

**BISMARCK
ENCLOSED WALKWAY
STUDY**

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WALKWAY STUDY

Commissioned by
the Board of City Commissioners

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INTRODUCTION

The purpose of the Bismarck Skyway Study, which is being undertaken at the request of the Bismarck Board of City Commissioners, is to establish policies and specifications for above and below-grade pedestrian systems. This study is intended to guide the city in making decisions on skyway or tunnel development.

Existing and future conditions in the downtown area, including physical elements, land use, parking and traffic will be examined first. Specifications for pedestrian systems will then be discussed, including design standards, construction and operations policies, approval procedures and implementation. Finally, present and future skyway and tunnel connections will be discussed.

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BENEFITS OF SEPARATE PEDESTRIAN SYSTEMS

The potential benefits of separate pedestrian systems include the following:

- Pedestrian/vehicle conflicts - the walkway study area is comprised of high traffic volume streets. Normal traffic flow and vehicles turning right make it difficult for pedestrians to cross streets. The provision of alternate pedestrian systems will reduce potential conflict points and minimize the accident rate. These conflicts are made more crucial by less than optimum driving conditions during our winters.
- Climate - walkways are an obvious means of protecting pedestrians from Bismarck's severe climate. In an average year, Bismarck experiences freezing temperatures from late September through mid-May. In addition, the average wind speed in the area is a little under 11 miles per hour with a prevailing direction from the west northwest. This results in long, cold and windy winters.
- Strengthen the CBD - one of the goals of the comprehensive plan for Bismarck is to maintain a high density, compact downtown. A walkway system would encourage a concentration of retail and service activities on a level above existing uses.
- Connect parking to activity centers - a walkway system would allow pedestrians uninterrupted, climate

controlled routes from parking garages to activity centers. Pedestrians would be encouraged to walk longer distances in such a system than they would otherwise.

- Serve CBD population and employment projections - according to the Street & Highway Plan Update (1981), downtown area population is projected to increase slightly from 700 in 1985 to 800 persons in 2000. Employment is projected to increase from 7,850 in 1985 to 11,780 in 2000. A walkway system would be highly desirable to serve the increased numbers of people living and working in the CBD. It would maintain the compactness of the area while minimizing internal vehicular traffic.

ABOVE & BELOW GRADE SYSTEMS COMPARED

Characteristics of above grade systems:

- separation of pedestrians and vehicles
- second level access required
- vertical change required
- positive pedestrian orientation
- generate second level utilization
- less energy efficient (expensive to cool & heat)
- minimal sense of confinement
- less disruptive to utilities
- may cause aesthetic problems (older buildings may not gracefully accept skyway connections)
- less expensive construction
- relates to upper levels of parking ramps
- creates shopping center atmosphere

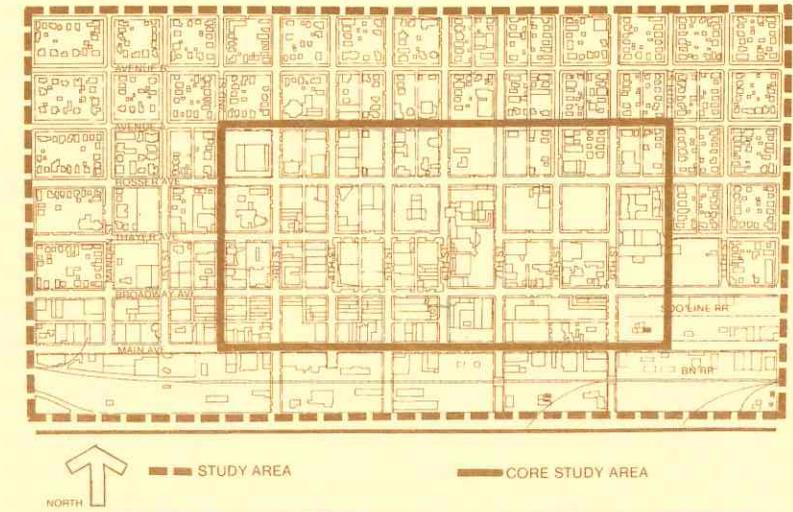
Characteristics of below grade systems:

- separation of pedestrians and vehicles
- basement access required
- vertical change required
- limited pedestrian orientation
- may generate basement level utilization
- energy efficient (less heat loss)
- sense of confinement
- potential utility conflict
- no aesthetic problem
- expensive construction
- easier to expand (don't require buildings for support)

SKYWAY STUDY AREA

The study area, comprised of 91 blocks, includes downtown. This area is bounded by Washington Street, Avenue C, 12th Street, and Front Avenue. A core area of 32 blocks was chosen for more intensive study as the area most likely to have the potential for walkway linkages. This area is bounded by 2nd Street, Avenue A, 10th Street, and Main Avenue. The study areas are illustrated in figure 1.

FIGURE 1. STUDY AREA



EXISTING CONDITIONS

Existing land uses are shown in figure 2 as well as their potential expansion. Medical uses have concentrated east of 6th Street

and north of Broadway Avenue, with service uses (banks, offices) located to the north and west. Many retail uses are located in a

strip along Main and Broadway Avenues, while residential uses are found in the northern edge of the downtown area.

