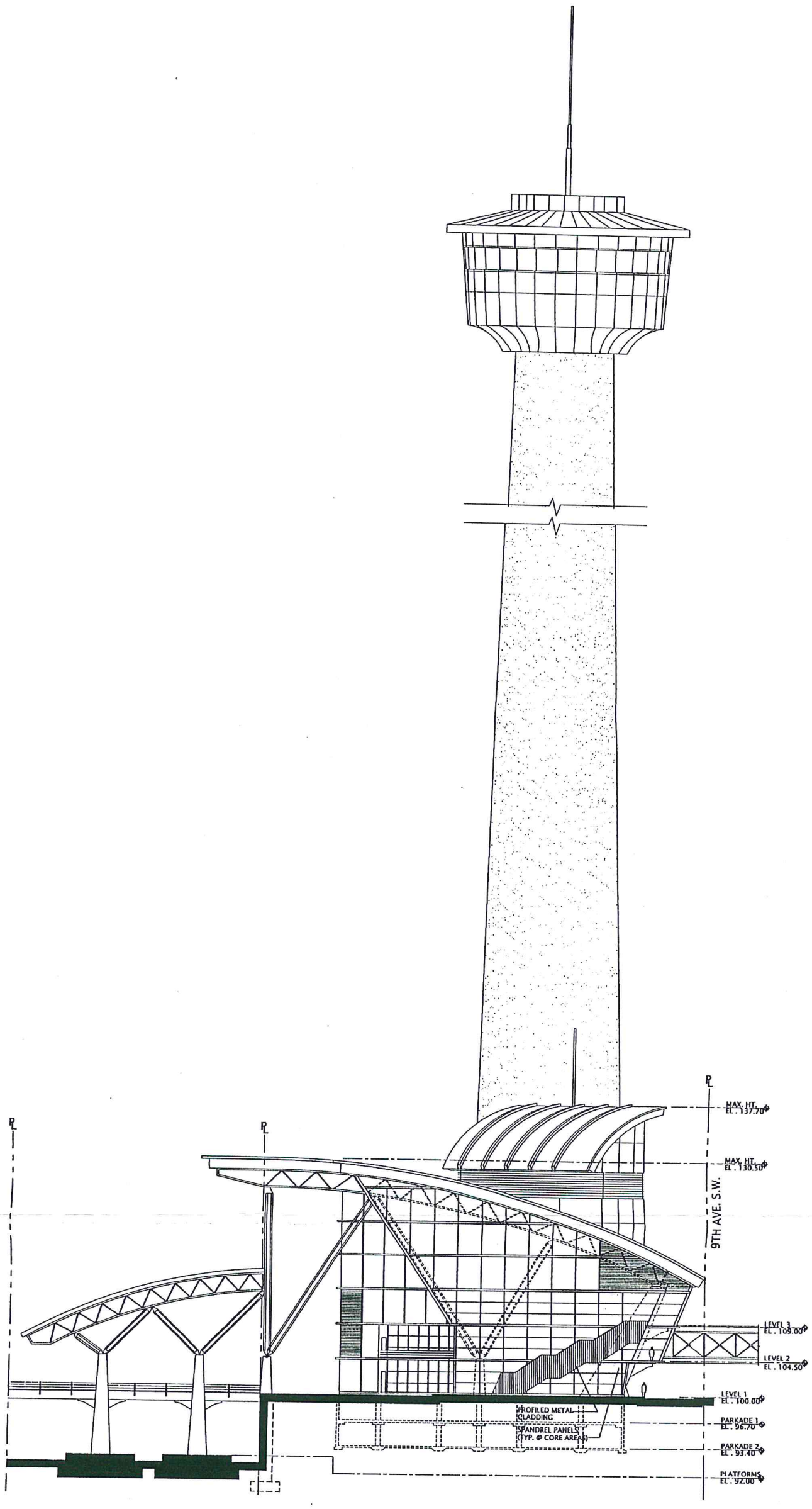
NORTH

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



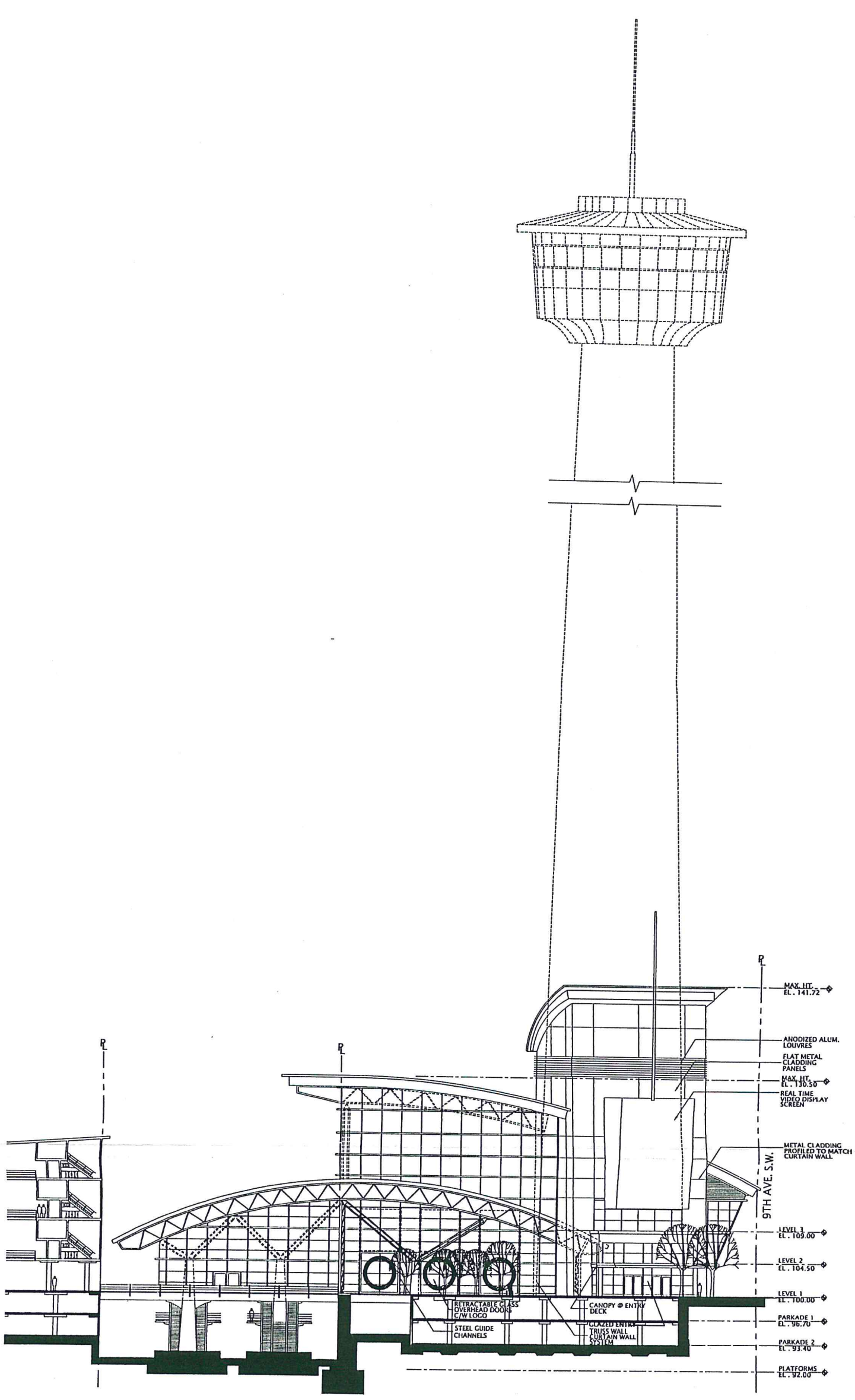
BUS TERMINAL WEST ELEVATION
SCALE 1:200

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



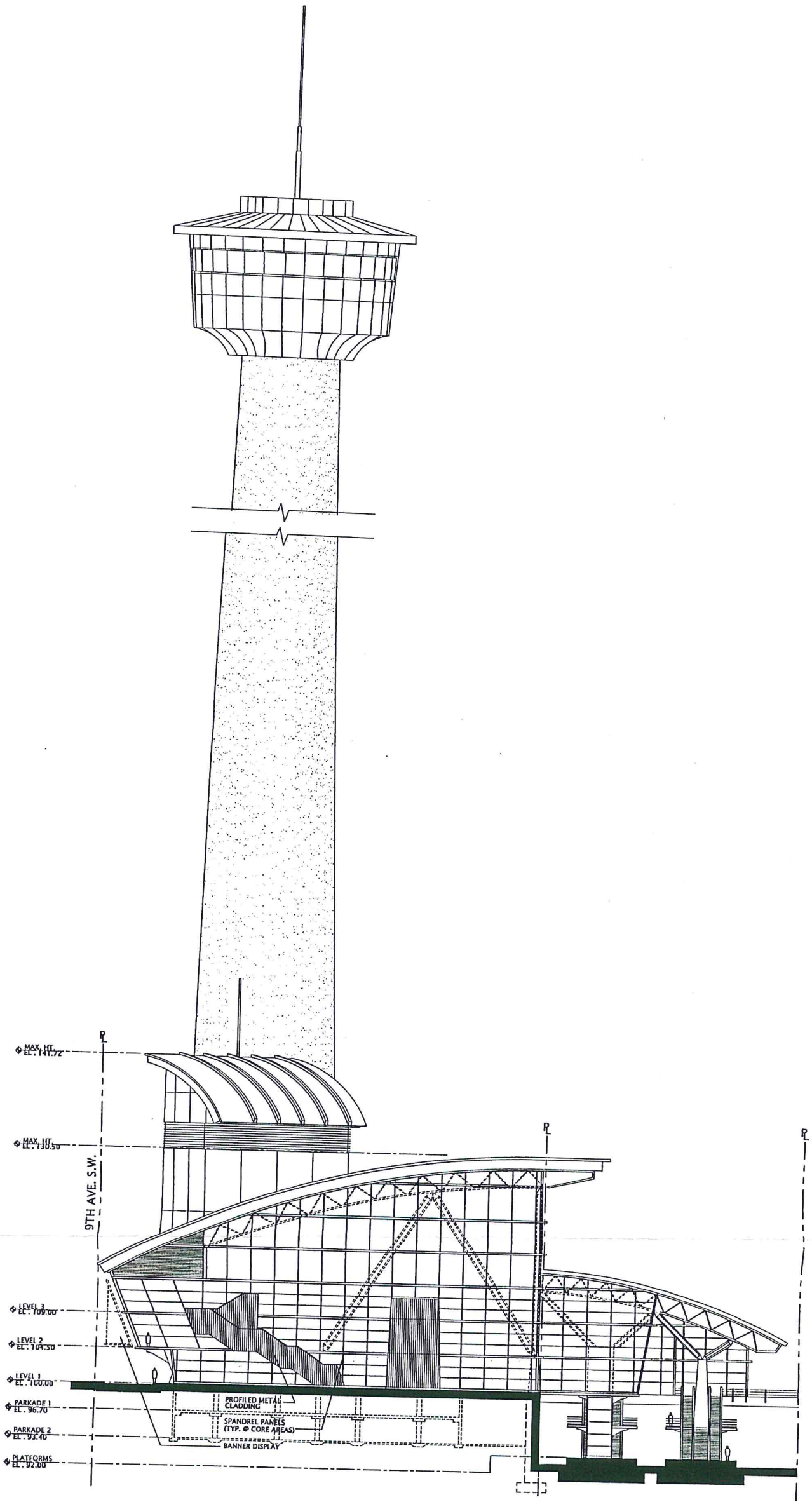
BUS TERMINAL EAST ELEVATION
SCALE 1:200

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



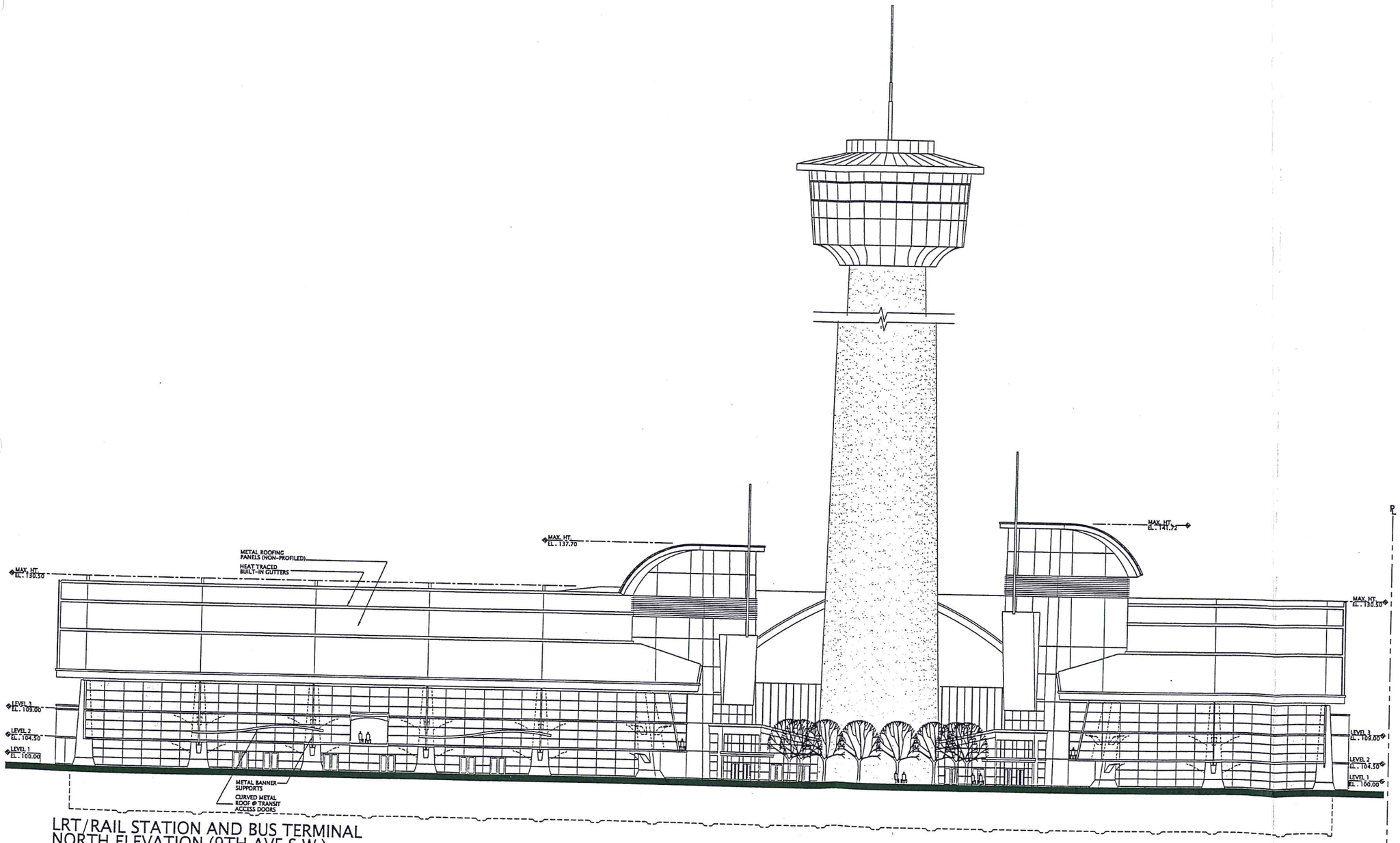
LRT/RAIL STATION EAST ELEVATION
SCALE 1:250

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



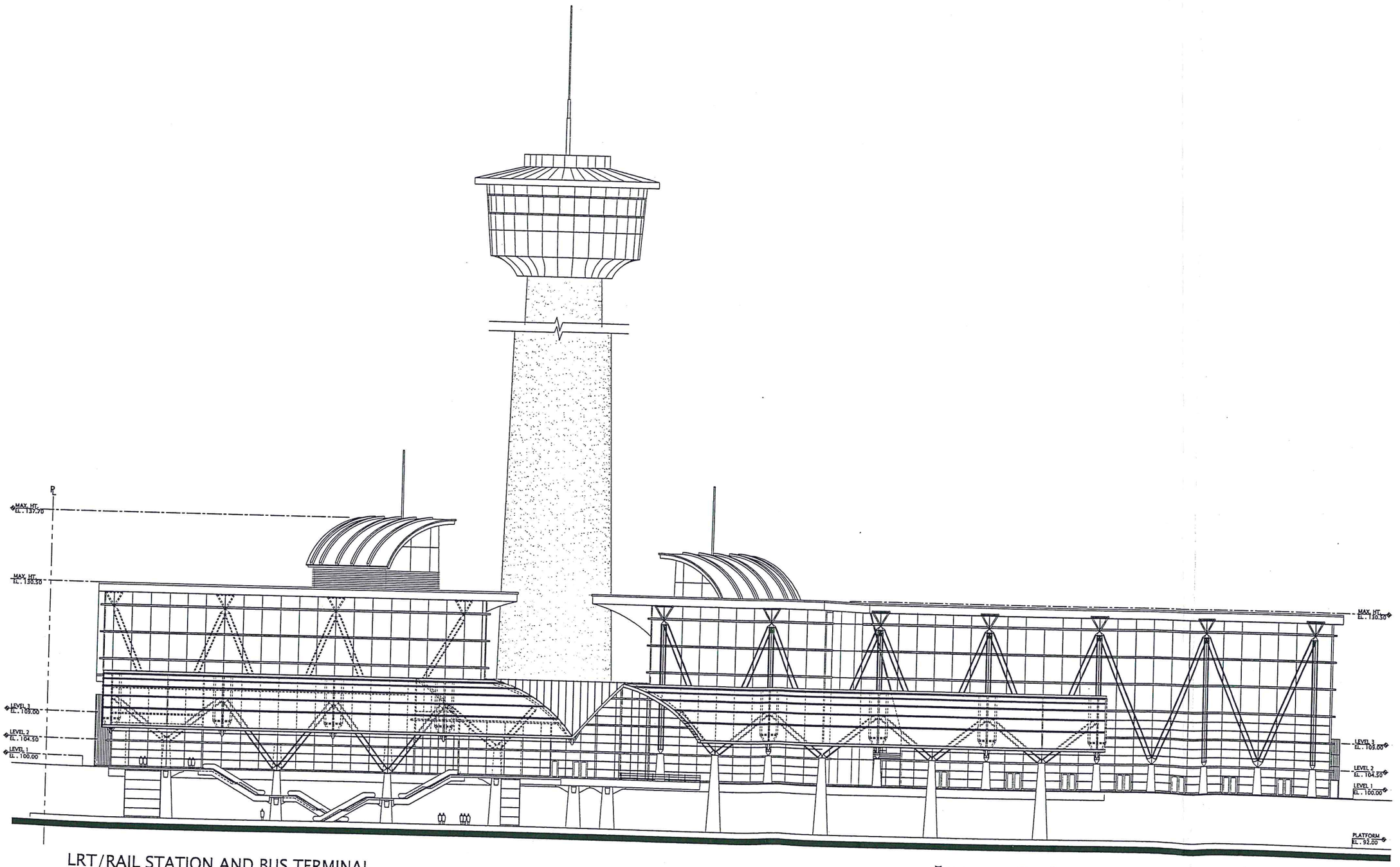
LRT/RAIL STATION WEST ELEVATION
SCALE 1:250

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



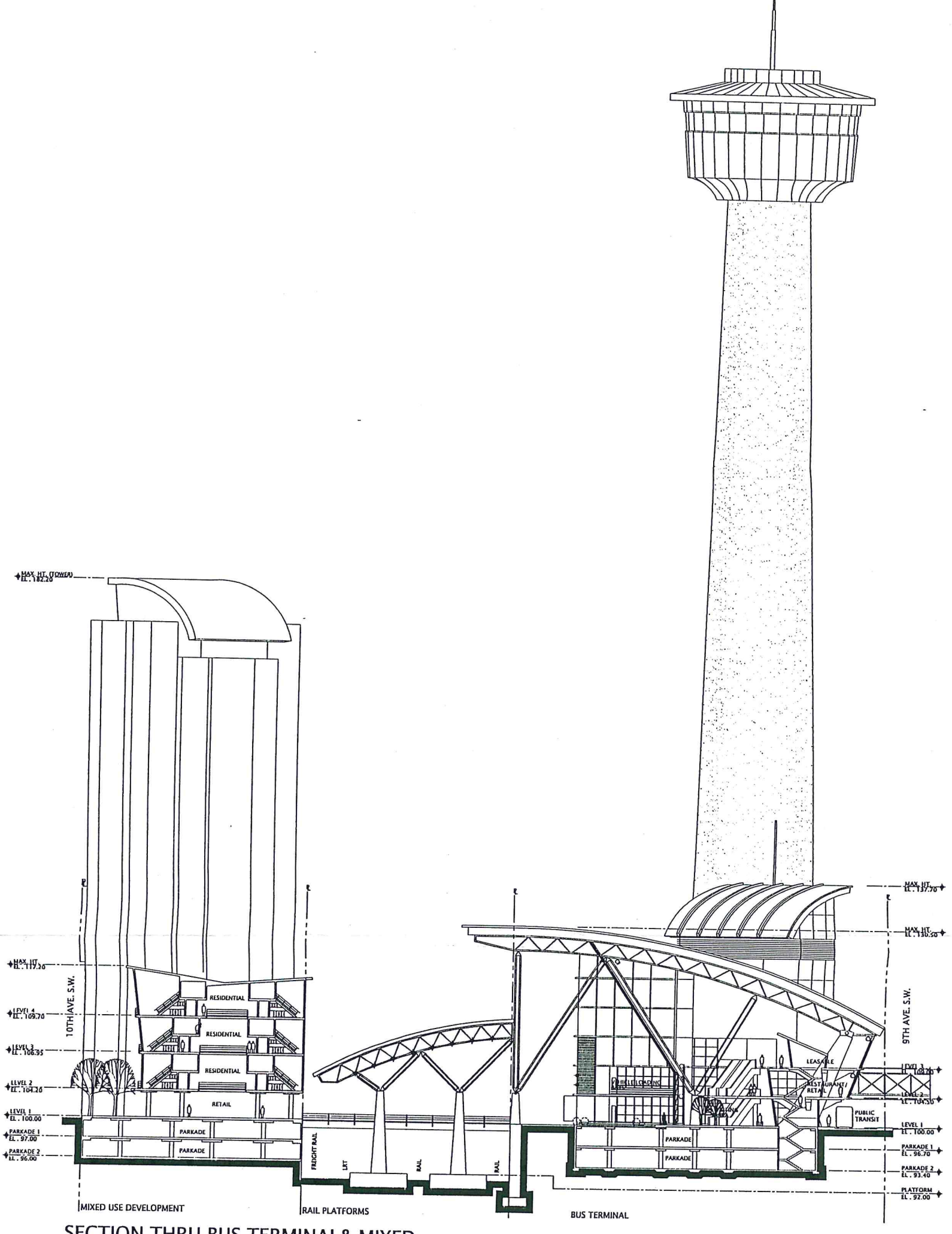
LRT/RAIL STATION AND BUS TERMINAL
NORTH ELEVATION (9TH AVE S.W.)
SCALE 1:250

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



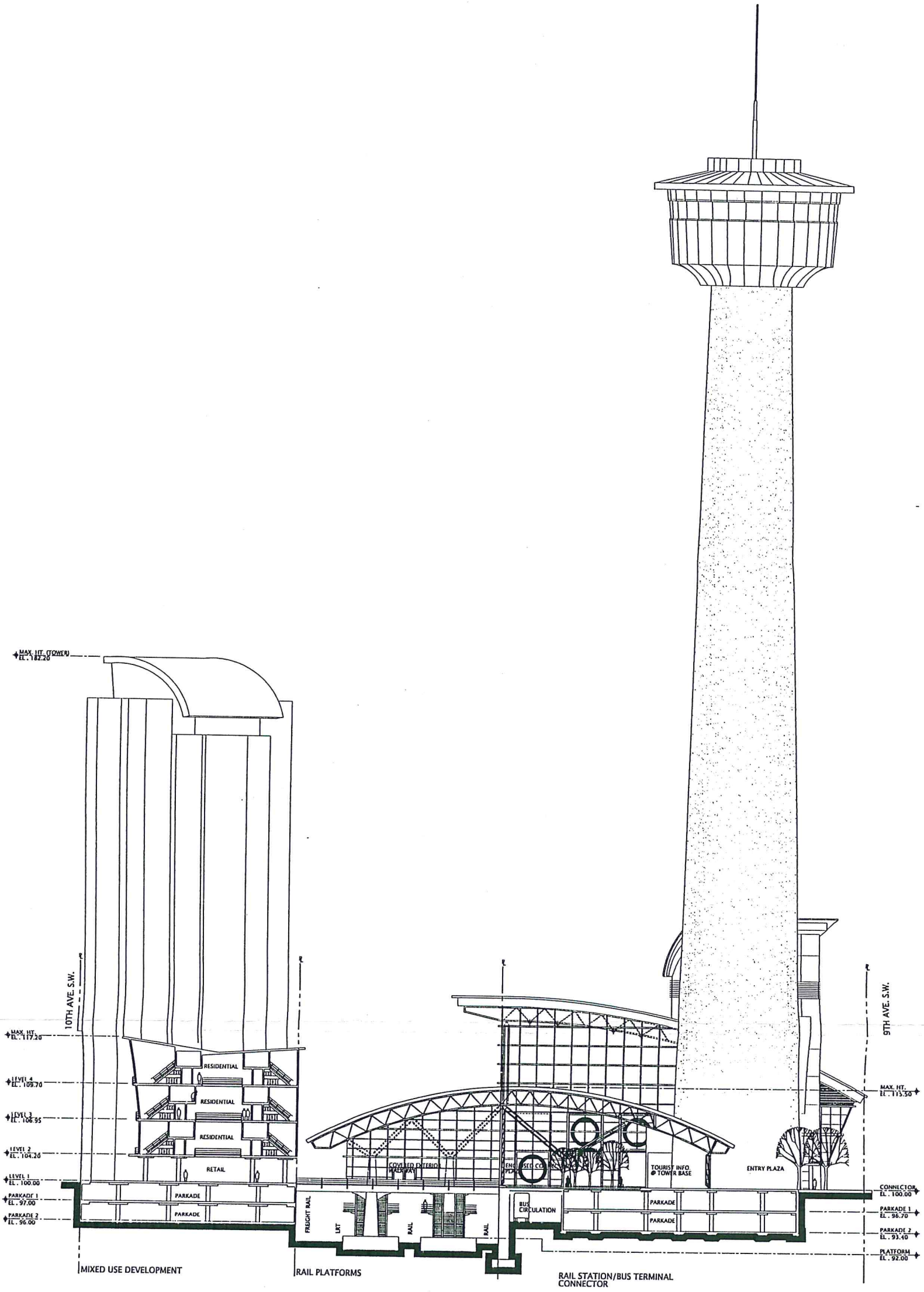
LRT/RAIL STATION AND BUS TERMINAL
SOUTH ELEVATION
SCALE 1:250

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



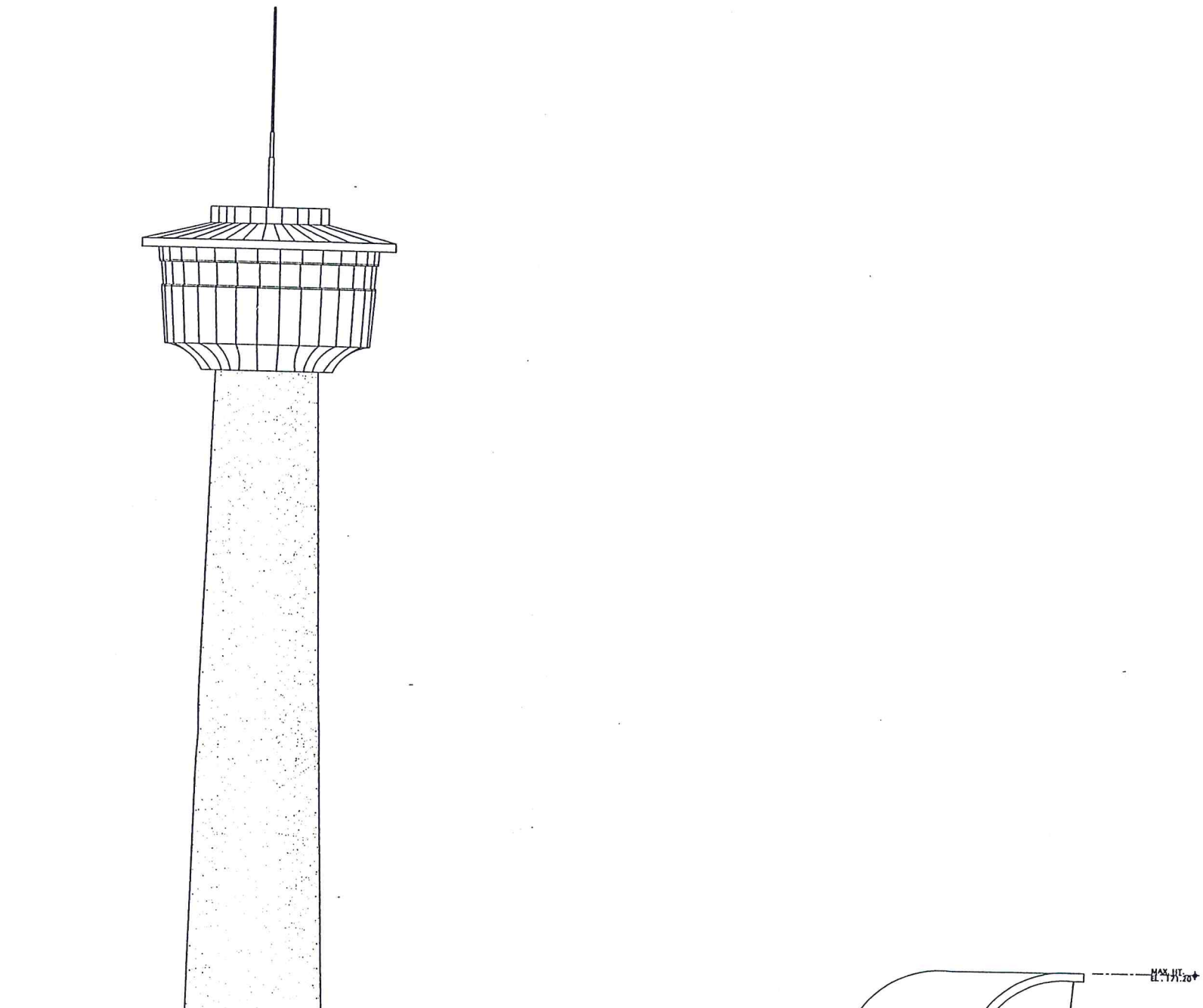
SECTION THRU BUS TERMINAL& MIXED USE DEVELOPMENT @ 10TH AVE (A-A)
SCALE 1:250

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



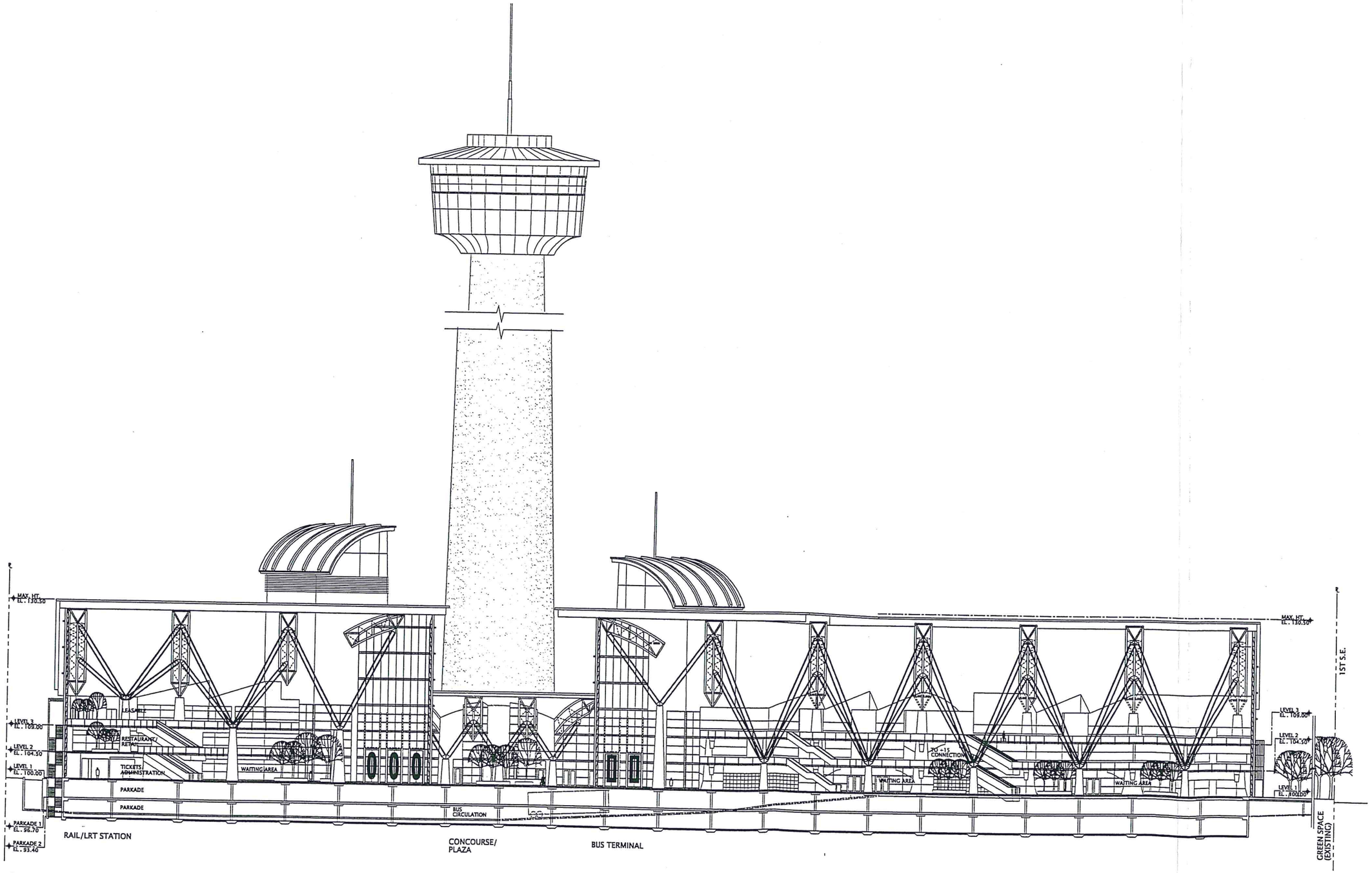
SECTION THRU WALKWAY CONNECTOR (B–B)
SCALE 1:250