FIGURE 2. GENERAL LAND USE

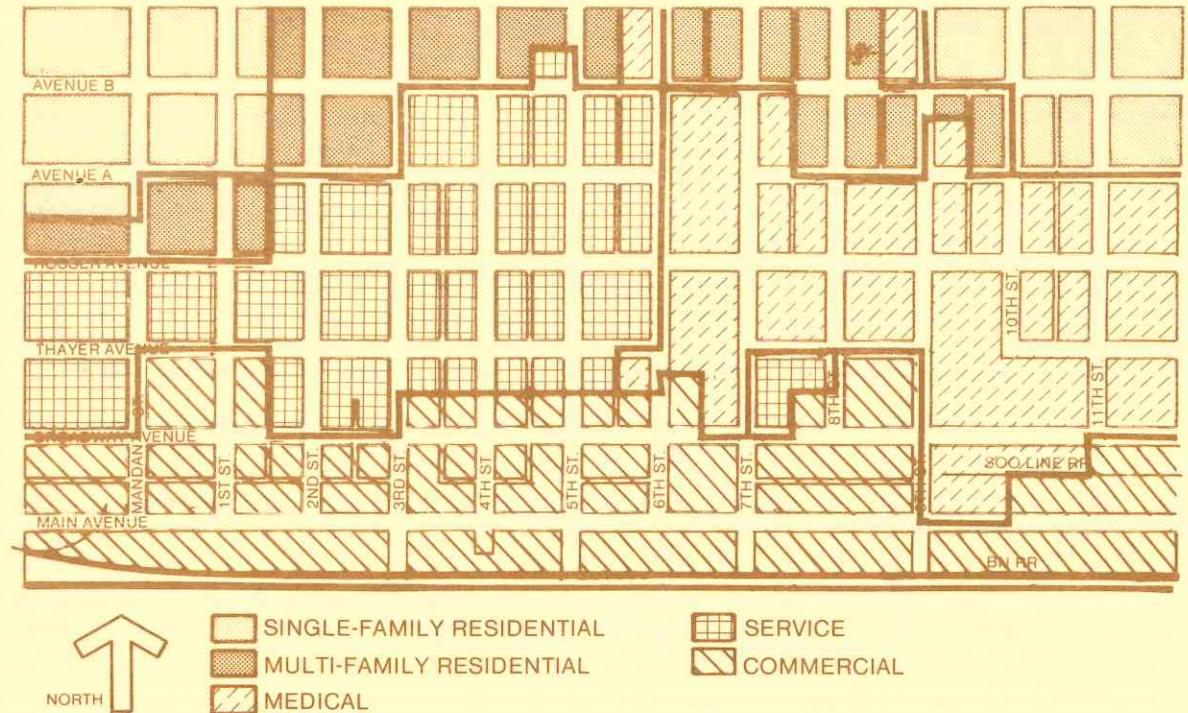
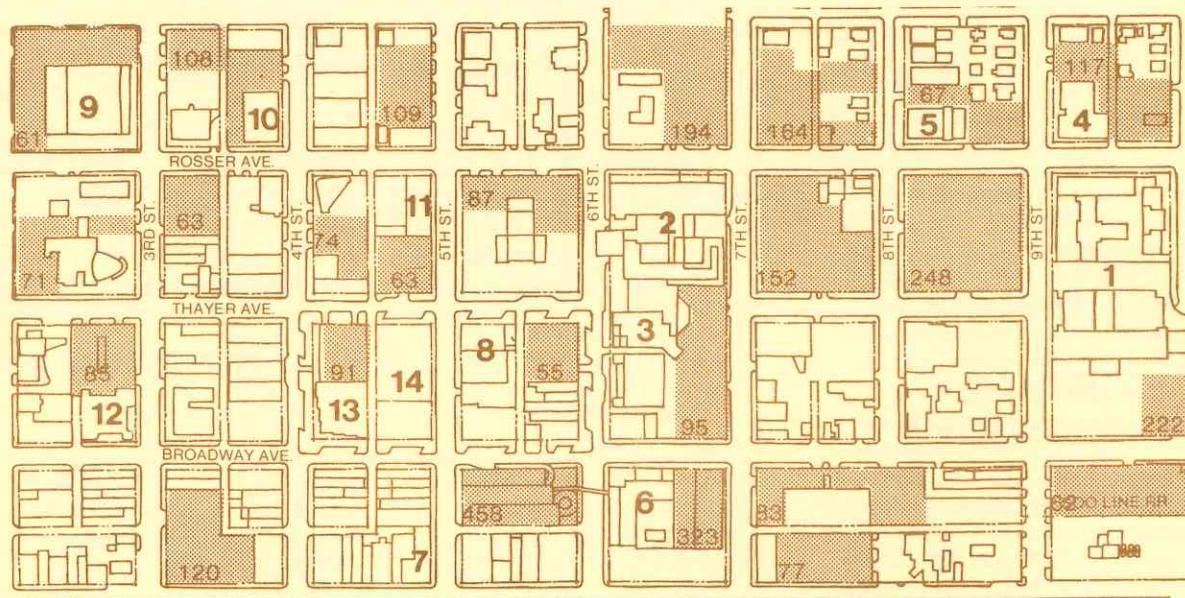


Figure 3 shows the major activity centers in the study area:

FIGURE 3. EXISTING ACTIVITY CENTERS AND PARKING





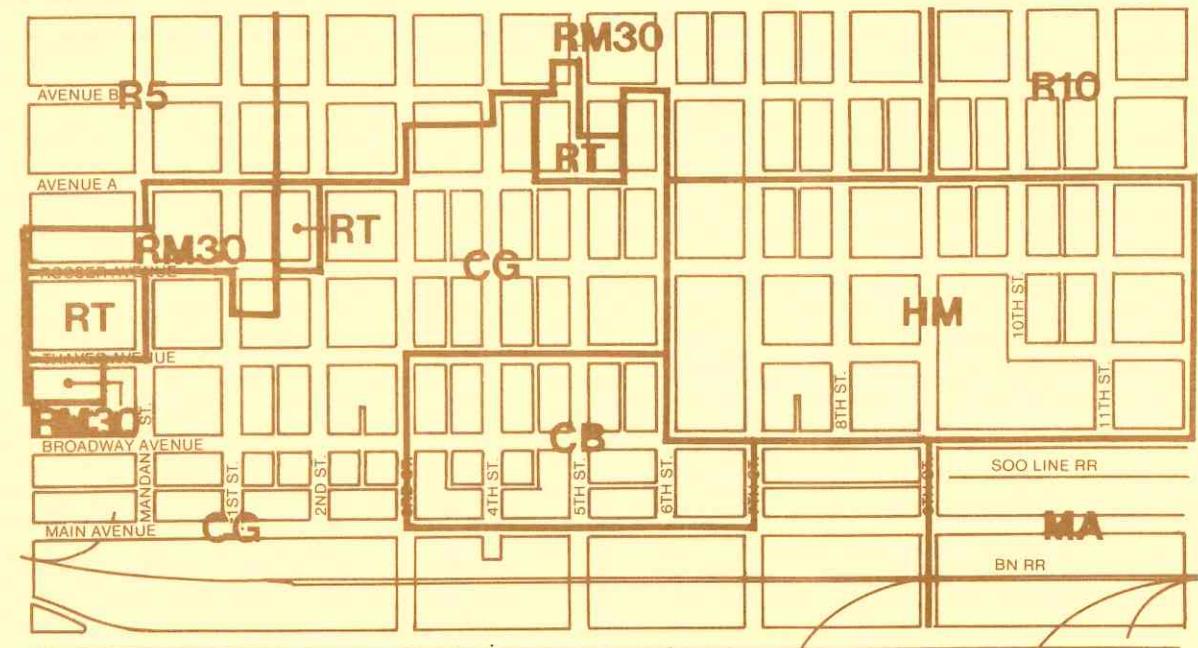

 EXISTING PARKING (OVER 50 SPACES)

1. St. Alexis Medical Center/Heart & Lung Clinic - the largest employer in the downtown area with over 1100 employees. The medical center, which completed an expansion project in 1984, occupies over 4 city blocks and contains 313 beds.
2. Medcenter One/School of Nursing - also completed expansion projects in 1984 and now covers an area of over 3 blocks. Medcenter One employs over 800 people and contains 256 beds.
3. Q & R Clinic - built a new facility in 1984. The clinic adjoins Medcenter One and employs over 300 people.
4. Mid Dakota Clinic - is located at 9th Street and Rosser Avenue, north of St. Alexis Medical Center. The clinic has 18 physicians and support staff.
5. Medical Arts Building - is located at 8th Street and Rosser Avenue. Twenty independent physicians and other medical services are located in this building.
6. Sheraton Galleria Hotel - phase one of the redevelopment of this urban renewal block was completed in 1984. The hotel contains 223 rooms. A 323 space parking ramp which adjoins the hotel was built by the city at the same time the hotel was being constructed.
7. Patterson Place - the former Patterson Hotel was renovated in 1983 for use as an elderly housing complex. The building contains 117 apartments, as well as a restaurant.

8. City-County Building/County Courthouse - a government center has been created with the renovation of the former Q & R Clinic building into city and county offices. The County Courthouse is presently undergoing an expansion project which will provide additional court space.
9. Federal Building - this activity center at 3rd Street and Rosser Avenue contains the post office and other federal agencies.
10. Montana Dakota Utilities - this major downtown building employs over 400 persons.
11. Provident Life Building - nearly 100 people are employed by the Provident Life Insurance Company.
12. First Bank - the bank building, together with drive-up facilities and parking ramp occupies most of the block at 3rd Street and Broadway Avenue.
13. Norwest Bank Building - this building along with a parking ramp covers half of the block at 4th Street and Broadway Avenue. The Norwest Bank building was the city's first urban renewal project, completed in 1975. It houses the bank along with other offices.
14. Northwestern Bell - at the corner of 5th Street and Thayer Avenue, this building has undergone several remodeling and expansion projects. Approximately 280 persons are employed at Northwestern Bell.

Figure 3 also shows the location of major off-street parking facilities in the study area and the number of parking spaces. Based on a site survey taken in February 1985, there are approximately 5,500 off-street spaces in the study area. Many of the parking spaces are located in the medical district area and within parking structures in the downtown core.