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



SECTION THRU RAIL/LRT STATION (C–C)
SCALE 1:250

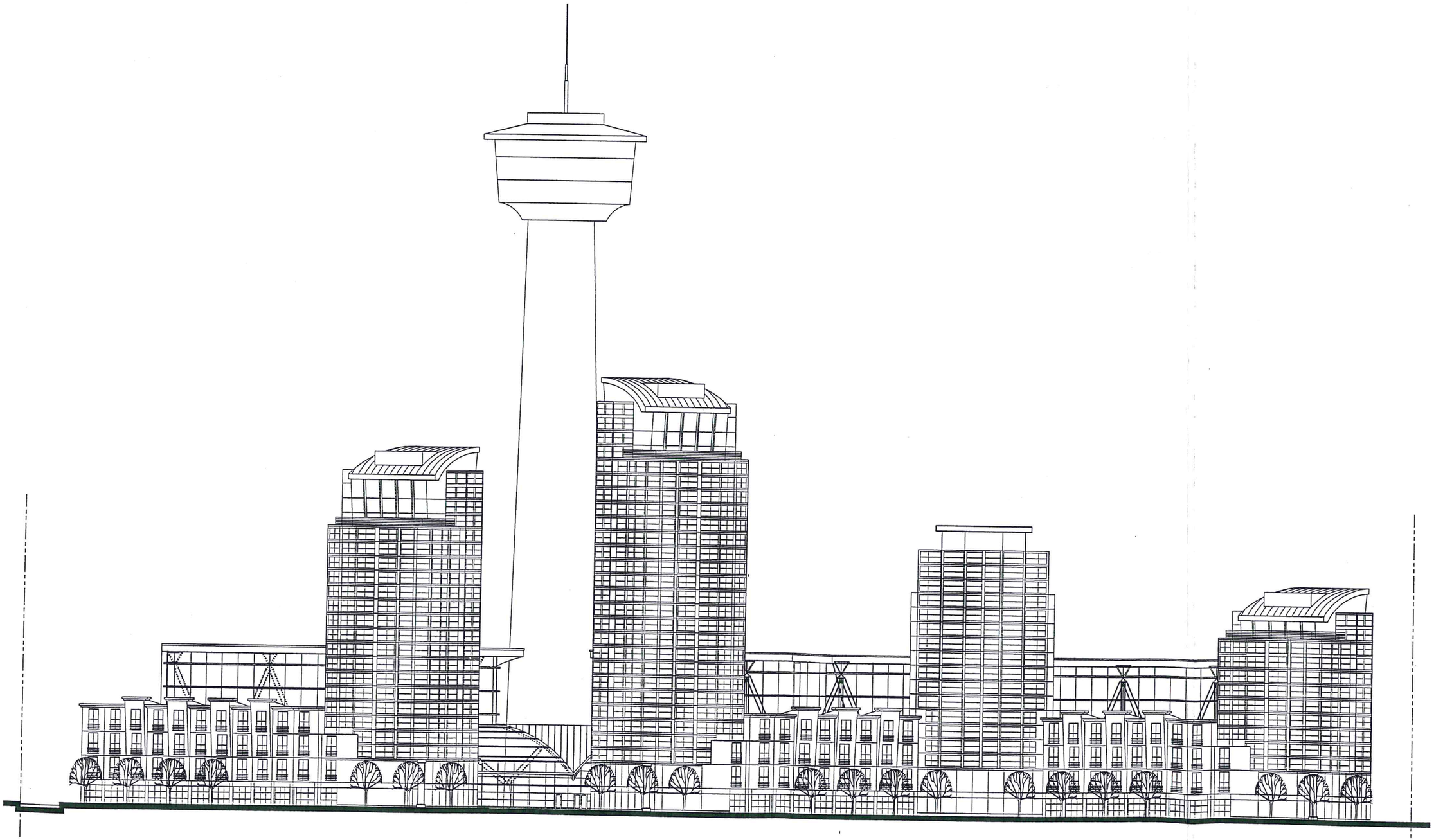
multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



SCALE 1:250

LONGITUDINAL SECTION THRU RAIL/LRT STATION
AND BUS STATION (D–D)

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9



CONCEPTUAL ELEVATION
MIXED USE DEVELOPMENT @ 10TH AVE.
SCALE 1:300

multimodal transit station proposal
R.A.I.C. syllabus programme
level 9

APPENDICES

APPENDIX 1

PRELIMINARY DESIGN ANALYSIS FOR PROPOSED MULTIMODAL TRANSIT STATION IN DOWNTOWN CALGARY (PROJECT REDESIGN)

POINT FORM ANALYSIS

- Initial proposal deemed too complex without attention to volumetrics and relationship of built form to intent of design.

- Intent of redesign as per original scheme to provide an entry point into the downtown that anticipates the evolution of Calgary's transportation system.

- Programmatic design revisions/design changes:

1. Civic uses as per original scheme noted as detracting from overall design scheme therefore children's museum/science centre/fitness facilities removed.

2. Hotel annex deemed to be unlikely possibility due to historical preservationist policy for Palliser Hotel. Annex removed.

3. Central connection through Centre Street visual only. New design creates street level public pedestrian access across site.

4. Rail lines at grade moved to trench condition providing greater acoustical separation, alleviating to a degree circulation problems.

5. 10th Avenue housing functions: lack of specific housing type deters from completing effective design. New housing scheme incorporates lowrise student housing/low rental housing with condominium highrises over, sharing common entry points.

SCHEME ANALYSIS

1. Bus/train/LRT functions split into two specific elements with potential bridge connection between the two functions at +15 level (also acting as access to existing Calgary Tower). Services/tourist services located to north side of structures, vaulted spire connects elements visually (to ±27 metre height). Access to bus station from west at Palliser Square, below grade and ramped up to new loading platforms.

- Rail station provides separate access points to LRT and rail through escalators. Cross over at grade, movement down to platforms clarifies circulation.

- New public pedestrian access at grade allows for entry points and visibility into both structures from central zone, visual interconnection. East end of bus station glazed for transparency.

- Public transit bus drop off at 9th Street within site. Built form to overhang to provide weather protection.

2. Pedestrian access across railway

- Public square created at base of tower with visual access to both station function and residential beyond.

- Interconnection to south downtown maintained, complexity given to path of circulation to provide sense of movement through space and complexity and richness to experience.

3. Housing

- Combination of low cost rental/studio housing and highrise condominiums allows for intermixing of social/economic groups for diversity and enriched residential population.

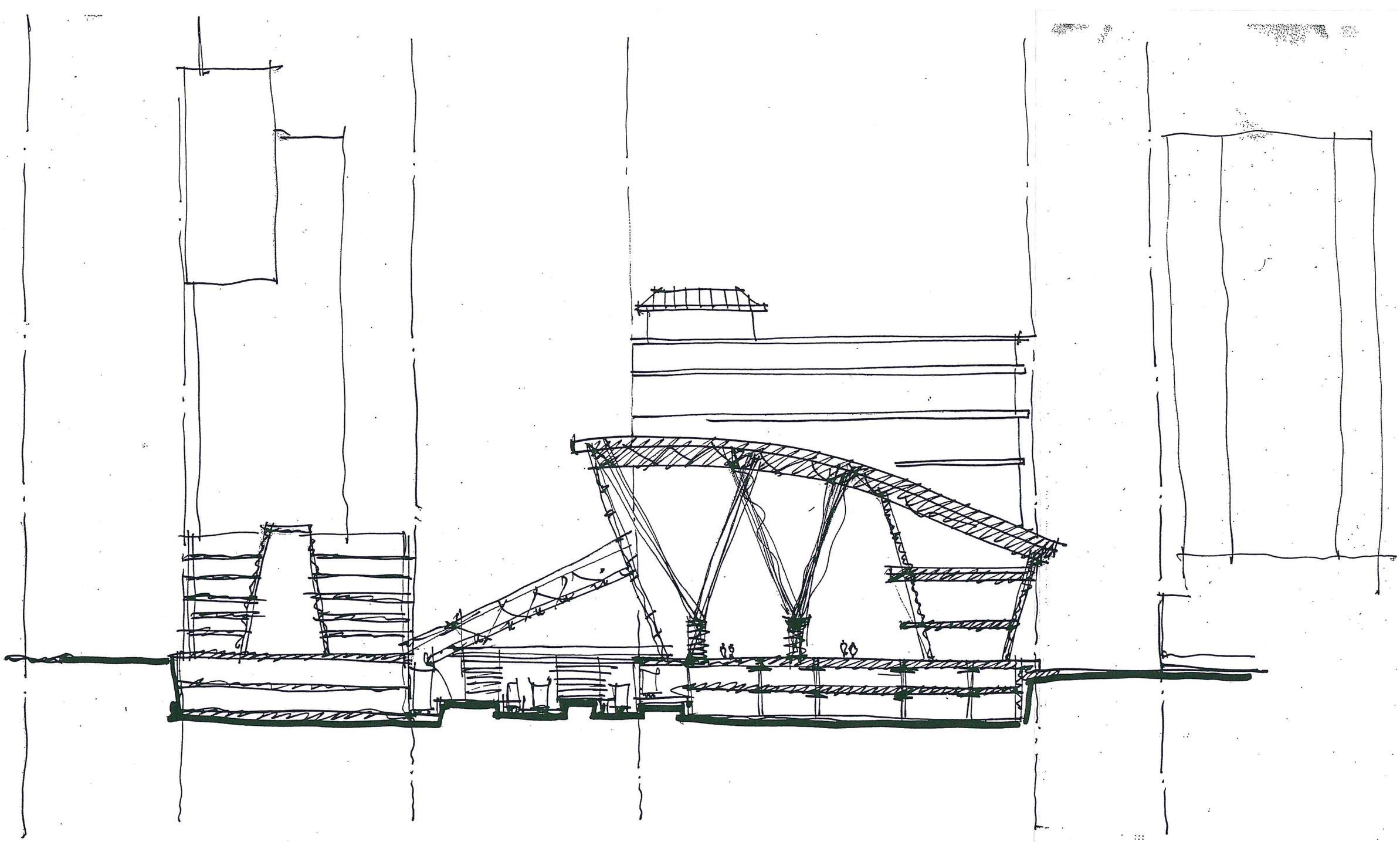
- Commercial/retail use at grade open from arcade within and at street level without provide services to residents.

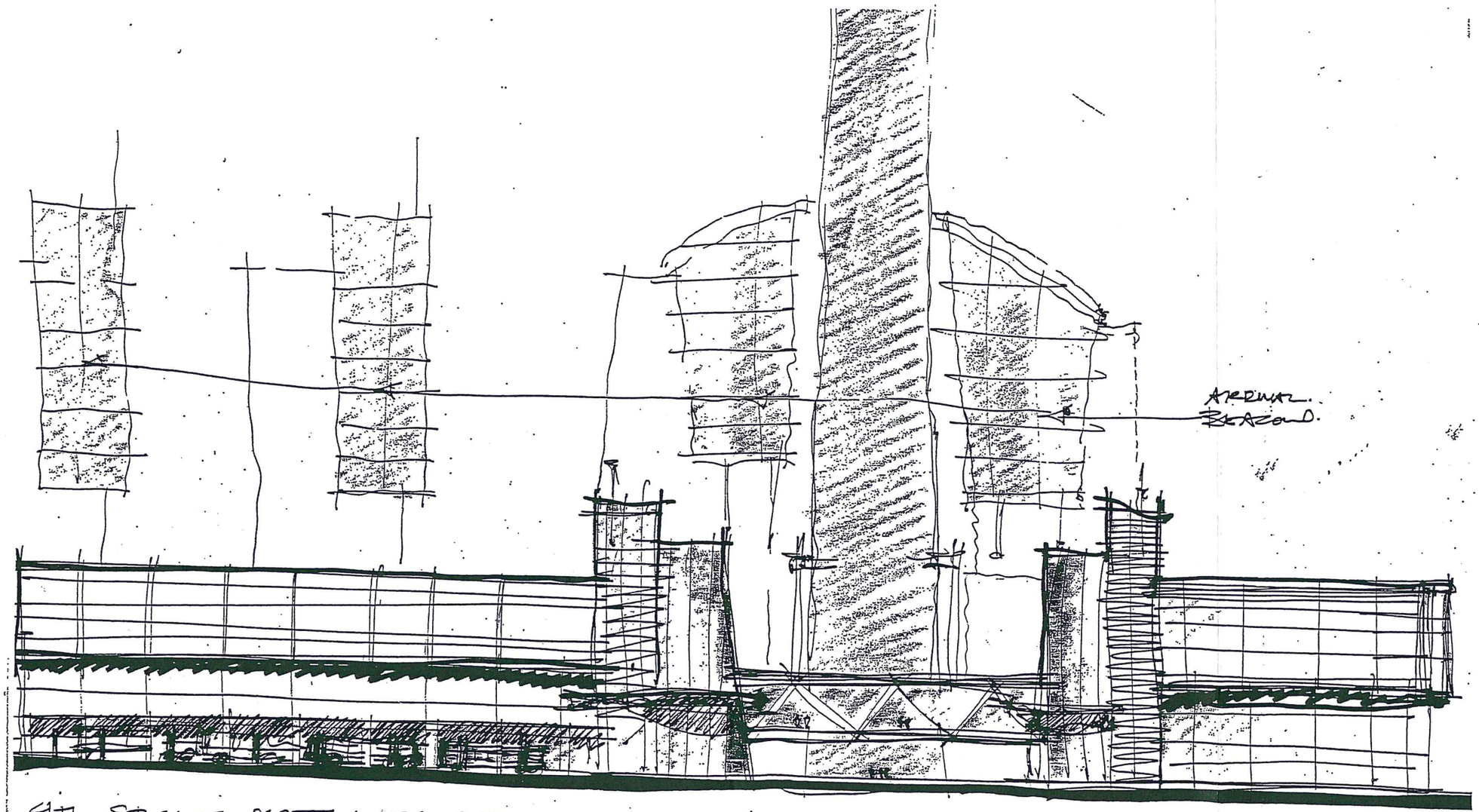
- Massing allows for street facade continuity with low rise street edge. Taller massing acting as definition of key point at site.

- Tower elements to be constructed as beacons signifying approach to station visually.

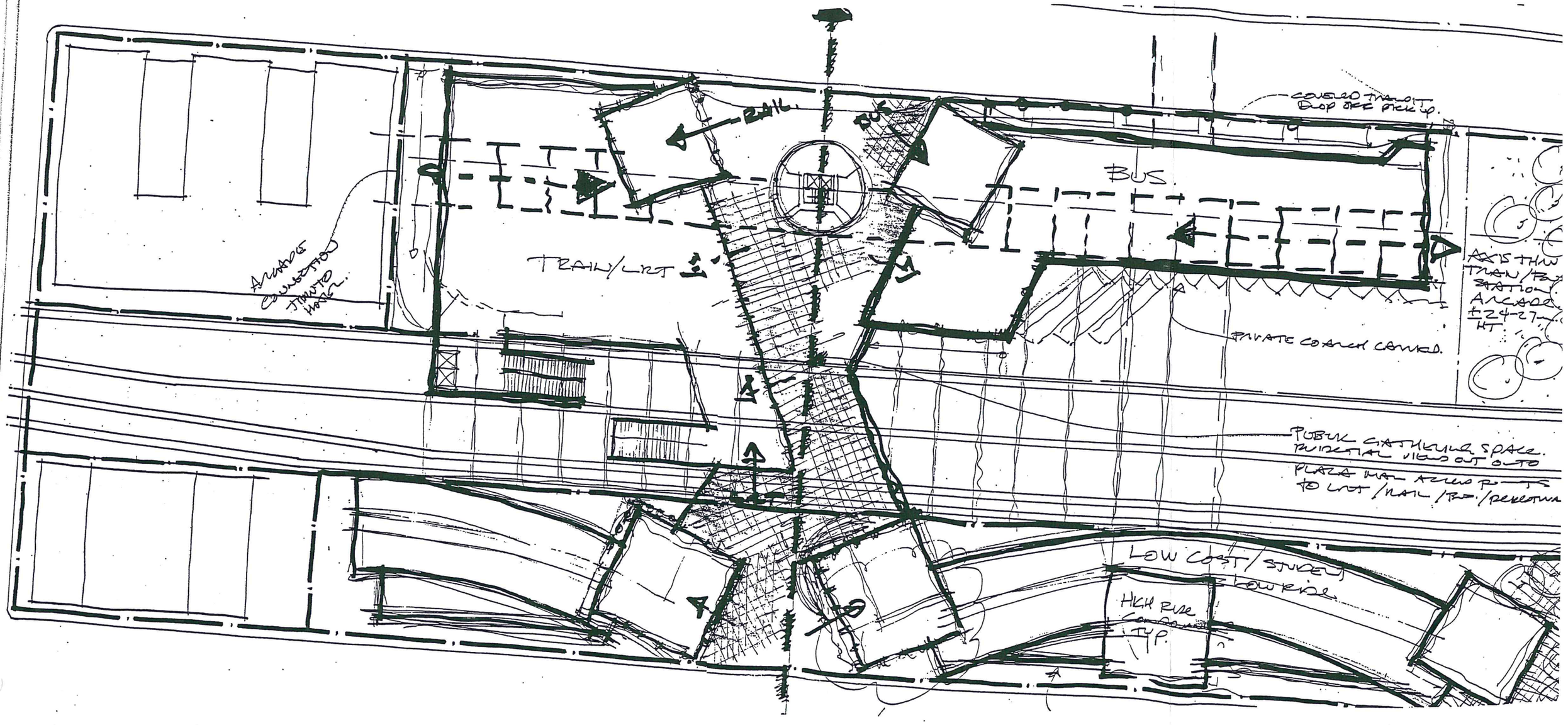
Note: net/gross floor areas approximately as per initial design submission

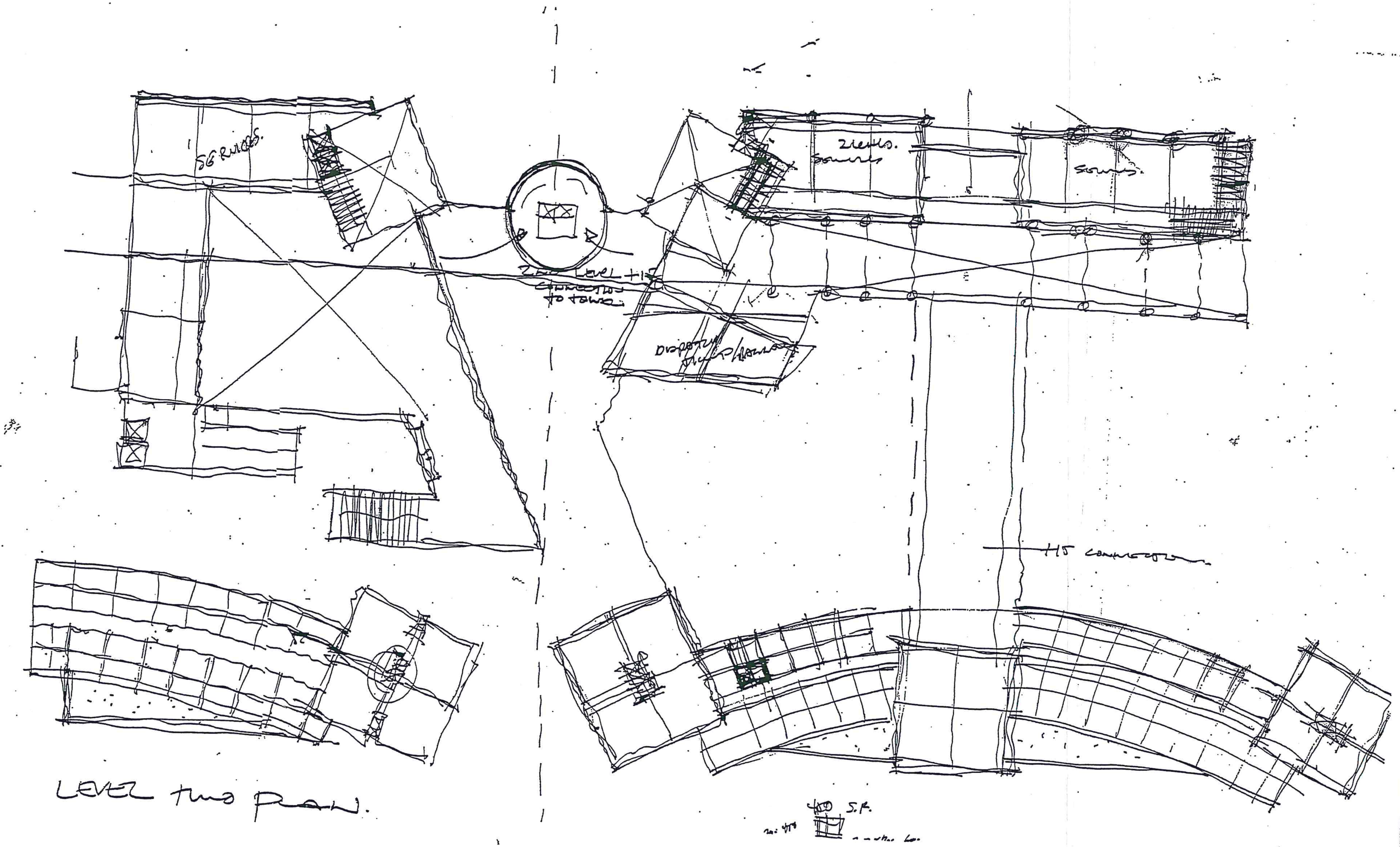
LIST OF ILLUSTRATIONS



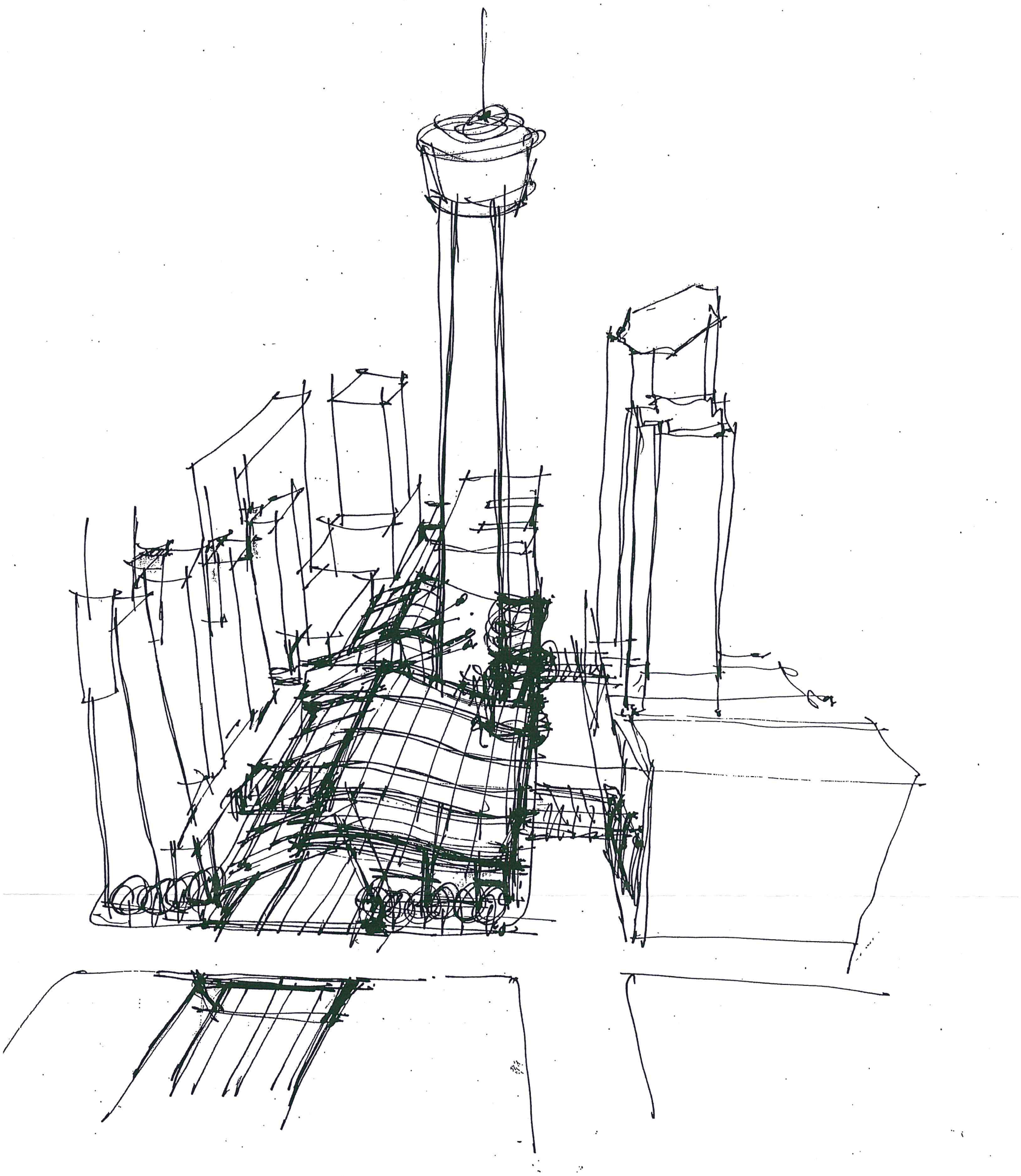


4th STREET SKETCH ELEVATION.


BUS.
TRAIN/LRT
PRIVATE COACH CANCEL.
PUBLIC GATHERING SPACE.
LOW COST/ STUDENT
HIGH RISE
TYP.



LEVEL TWO PLAN.



Downtown Calgary

EXISTING LRT

A FUTURE 3RD AVE LOOP (TO ACCESS INCREASED RESIDENTIAL POPULATION.

AIRPORT EXT. UTILIZING FUTURE 3RD AVE CONNECTION

AIRPORT EXT. UTILIZING EXISTING LRT

AIRPORT EXTENSION ALONG CP R.O.W. INCORPORATING 3RD AVE/ 7TH AVE LOOP

EXISTING 7TH AVE LINE TO BE USED PART OF 3RD AVE LOOP NORTH.

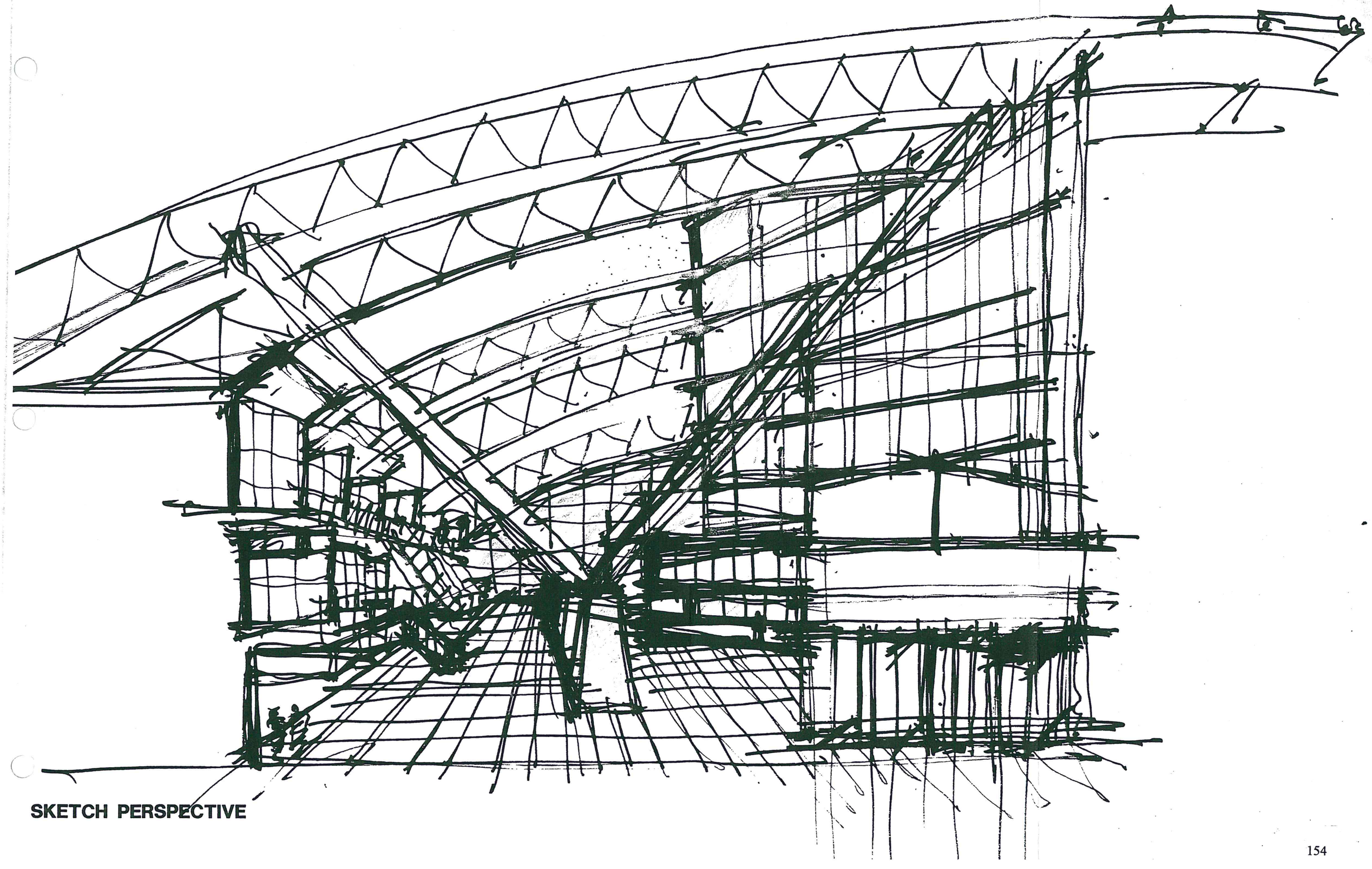
AIRPORT EXTENSION TURN-AROUND/DIRECTION CHANGE

BOW TRAIL EXTENSION INCORPORATING 3RD AVE & 7TH AVE LOOP.