FIGURE 4. ZONING DISTRICTS





 NORTH

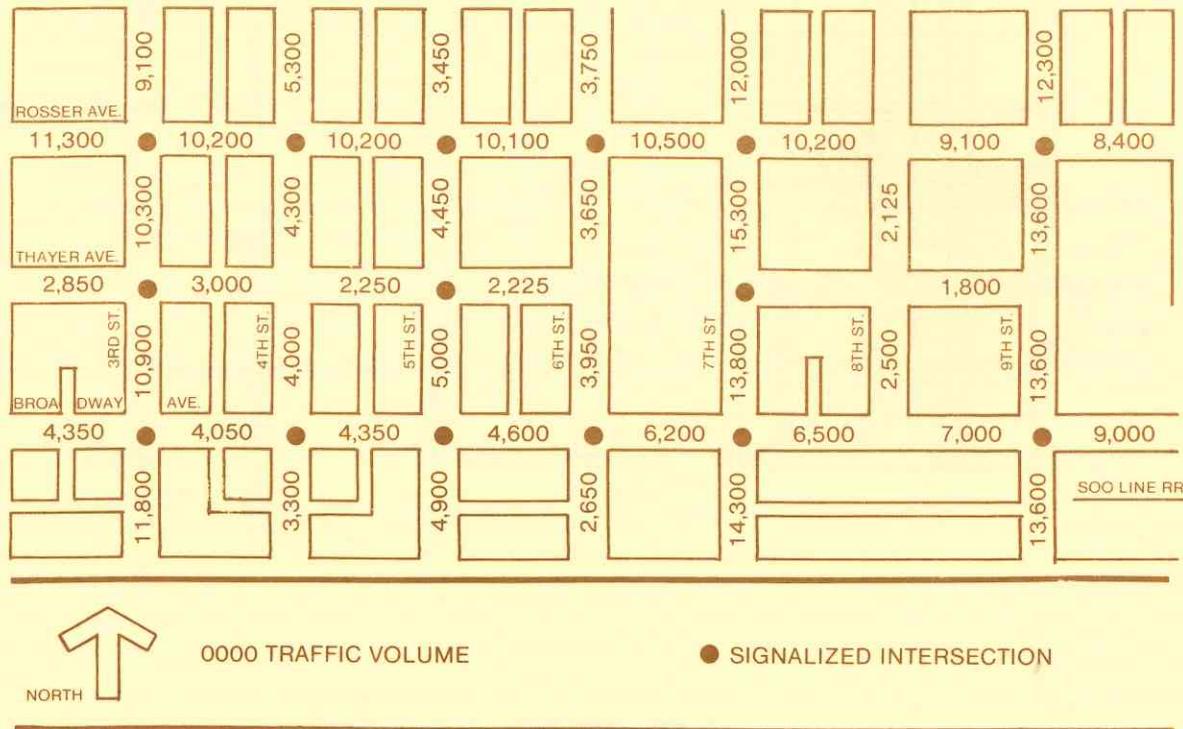
The zoning districts in the study area are shown on figure 4. A majority of the study area is zoned either commercial or medical. The southeast portion of the study area is zoned industrial and the northern portion contains a mixture of residential districts.

Traffic volumes, surveyed in 1984, are illustrated in figure 5. The heaviest traveled streets in the study area are three major arterials - 7th and 9th Streets and Main Avenue; 3 minor arterials - 3rd and Washington Streets and Rosser Avenue; and a collector - Avenue C.

Figure 5 also illustrates the location of traffic signals within the study area. Other intersections contain stop signs or are uncontrolled, depending on the level of traffic.

ZONE	TYPE	MAJOR USES ALLOWED
R5	Single-family residential	Single-family homes
R10	Two-family residential	Single & two-family homes
RM(30)	Multi-family residential	Multi-family homes, health/medical
RT	Multi-family/office	Multi-family homes, office/banks, health/medical
HM	Health/Medical	Residential, hotel/motel, health/medical, parking lots, light service & retail
CB	Downtown commercial	Light commercial, multi-family homes, parking lots, hotel/motels, office/banks, health/medical
CG	Heavy commercial	Multi-family homes, office/banks, wholesale, health/medical, parking lots, commercial
MA	Light industrial	Hotel/motels, office/banks, commercial, wholesale, light industrial, truck terminals

FIGURE 5. TRAFFIC VOLUME AND SIGNALS



Pedestrian traffic volume in downtown Bismarck peaks at 8:00 a.m. when people arrive for work, 12:00 noon during the lunch hour and 5:00 p.m. as people return home. The location of pedestrian traffic is varied, generally from parking areas to places of employment. Major pedestrian desire lines connect parking lots to the two medical centers, and from the Parkade ramp and other large parking facilities to various employment centers.

There are few conflict areas between pedestrians and vehicles within the study area that are not being handled by traffic signal lights.

There are numerous above and below grade utilities in the downtown area, some of which may influence the location of potential skyways or tunnels. The water lines are shown on figure 6 and the sanitary and sewer lines are shown on figure 7. Individual utility companies should be contacted to determine locations of natural gas, electrical, telephone and cable TV lines.

FUTURE CONDITIONS

Several construction projects in downtown Bismarck are either under construction or are in the planning stage. New buildings and parking structures will intensify the amount of activity in the downtown area and will help make skyway and tunnel development more feasible. Figure 8 illustrates the locations of these potential activity centers.