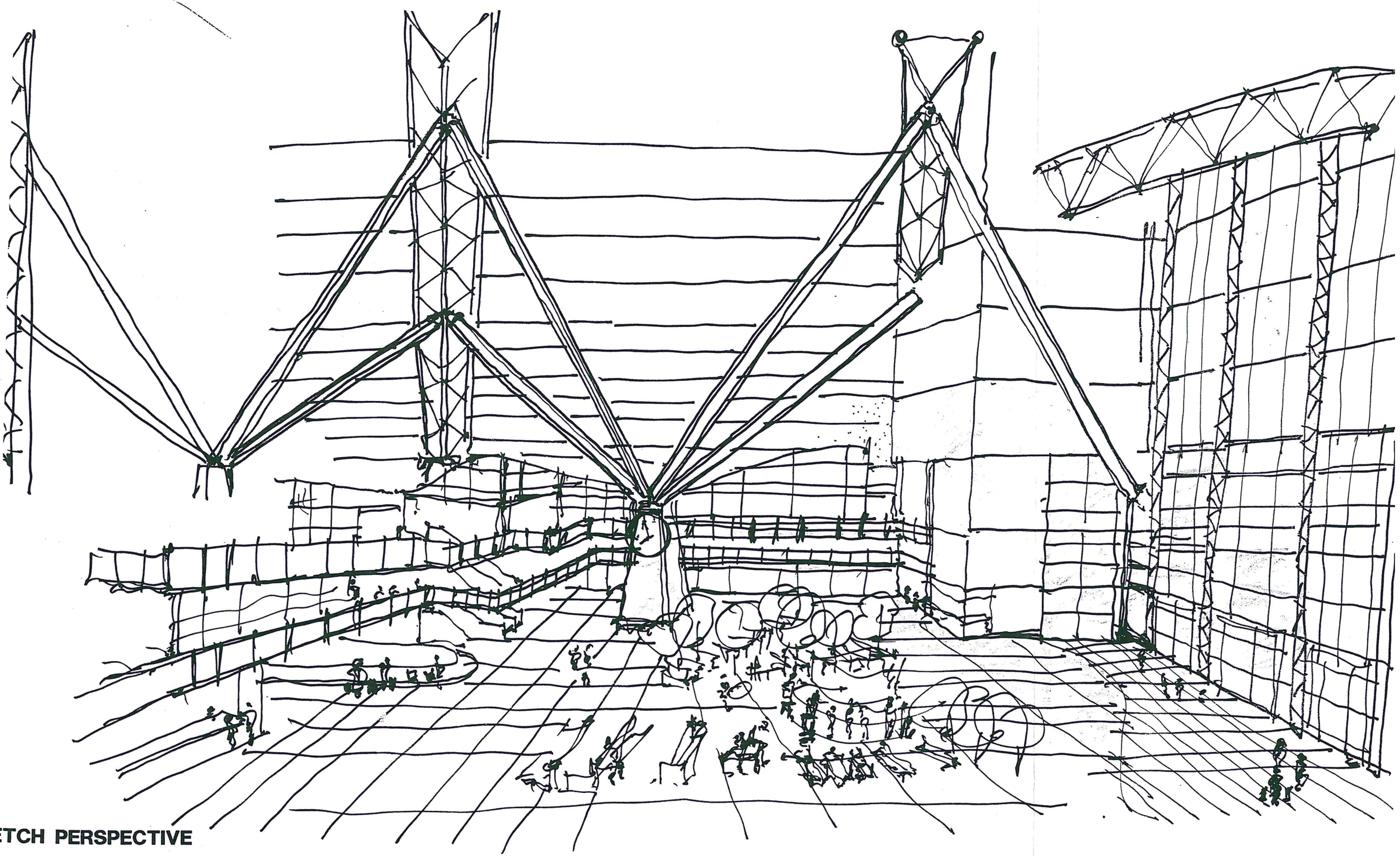
BOW TRAIL/AIRPORT EXPANSION SINGLE DIRECTION (WEST) AIRPORT RETURN ALONG 7th/ 3RD AVE.

EXISTING LRT.

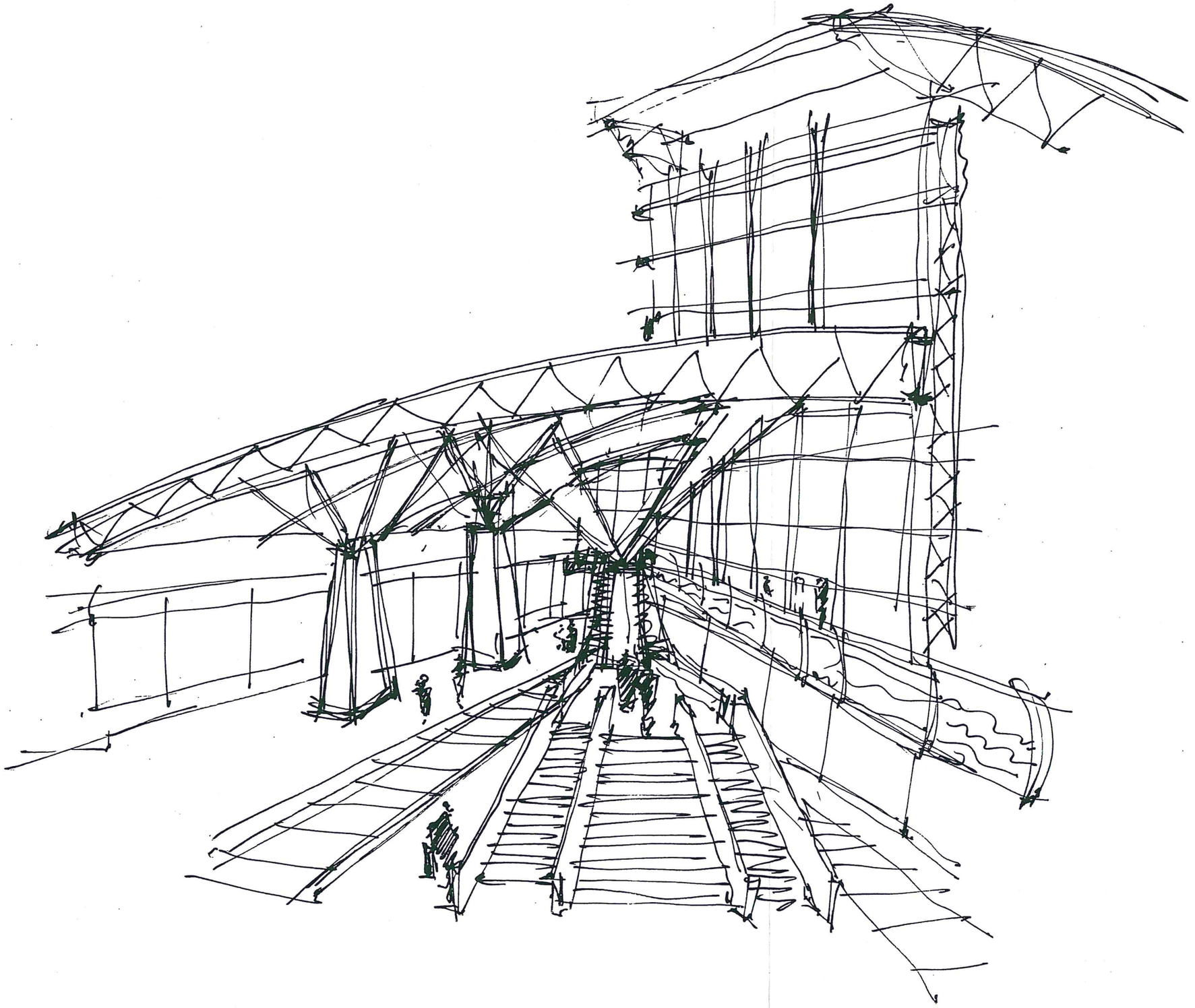
LRT ROUTING POTENTIAL



SKETCH PERSPECTIVE



SKETCH PERSPECTIVE



PLATFORM WEST SKETCH.

APPENDIX 2

STRUCTURAL AND MECHANICAL ANALYSIS

STRUCTURAL DESIGN

Floor System

- 2 way concrete slab
- 200 mm thick
- drop panels at 200 mm thick
- column spacing at 9 m O/C typical at all floors

Upper Tower construction steel frame, OWSJ floor system

Design loads for floor 4.8 kpi/100 lb sq ft.

Roof System

- space truss construction for main roof trusses
- 2 part truss construction split at interior/exterior interface to accommodate temperature differential

MECHANICAL SYSTEM

- glazing, tinted low 'E' to reduce heat load
- zoned mechanical systems AHU, MAU
- 3 mechanical rooms at bus terminal
- 2 mechanical rooms at train station
- air curtain provided at openings w/o vestibules
- CRU's independent controls: VAV unit at each
- kitchens - exhaust fans required with rated enclosure. MAU's
- parkade - 4 exhaust fans, 4 MAU units

BUS TERMINALS

- cooling capacity 230 tons
- mechanical unit 1 60 ton; 24,000 cfm
- mechanical unit 2 +85 ton; 34,000 cfm
- mechanical unit 3 +85 ton; 34,000 cfm

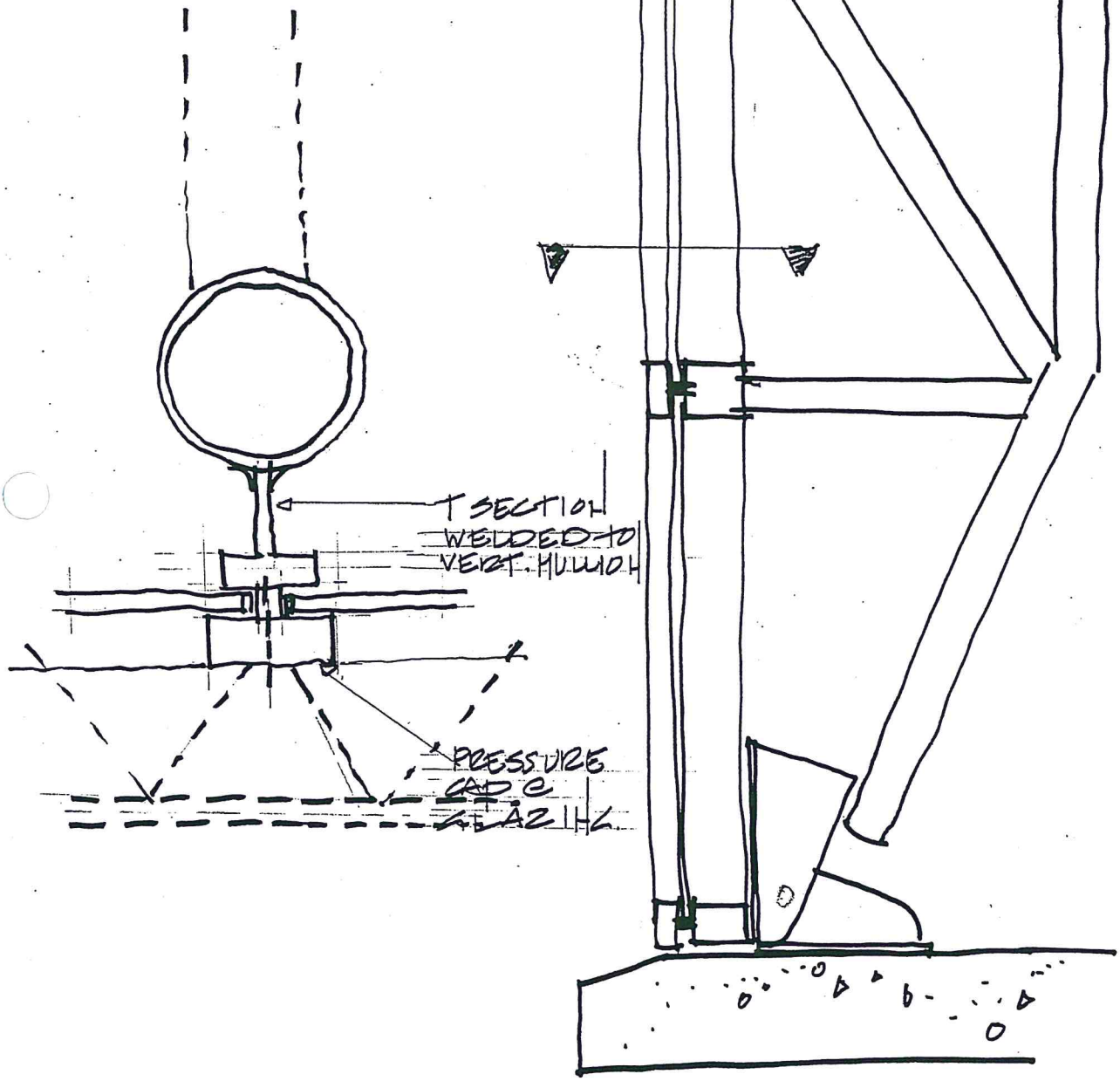
TRAIN STATION

- mechanical room 1- 100 ton; 40,000 cfm
- mechanical room 2- 100 ton; 40,000 cfm

- condensers required at restaurant's
- local cooling with condenser units versus central cooling

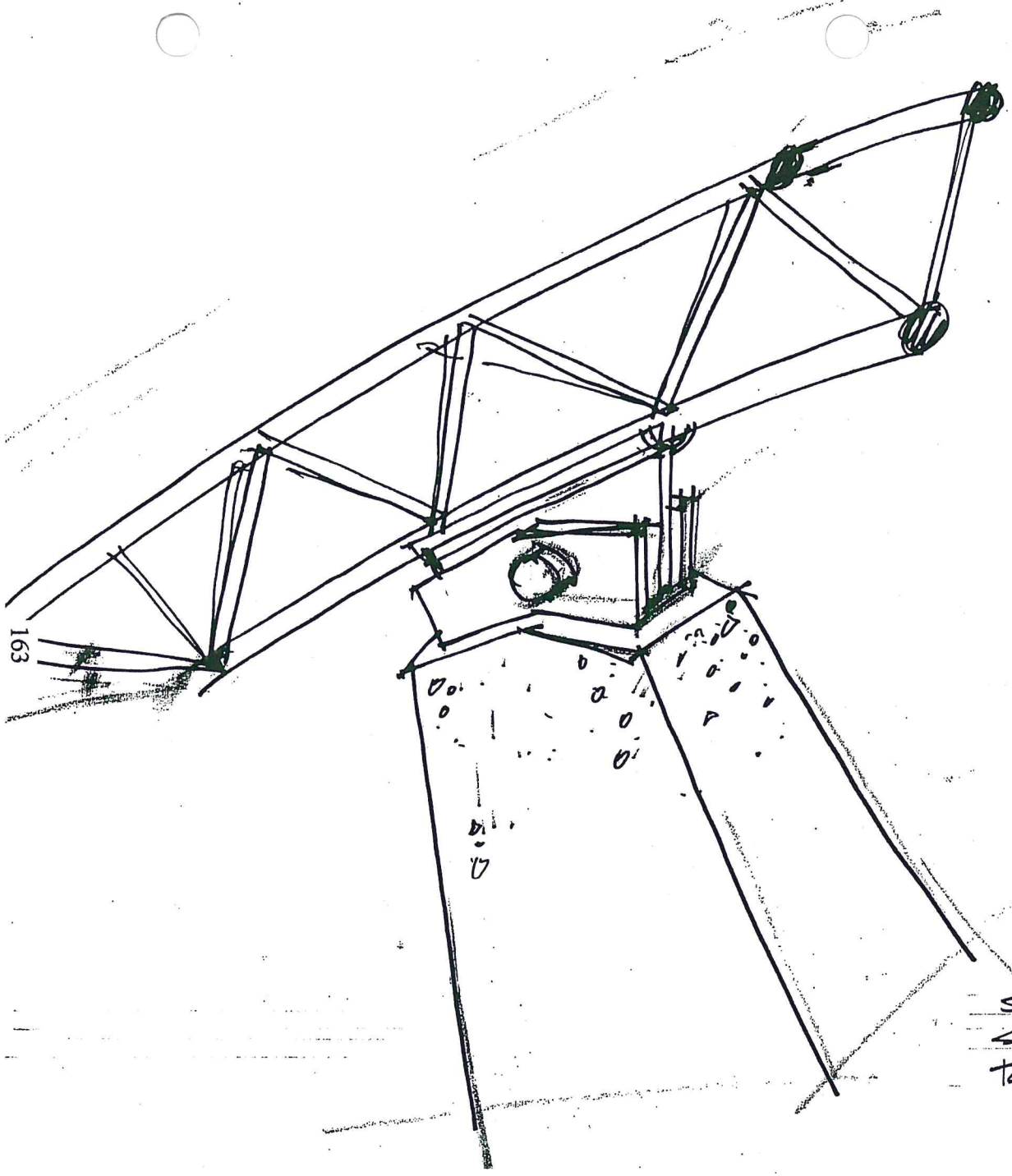
Air Quality Control
- location of louvres critical
- carbon filters on AHU's
- C.O. detectors required due to facility

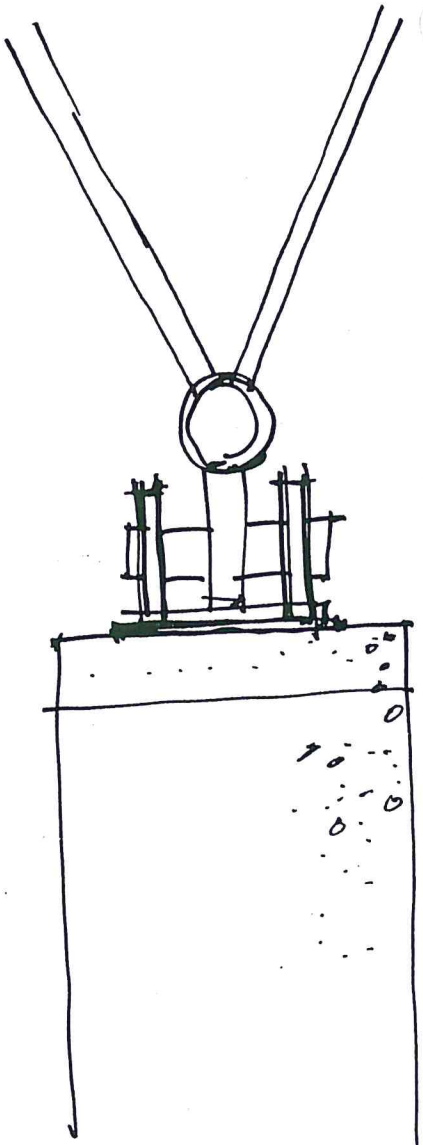
LIST OF ILLUSTRATIONS



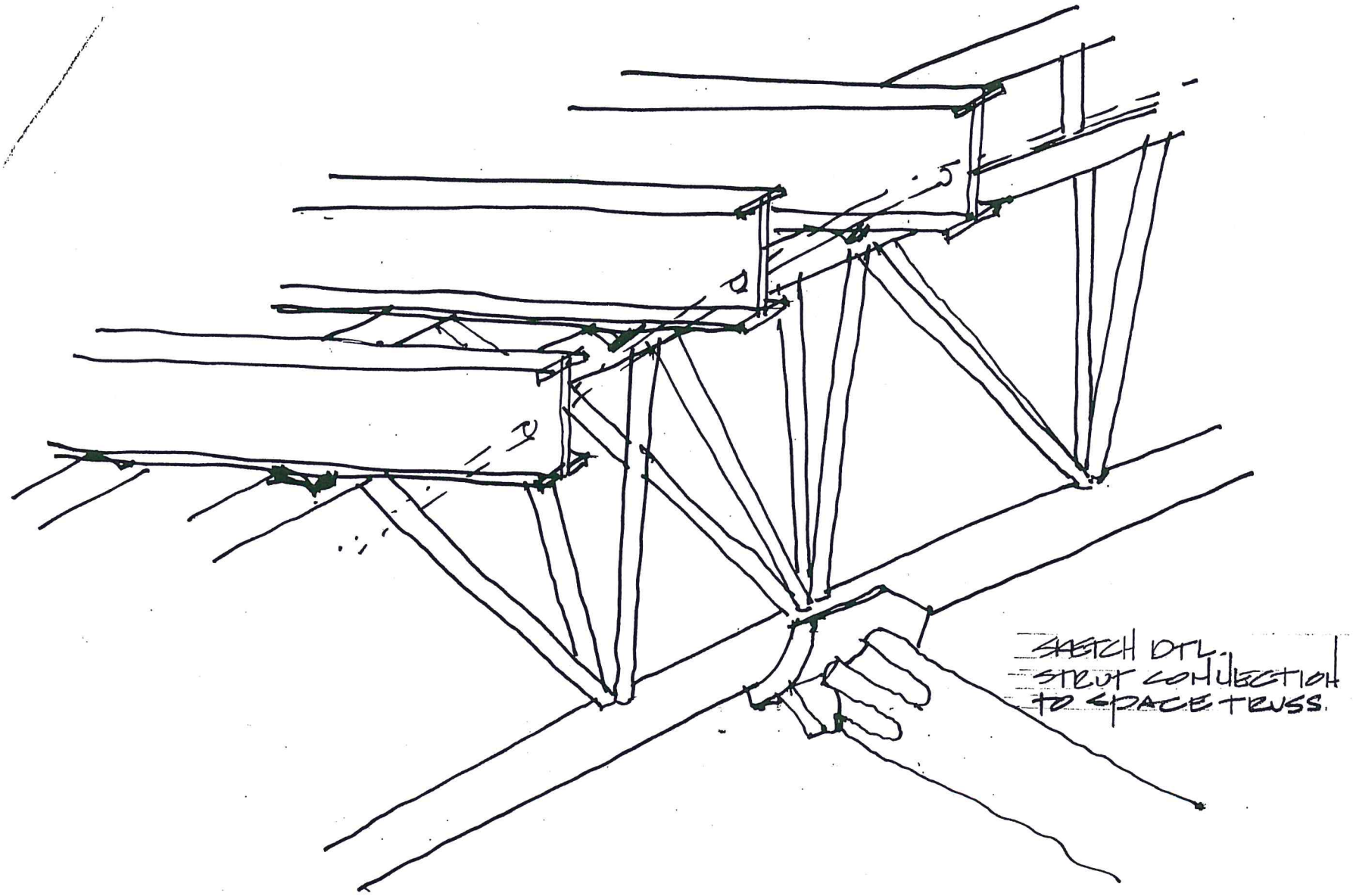
SECTION THRU
TRUSSWALL GLAZING.

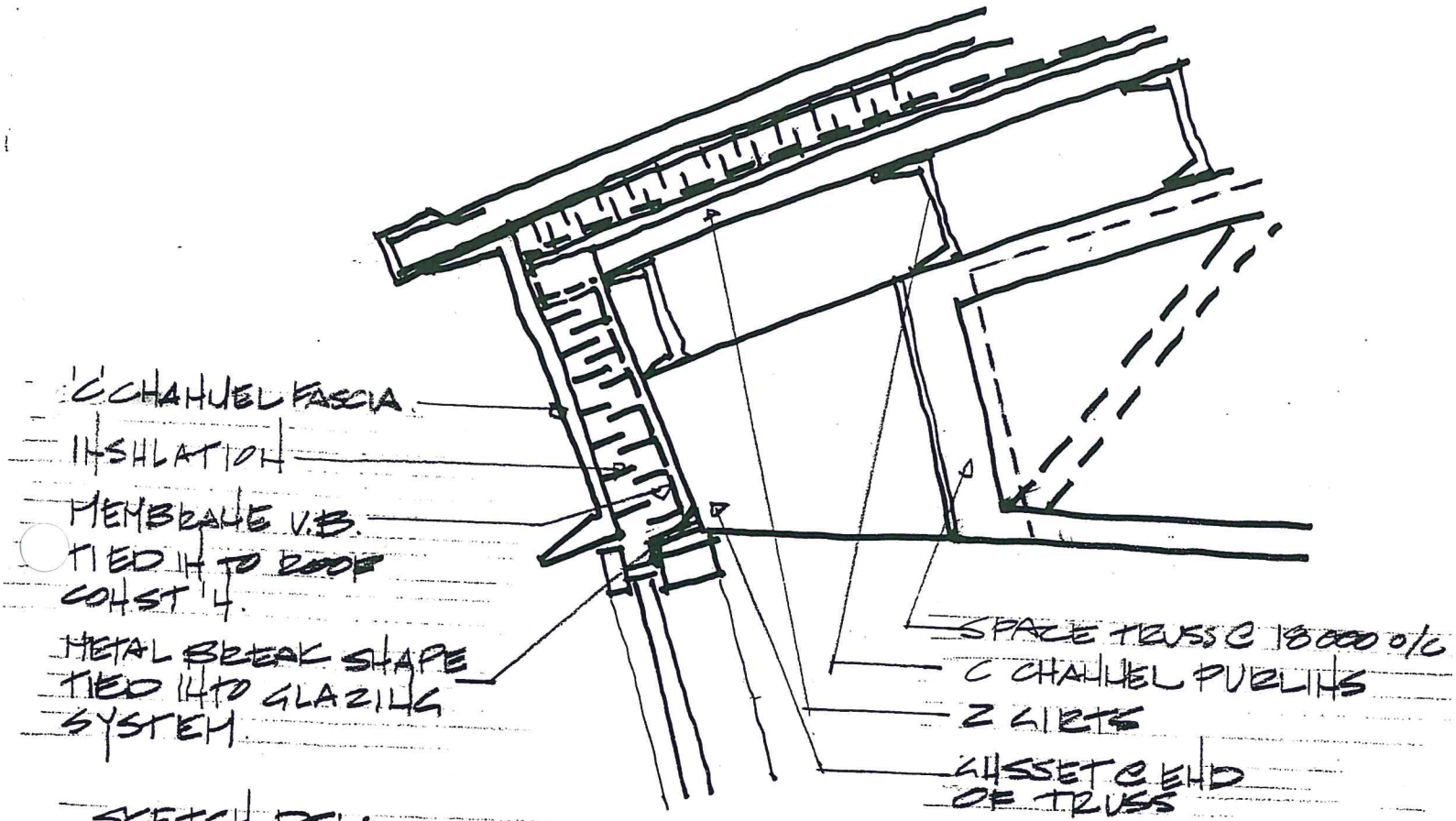
PROPOSED GLAZING
SYSTEM, STRUCT BEAMS.
3m o/c.



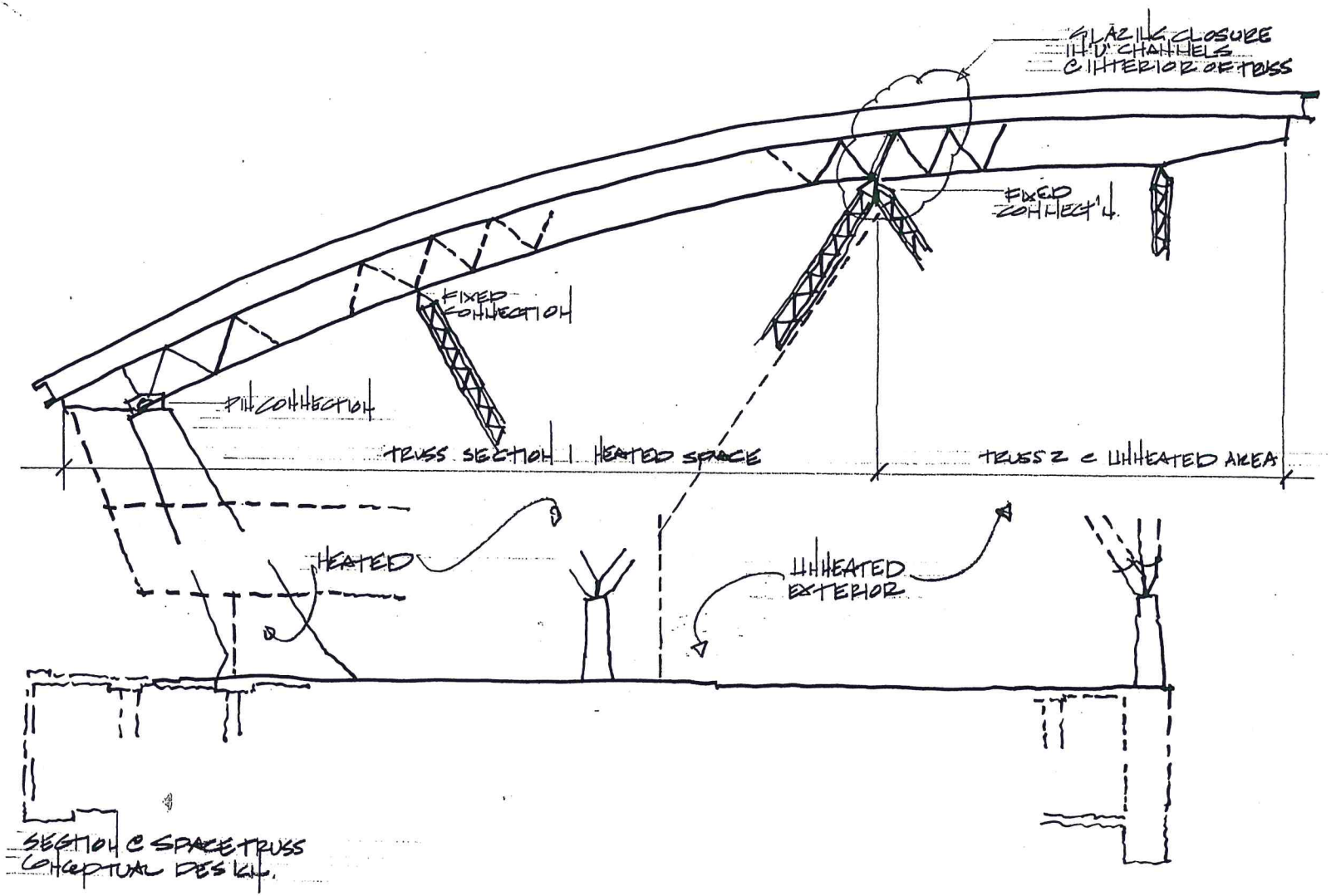


SKETCH DETAIL:
SPACE TRUSS CONNECTION
TO CONC. COLUMN BASE.

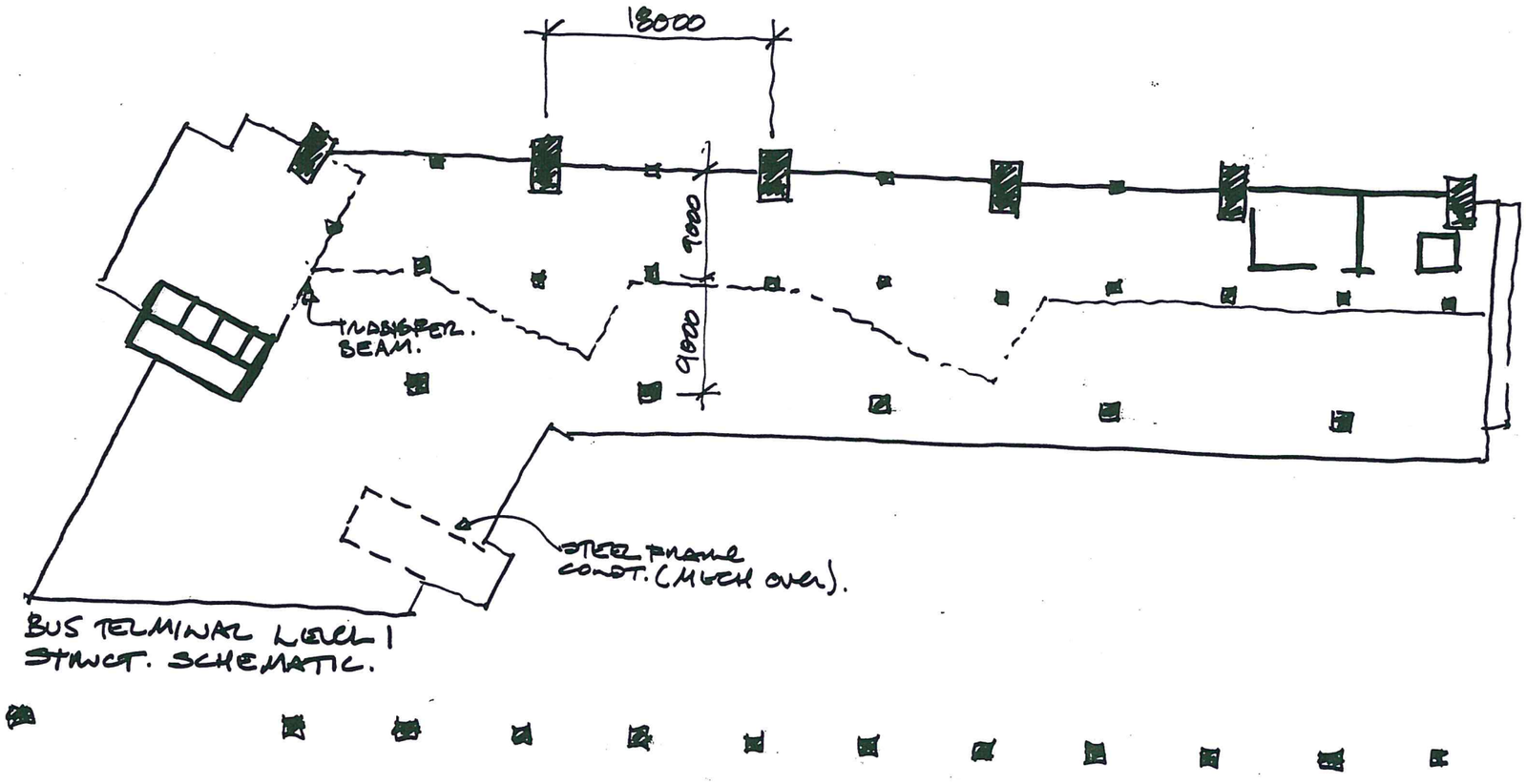

SKETCH DTL.
STRUT CONNECTION
TO SPACE TRUSS.