Future zoning in the study area will likely remain a mixture of districts. One change being contemplated is to extend the

FIGURE 6. WATER LINES

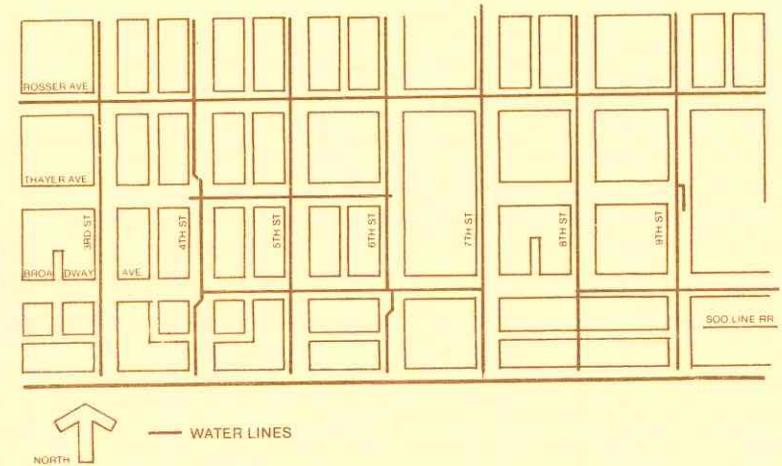
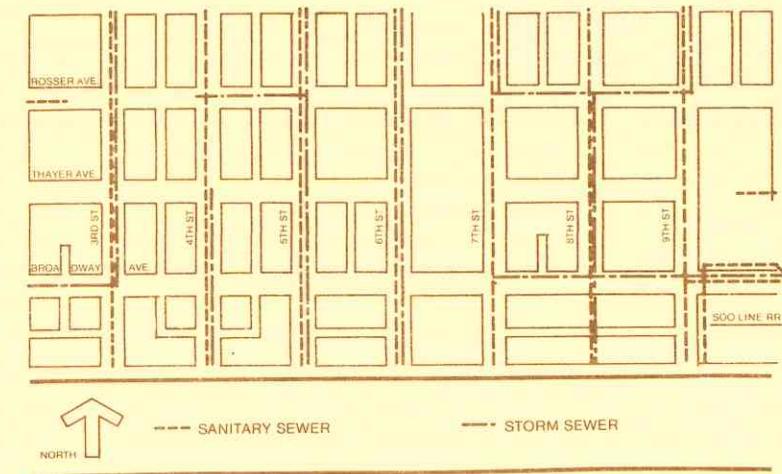


FIGURE 7. STORM AND SANITARY SEWER LINES



boundaries of the CB-Commercial district to roughly match the core area of downtown. The present CB zone covers only seven blocks and is in need of updating. The HM-Medical district may also expand if medical uses continue their growth in the future. Likely expansion would occur south toward Main Avenue or north toward Avenue C. Other commercial and residential districts will remain on the edges of the downtown core area.

Figure 8 also shows the location of possible additional parking facilities within the study area. Surface parking lots will likely continue developing around the major medical facilities. Prime locations for ramp structures would be on the two blocks presently used for surface lots between the medical centers and a facility on the west side of downtown, probably tied into redevelopment of the Lucas block. Both locations would offer needed parking spaces in areas

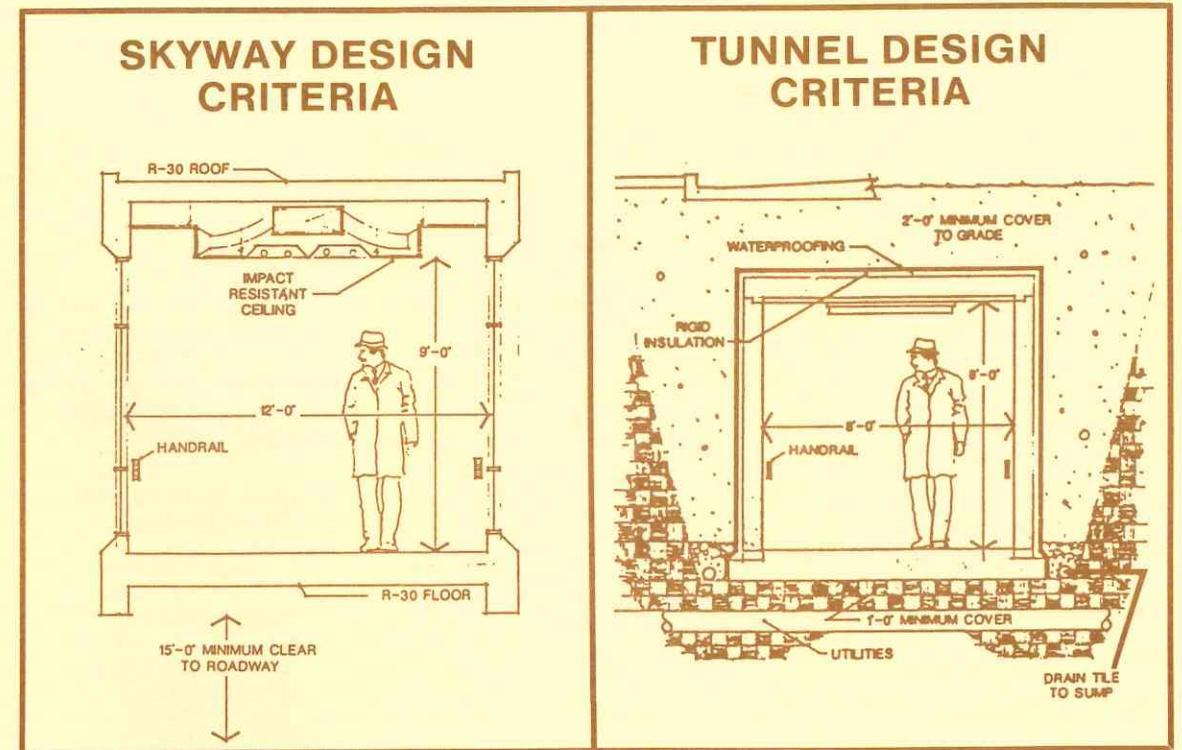
DESIGN SPECIFICATIONS

The following table contains design standards for use in constructing skyways and tunnels. Included are basic construction standards, recommended materials and aesthetic considerations. Several references were used in compiling the table, including the Uniform Building Code, Handicap Code and others, as well as city policies. These standards will be used in the review of proposed walkway projects.