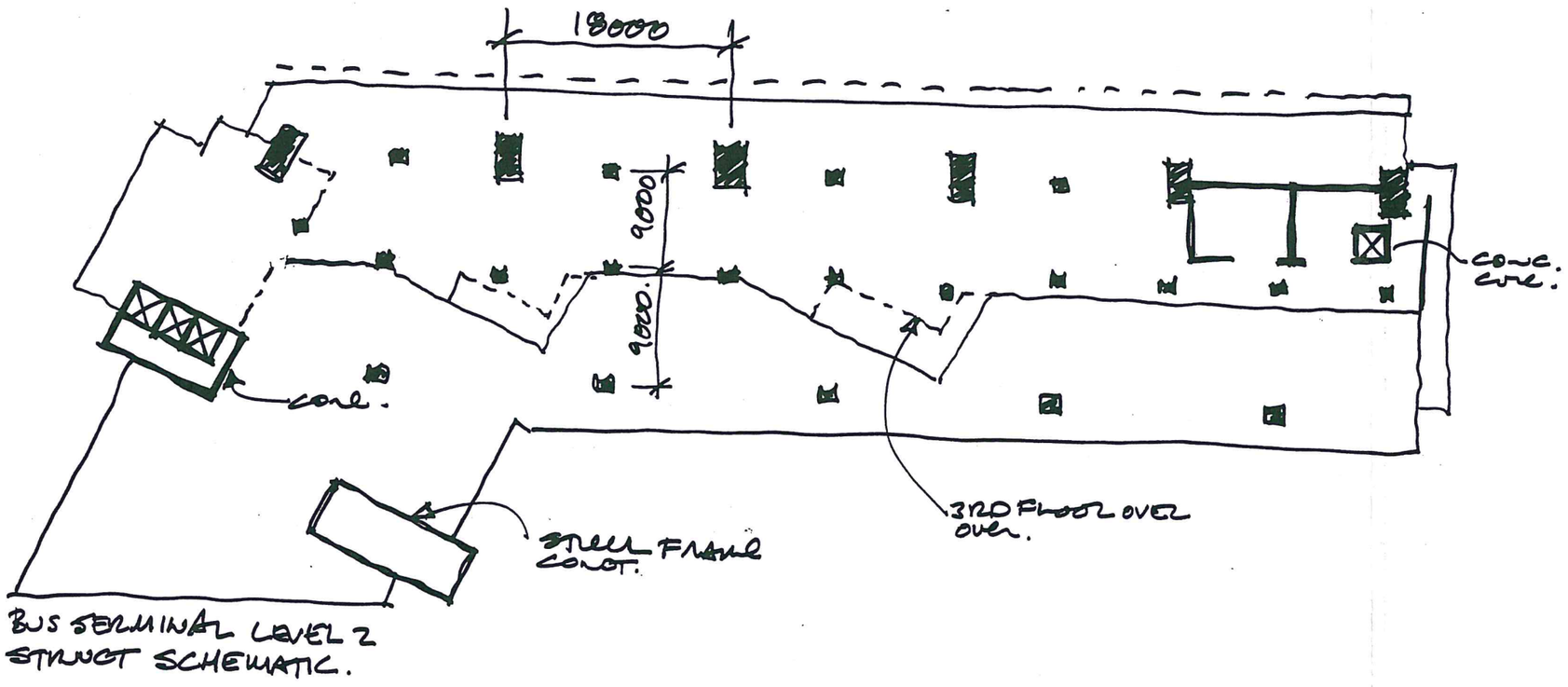
SKETCH DTL:
PROPOSED FASCIA DTL.



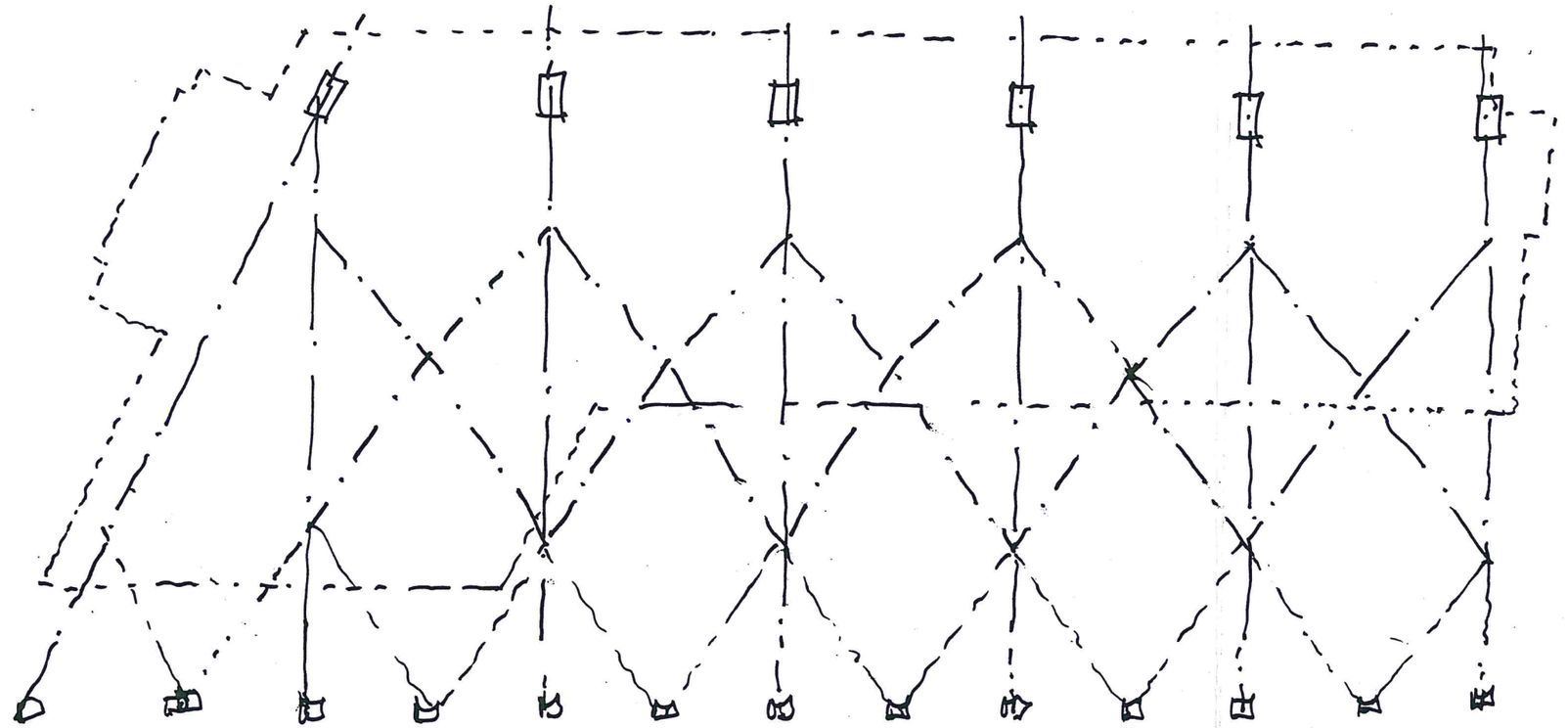
SECTION @ SPACETRUSS
CONCEPTUAL DESIGN.

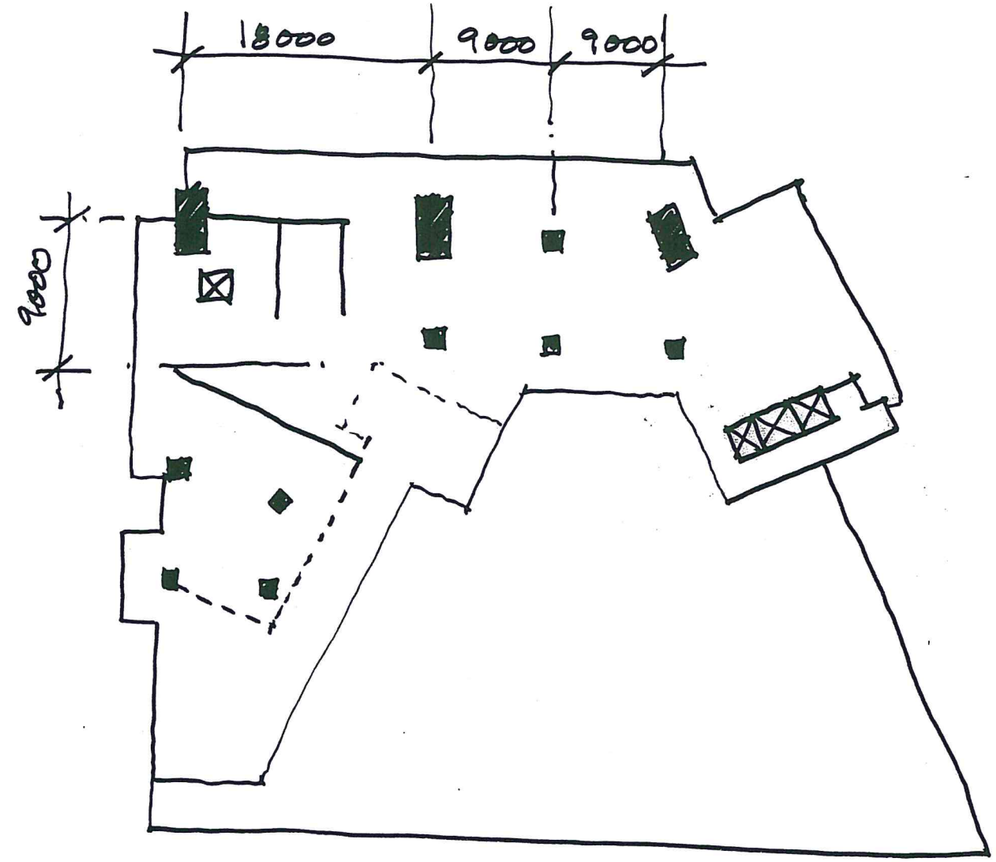


BUS TERMINAL LEVEL I
STRUCT. SCHEMATIC.

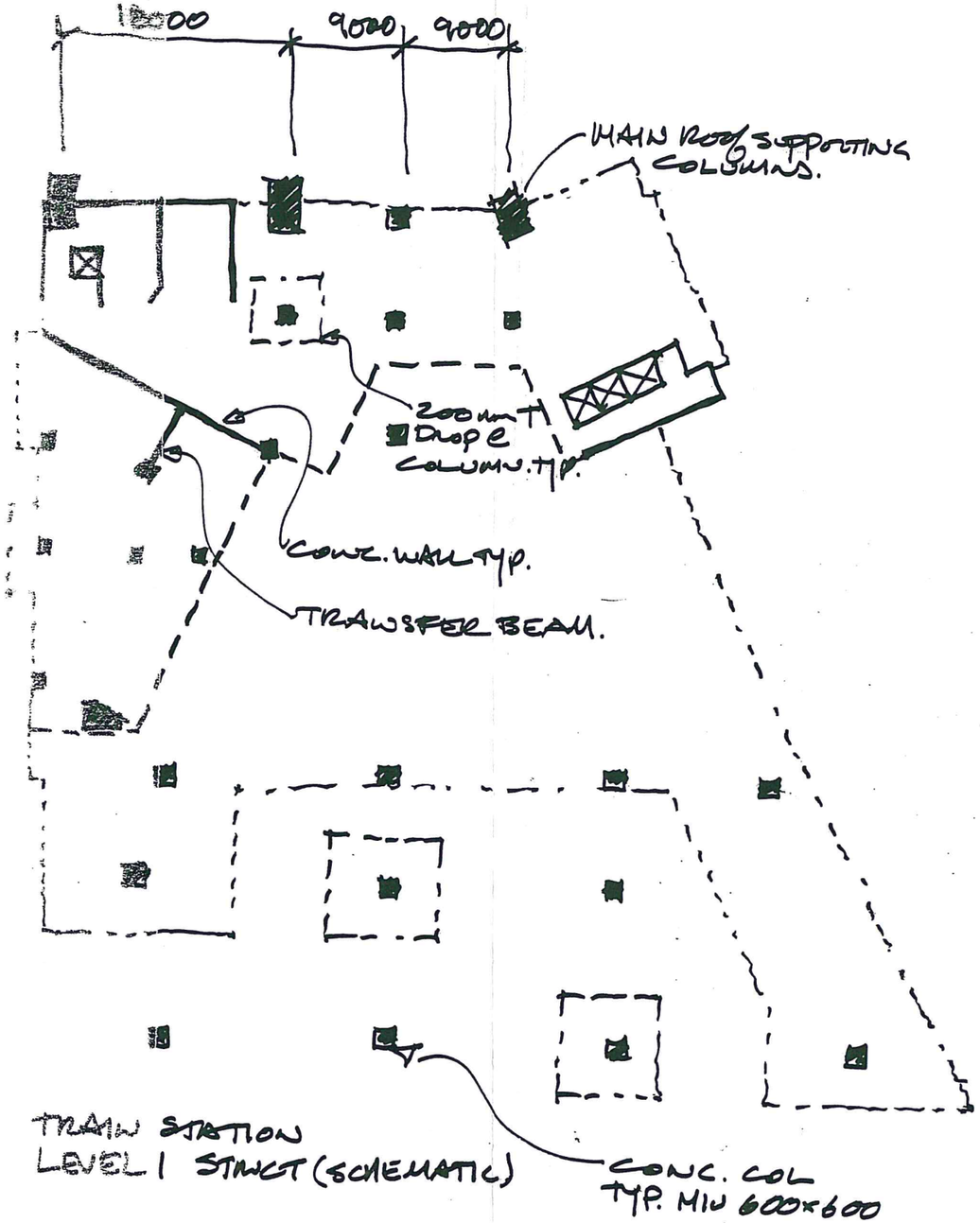


BUS SERMINAL LEVEL 2
STRUCT SCHEMATIC.