SKYWAYS	BUILDING DESIGN CRITERIA	TUNNELS
Section 509(b) Uniform Building Code states walkways shall be of non-combustible construction materials.	WALKWAY CONSTRUCTION	Section 509(b) Uniform Building Code states walkways shall be of non-combustible construction materials.
Section 509(g) Uniform Building Code states that any walkway other than at grade shall not be used as required exits from connecting buildings.	BUILDING EXITS	Section 509(g) Uniform Building Code states that any walkway other than at grade shall not be used as required exits from connecting buildings.
Section 3305(h) Uniform Building Code states that doors at building openings shall be smoke and draft controlled having at least a 20 minute fire rating and shall be self-closing or be automatic closing by actuating of a smoke detector.	BUILDING OPENINGS - DOORS	Section 3305(h) Uniform Building Code states that doors at building openings shall be smoke and draft controlled having at least a 20 minute fire rating and shall be self-closing or be automatic closing by actuating of a smoke detector.
Section 3305(h) Uniform Building Code states that interior openings shall be protected by 1/4" thick wire glass in steel frames. Duct openings shall include fire dampers as required by U.B.C. Section 4806.	BUILDING OPENINGS - OTHER THAN DOORS	Section 3305(h) Uniform Building Code states that interior openings shall be protected by 1/4" thick wire glass in steel frames. Duct openings shall include fire dampers as required by U.B.C. Section 4806.
Section 509(d) Uniform Building Code states that an unobstructed width shall not be less than 44 inches. A recommended width is 12 feet.	WALKWAY WIDTH	Section 509(d) Uniform Building Code states that an unobstructed width shall not be less than 44 inches. A recommended width is 8 feet.
Section 509(e) Uniform Building Code states the length shall not exceed 300 feet. Fully sprinklered walkways are permitted to be 400 feet in length.	WALKWAY LENGTH	Section 509 (e) Uniform Building Code states the length shall not exceed 300 feet. Fully sprinklered walkways are permitted to be 400 feet in length.

SKYWAYS	BUILDING DESIGN CRITERIA	TUNNELS
Drainage of storm water and melted snow is not allowed on public right-of-way. Water must be collected and drained to the storm sewer inside adjoining buildings. Energy value minimum of R-30.	WALKWAY ROOF CONSTRUCTION	Top of tunnel roof shall be water-proofed and include 2" rigid insulation.
Any walkway that connects a public building that requires handicap access shall provide for the physically handicapped.	ACCESSIBILITY	Any walkway that connects a public building that requires handicap access shall provide for the physically handicapped.
Handicap Code (ANSI A117.1) 4.8.2 - Slope cannot exceed 1:12 (1:20 preferable) 4.8.4 - Landings must be 5 feet long. 4.5.1 - Surfaces shall be smooth and non-slip.	RAMPS	Handicap Code (ANSI A117.1) 4.8.2 - Slope cannot exceed 1:12 (1:20 preferable) 4.8.4 - Landings must be 5 feet long. 4.5.1 - Surfaces shall be smooth and non-slip.
Walkways shall be provided with handrails at both sides complying with applicable codes. Ramp handrails shall be 1 1/2" clear away from wall and be continuous or extend 12" beyond the ramp end, complying with ANSI A117.1 Section 4.9.4.	HANDRAILS	Walkways shall be provided with handrails at both sides complying with applicable codes. Ramp handrails shall be 1 1/2" clear away from wall and be continuous or extend 12" beyond the ramp end, complying with ANSI A117.1 Section 4.9.4.
Lighting levels shall be a minimum of 30 f.c. at every point along the floor. Outside air obtained from adjacent buildings shall be minimum of 5 cfm/person. Heat walkway according to ASHRAE minimum standards. Walkways shall be designed to minimize differences in air pressure at building connections to eliminate excessive walkway drafting.	HVAC AND LIGHTING	Lighting levels shall be a minimum of 30 f.c. at every point along the floor. Outside air obtained from adjacent buildings shall be minimum of 5 cfm/person. Heat walkway according to ASHRAE minimum standards. Walkways shall be designed to minimize differences in air pressure at building connections to eliminate excessive walkway drafting.
The State Highway Department recognizes a minimum clear distance between the top of the roadway surface and the bottom of the walkway of 15 feet.	CLEARANCES OVER PUBLIC RIGHT-OF-WAY	
	DEPTH BELOW GRADE	Minimum cover shall be 2 feet measured between the top of the walkway structure and the finished street grade. Minimum cover of 1 foot over any utility line which is constructed over. Conduit or carrier pipe required for all water, sewer, or storm lines extending 10 feet beyond each side. Contact City Engineering Department to avoid conflicts with existing utilities.

SKYWAYS	BUILDING DESIGN CRITERIA	TUNNELS
Walkway supports should be located within private property. If not possible, a support can be placed within the public right-of-way as close to the property line as possible with approval of the City Engineer.	WALKWAY SUPPORT	Tunnel footings may conflict with below grade water conditions. Where required, piping and sump pump shall be included.
Heavyweight commercial carpet, terrazzo.	WALKWAY FLOOR MATERIAL	Concrete, terrazzo.
Insulated glass and insulated metal panels. Minimum energy value of R-30. Other wall areas should be durable vinyl wall covering.	WALKWAY WALL MATERIALS	Exterior side of tunnel walls shall be waterproofed and include 2" rigid insulation. Interior finishes shall be painted.
Impact resistant acoustical ceiling tiles at 9 feet. Recessed light fixtures.	WALKWAY CEILINGS	Insulated acoustical panel at 8 feet and vandal resistant wall lights.
Walkways shall include signage and/or graphics at all building connections. Elements shall be consistent to achieve design continuity throughout the walkway system.	SIGNAGE & GRAPHICS	Walkways shall include signage and/or graphics at all building connections. Elements shall be consistent to achieve design continuity throughout the walkway system.
All color selections must be compatible with the entire walkway system. Selections will be reviewed to coordinate with the system.	COLOR	All color selections must be compatible with the entire walkway system. Selections will be reviewed to coordinate with the system.
Walkway design shall consider architecture of connecting buildings and be sympathetic to the overall appearance of the neighborhood to be impacted. Walkway design will be reviewed by the City of Bismarck.	AESTHETICS	None.
Locations of connections shall possess a clear identity and character separate from building private spaces and must be identified by the public to create a clear movement system.	CONNECTIONS TO BUILDINGS	Locations of connections shall possess a clear identity and character separate from building private spaces and must be identified by the public to create a clear movement system.



CONSTRUCTION & OPERATIONS POLICIES

Based on recent construction cost estimates, the average cost for tunnels was \$2,000 per lineal foot and for skyways \$2,500 - \$3,000 per lineal foot.

One of the goals for the city's comprehensive plan is to maintain and strengthen the role of the central business district. To further these goals the city becomes involved in several means of financing. The following financing methods may be used in the construction of skyways or tunnels.

- Tax increment financing - Bismarck has created an urban renewal district in which this type of financing may be used to assist building projects. The city issues bonds

to cover the construction costs. The potential increased property taxes are then used to pay off the bonds. The Board of City Commissioners must approve each specific tax increment request.

- Federal grants - from time to time, grant programs become available for specific projects. The goal of most of these grants is the elimination of slum conditions and blight. Projects must also benefit low and moderate income groups. The city customarily applies for and administers federal grants.
- MIDA bonds - this alternative, provided federal law permits its use, allows bonds with the

city's name to be issued for construction projects. Although no responsibility is borne by the city, having its name on the bonds confers a tax free status to the bond holder. As a result lower interest rates can be obtained. The Board of City Commissioners must approve MIDA bond requests.

The above programs may not be appropriate for individual skyways or tunnels but could be utilized for larger projects that include these features.

- Private financing - this method is available for those owners or developers willing to finance the cost of skyways or tunnels.

- Special assessment district - this method was used to construct the Parkade facility at 5th Street and Broadway Avenue. Pursuant to statute, the city establishes the assessment district at the request of benefiting property owners. An assessment is then collected each year from participants to pay off the construction bonds.

Maintenance, heating and cooling costs of skyways and tunnels will be the responsibility of benefiting property owners, usually the building owners at each end of the facility. If the property is not maintained in a satisfactory manner the city may order the work done and assess the costs to abutting property owners.

Security, particularly in below-grade facilities, should be addressed. Security provisions will be an important consideration when skyway and tunnel requests are reviewed by city staff.

The hours of operation for tunnels and skyways that cross public right-of-way are another item to be considered as each request is reviewed. At a minimum, the facilities should be open during business hours. Extended hours could be implemented if connecting buildings so desire.

Easements are rights acquired by one party to use the land of another party for a specific purpose. If access to and from a skyway or tunnel runs through private property an easement

document will be required before a building permit can be issued. The Board of City Commissioners must approve all requests for air rights above public property or underground easements below public property.

APPROVAL & REVIEW PROCEDURES

As with other types of construction, skyways and tunnels require a building permit. Because of the unique nature of these structures it is recommended that those skyways and tunnels that extend over or under public right-of-way be reviewed by the staff of the Fire & Inspections, Engineering and Planning Departments. The review, to be completed prior to the issuance of a building permit, should include the following items:

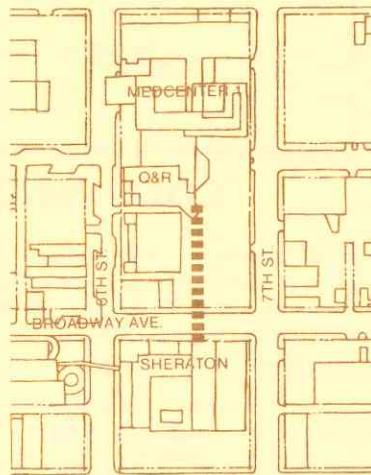
- Name(s) of applicant and affected landowners
- Applicable codes and standards
- Access provisions
- Design criteria
- Aesthetic considerations
- Financing
- Hours of operation
- Easements
- Security
- Maintenance and utilities

Financing techniques that result in public involvement or the encroachment over or under public right-of-way will require approval by the Board of City Commissioners.