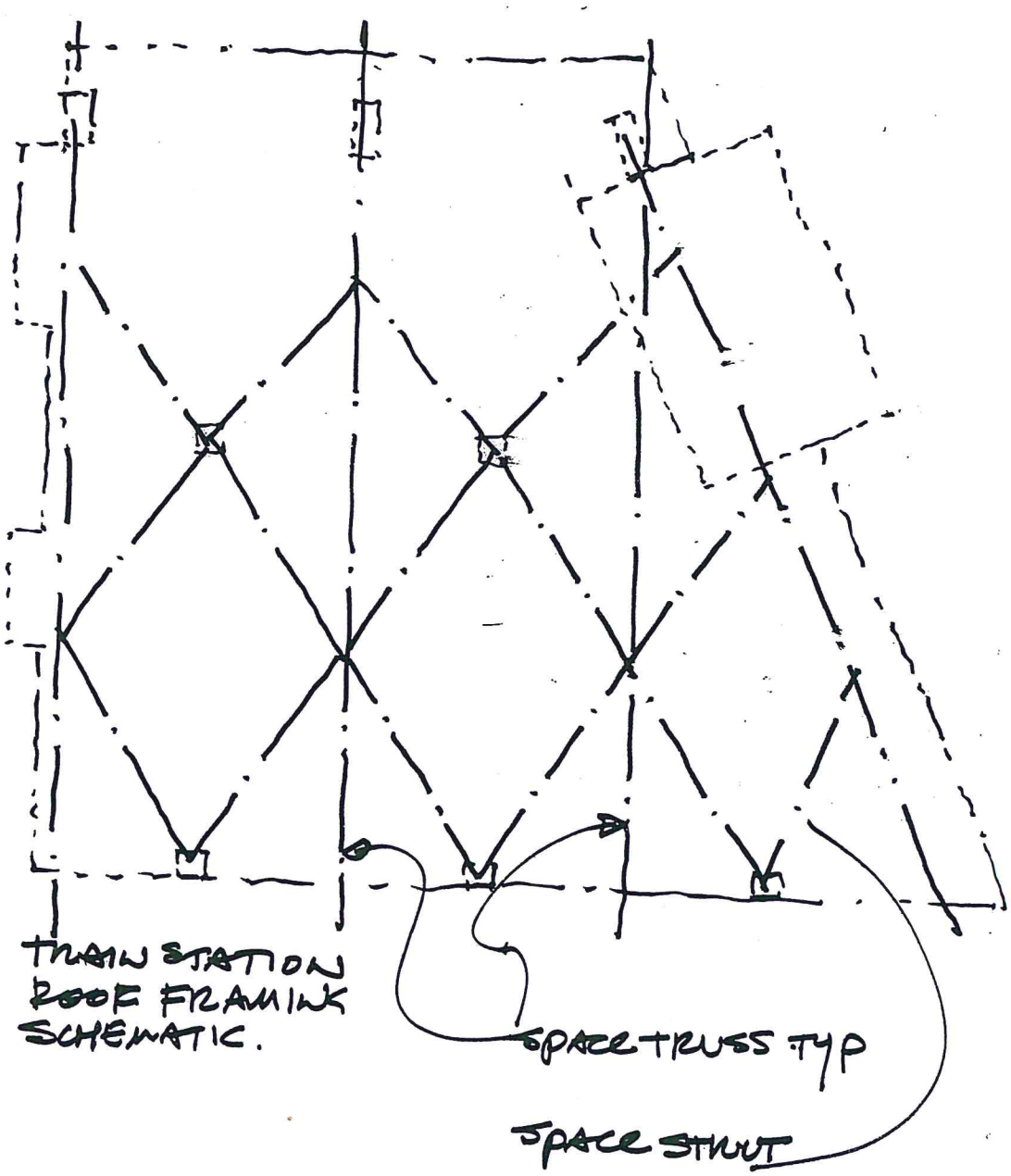


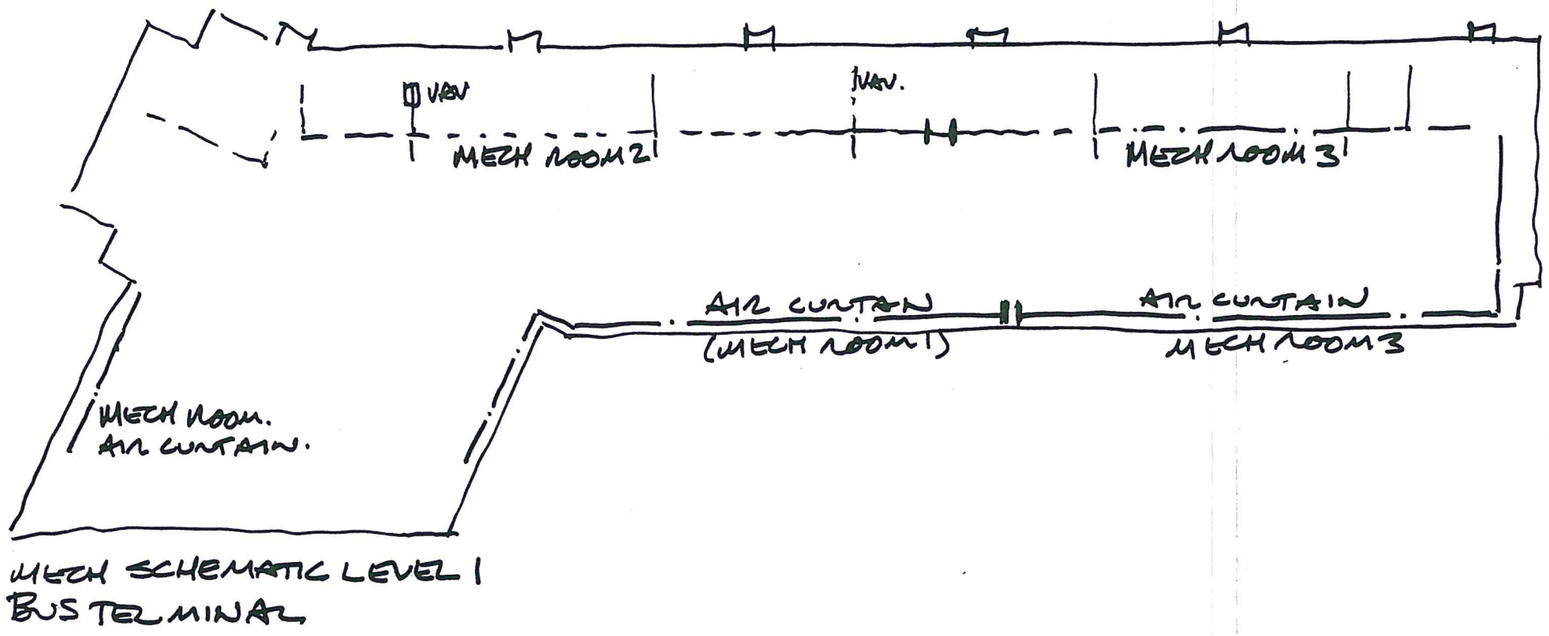


TRAIN STATION
LEVEL 2 COL. LOCATION
SCHEMATIC.

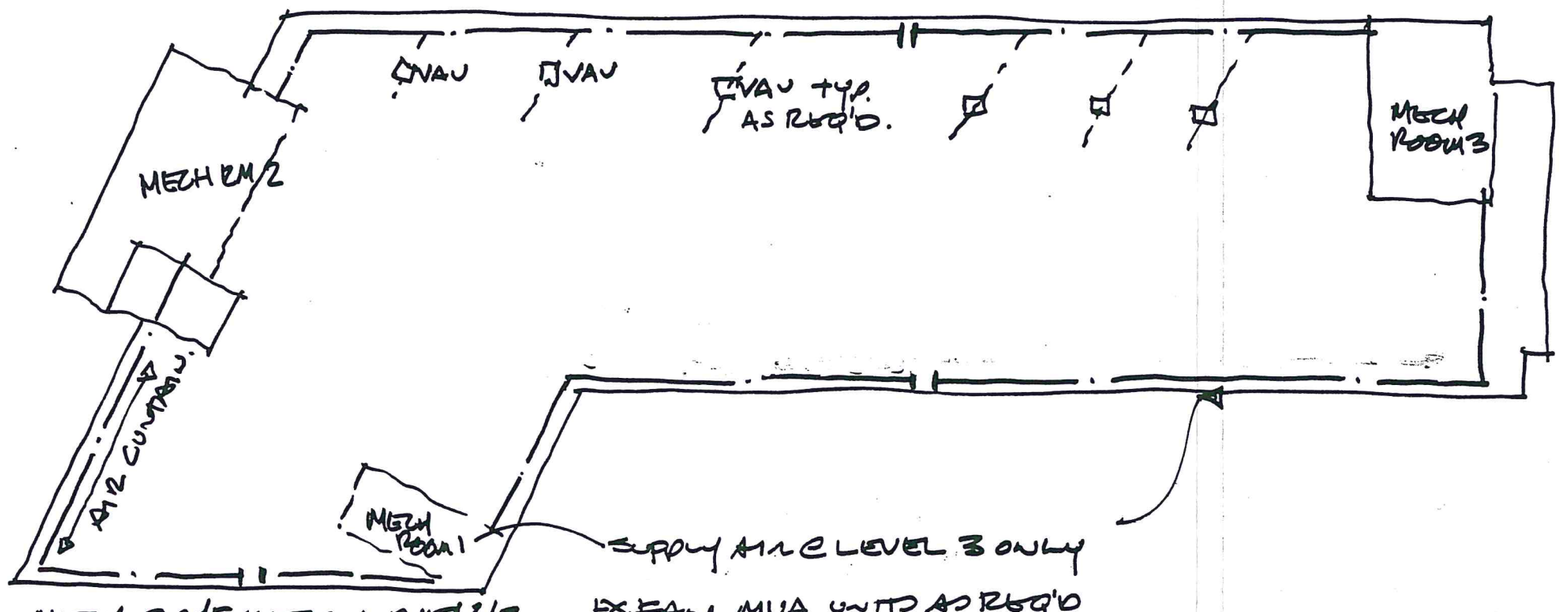


TRAIN STATION
LEVEL 1 STRUCT (SCHEMATIC)

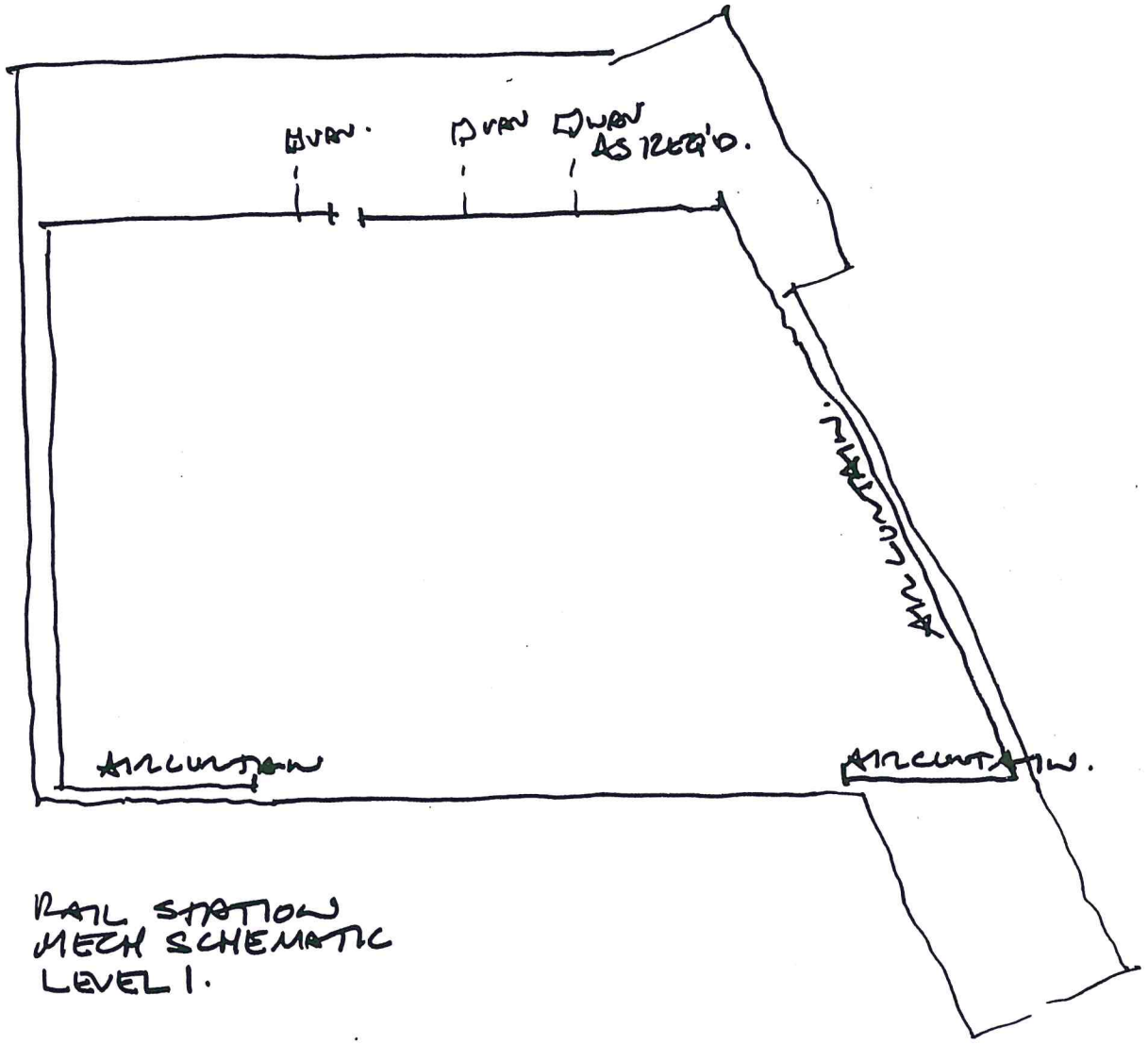

TRAIN STATION
ROOF FRAMING
SCHEMATIC.
SPACE TRUSS TYP
SPACE STRUT



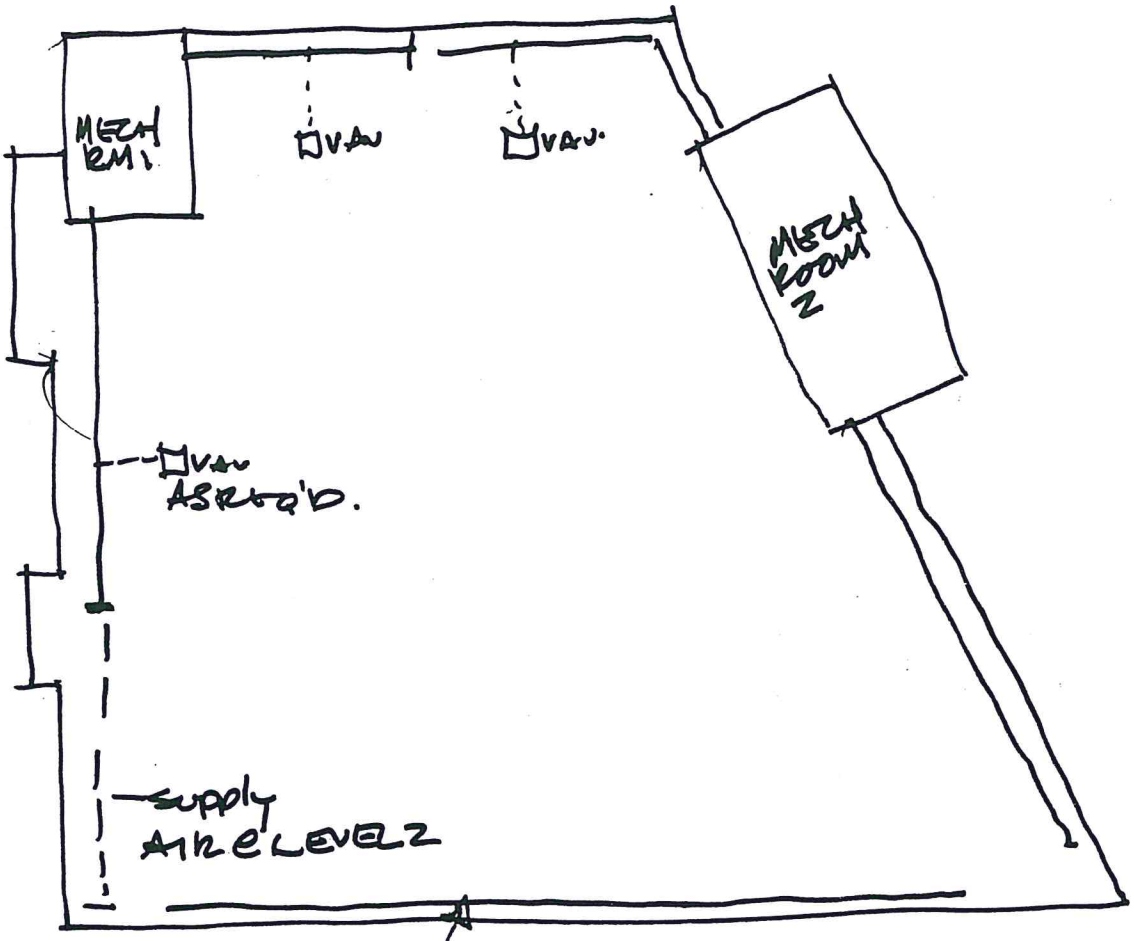
MECH SCHEMATIC LEVEL 1
BUS TERMINAL



MECH SCHEMATIC. LEVEL 2/3
BUS TERMINAL.



RAIL STATION
MECH SCHEMATIC
LEVEL 1.



TRAIN STATION
MECH SCHEMATIC.
LEVEL 3
LEVEL 2 SIM.

EX. FAN, MUA AS REQ'D BY RESTAURANT/ FOOD SERVICE FUNCTIONS.

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