CONCLUSION

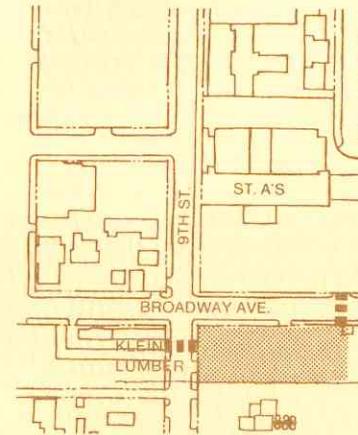
At the present time, based on the observed need for pedestrian linkages in the city, there does not appear to be a need for any new overhead walkway or tunnel construction if this construction is analyzed on a cost/benefit basis. The followings walkways were analyzed to determine their feasibility. The closest facility to being feasible would appear to be the proposed linkage between the Sheraton Galleria Hotel and the Quain and Ramstad/Medcenter One complex.

1. Sheraton Galleria Hotel/ Quain and Ramstad/ Medcenter One



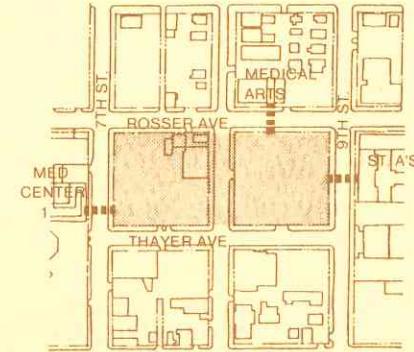
If phase two of the Quain and Ramstad Clinic were to be built the overhead walkway in this proposal would become more attractive and feasible to construct. This would occur because of the shorter length of the walkway, the lower construction cost and the increased foot traffic which would accompany a more intensive land usage.

2. 9th Street and Broadway Avenue Clinic



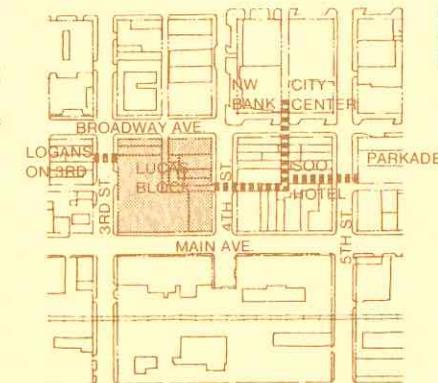
If a medical building is built on this parcel a tunnel connection to St. Alexius Medical Center would seem logical. The feasibility of this connection would be enhanced by the fact that the hospital presently has a tunnel stubbed in under its south driveway. Construction of multiple buildings on the south side of Broadway Avenue would add to the usefulness of this tunnel. An overhead walkway in this location is judged to be inappropriate from both a cost and aesthetic perspective. If the present Klein Lumber property were to be redeveloped in the future this connection could be extended under 9th Street to the present lumberyard property if the reuse of this parcel was compatible with the other users of the tunnel. The new structures in this area, if any, will hold the key to the feasibility of this tunnel.

3. Parking lots between 7th and 9th Streets and Thayer and Rosser Avenues

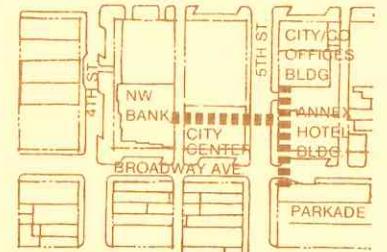


Development of any medical facility on this property should be physically tied to the other medical facilities in the area via an overhead walkway. This should be a conscious design consideration in any development of this site. This is an essential area to include in any pedestrian circulation system in the eastern part of the Central Business District. The connection should, however, not be made until meaningful development occurs on one or both of these blocks.

4. Parkade/Soo Hotel/Lucas Block/Norwest Bank/City Center Plaza/Logan's on Third



5. Parkade/City/County Building/City Center Plaza/Norwest Bank



This overhead walkway could be justified if the old Annex Hotel (Thompson building) were to be developed into a more intensive use. This walkway should connect the Parkade, old Annex Hotel and City/County Building. Tying into this would be a walkway connecting the old Annex Hotel, City Center Plaza and Norwest Bank.

This routing of an overhead walkway could be justified with the revitalization of the Soo Hotel structure and the arrangement of a walkway connection on both the east and west sides of the structure. There would, however, be little justification for the expense of a connection to the Parkade and the internal circulation difficulties such a walkway would pose to the Soo Hotel if there was not a substantial volume of pedestrian traffic to be served by it. In our judgement this volume would be lacking if the Lucas block were not developed into a high intensity multi-purpose use which would employ a considerable number of people and which would generate large numbers of trips. Present day volumes would not warrant this connection.

Certain conditions should be present in an area to justify the expense of building skyway and tunnel linkages:

- Dense, vital central business district - does the downtown area generate a large amount of activity within a compact area?
- Multi-level buildings - are there buildings with several stories close to one another and generating a considerable amount of activity?

- Activity-levels - is there a need for a second level of service and retail space to accommodate demand?

- Feasible linkages - are there activity centers which would benefit from a skyway or tunnel connection?

- Safety - are there areas of vehicle and pedestrian conflict of sufficient severity to warrant the construction of skyways or tunnels?

Although additional walkway connections in downtown Bismarck are not warranted at this time, the city should continue to evaluate the opportunity for pedestrian linkages. Separated pedestrian facilities result in convenient, comfortable access to work, entertainment and residence. Since this would contribute toward a revitalized downtown area, this major goal of the comprehensive plan should be pursued.