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Feasibility Study:
Connecting Saint Croix State Park
and the
Munger State Trail - Hinckley Fire Segment
(Hinckley Fire Trail)
via a
Minnesota Department of Transportation Right-of-Way

A Report to the Legislature

Prepared by the

Department of Natural Resources
500 Lafayette Road
Saint Paul, Minnesota 55155-4052


in Cooperation with the

Department of Transportation
Transportation Building - John Ireland Boulevard
Saint Paul, Minnesota 55155

In Accordance with
Laws of Minnesota 1988, Chapter 686,
Article 1, Section 11(m), Hinckley Trail

Submitted:


JOSEPH N. ALEXANDER, Commissioner
Minnesota Department of Natural
Resources


LEONARD W. LEVINE, Commissioner
Minnesota Department of
Transportation

January 1, 1989

Pursuant to 1988 Laws, ch 686
Article 1, sec 11 (m)

The following feasibility study was completed as per the Laws of Minnesota for 1988, Chapter 686, Article 1, Section 11(m), Hinckley Trail.

"The commissioner in cooperation with the commissioner of the Minnesota department of transportation shall study the feasibility of connecting Saint Croix State Park and the Hinckley Trail via a Minnesota department of transportation right-of-way and report to the legislature by January 1, 1989."

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SUMMARY

SUMMARY

This study has evaluated the potential for connecting Saint Croix State Park with the Hinckley Fire Trail via the Trunk Highway 48 right-of-way. Five development alternatives were examined within the highway right-of-way, two routing alternatives within Hinckley were examined to get users from the west side of the city to the east side. Costs for the various alternatives ranged from \$1.02 million for minimal development (i.e., four foot paved shoulders for bikes only) to \$4.63 million for the maximum development option (four foot paved shoulders for bikes plus unpaved snowmobile trails on both sides of the road).

It is estimated that the trail would generate between 8,850 to 18,250 annual user occasions, depending on the development alternative (see Appendix D for use projections).

Comparison of users and development costs on other state trails provides a measure with which to evaluate the feasibility of this proposed trail connection. The following table compares several state trails and development costs with the proposed Trunk Highway 48 trail alternatives.

Table 1

<u>State Trail</u>	<u>Annual Users</u>	<u>20 Year User Projection (static)</u>	<u>Development Cost Per Mile</u>	<u>Cost Per Use Per Mile</u>
Hinckley Fire	32,500	650,000	\$ 40,000	\$0.06
Heartland	79,065	1,581,300	\$ 40,000	\$0.03
Douglas	61,450	1,229,000	\$ 40,000	\$0.03
Trunk Highway 48 (Proposed)				
Alternative A	8,850	177,000	\$ 65,000	\$0.37
Alternative B	16,825	336,500	\$143,367	\$0.43
Alternative C	10,275	205,500	\$188,354	\$0.92
Alternative D	11,700	234,000	\$293,506	\$1.25
Alternative E	18,250	365,000	\$226,227	\$0.62

Development costs on the proposed Trunk Highway 48 facility are substantially higher than other state trails due to the additional work necessary to prepare the trail grade and/or road shoulders.

The state trails identified in Table 1 were all developed on abandoned railroad rights-of-way which had an existing grade suitable for trail development. Although these trails offer a somewhat different type of experience than the proposed Trunk Highway 48 facility, a use and cost comparison helps evaluate the feasibility of providing such a facility. The cost per use per mile over a 20 year period for other state trails range from three cents to six cents. For a Trunk Highway 48 trail facility comparable costs range from 37 cents per use per mile to \$1.25.

In order for Alternative A, the lowest cost alternative for the proposed Trunk Highway 48 facility, to approach a cost similar to that of the state trails identified, it would need to host between 1,083,333 to 2,166,666 users over a 20 year period.

INTRODUCTION

The purpose of the study is to determine the "feasibility" of a trail connection from the Hinckley Fire Trail to Saint Croix State Park via Minnesota Department of Transportation (Mn/DOT) right-of-way. Part of determining the feasibility is to determine the "value" of such a connection. Obviously, anything can be done (with enough money), but should it be done.

The most direct route of connecting the city of Hinckley and Saint Croix State Park is via Trunk Highway 48. Trunk Highway 48 runs west to east from the city of Hinckley past the northern edge of Saint Croix State Park to the Minnesota-Wisconsin border at the Saint Croix River. The highway from Hinckley to Saint Croix State Park is approximately 15 miles in length. The road design generally consists of two 12 foot bituminous traffic lanes and 3 foot gravel shoulders. Average daily traffic volumes on the road range from 3,875 in Hinckley to 516 at the Saint Croix Park entrance. Heavy commercial vehicles account for about four percent of the traffic.

Additionally, the study will evaluate two routes from the Hinckley Fire Trail through the city of Hinckley to Trunk Highway 48.

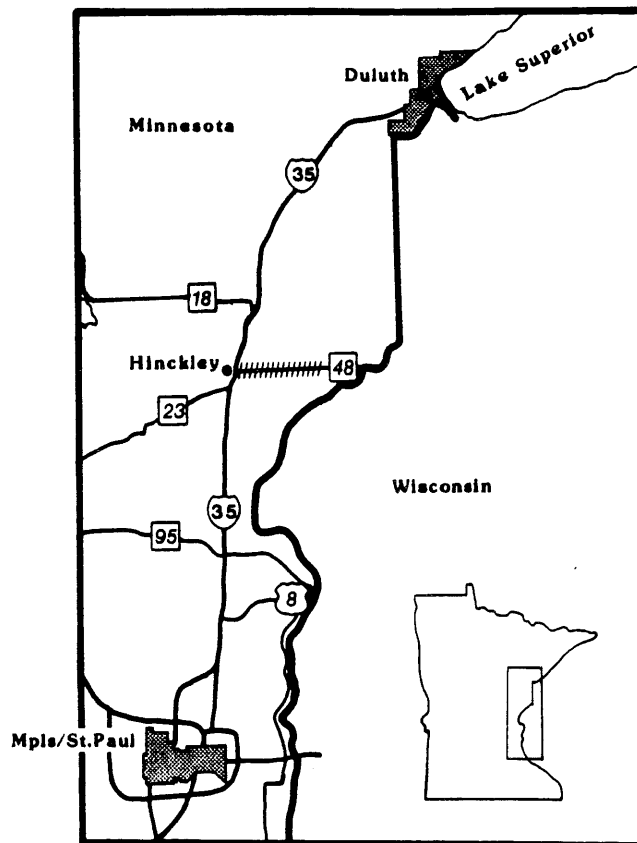
In studying the feasibility of a trail connection along this route, the following issues were examined:

- ° the route location in proximity to population centers
- ° the history of the area
- ° potential trail users
- ° existing public property and trails in the vicinity
- ° route alternatives through Hinckley

- ° trail alternatives and costs
- ° trail use projections
- ° inventory of existing bridges, and
- ° issues which may affect trail development.

Only after compiling and analyzing this data can conclusions be drawn regarding the feasibility of a trail along this route.

THE ROUTE LOCATION IN PROXIMITY TO POPULATION CENTERS



The route is located in Pine County (population 21,074), approximately 75 miles north of the Twin Cities metropolitan area (Hennepin/Ramsey counties population 1,444,535) and approximately 65 miles south of Duluth (population 83,065). As such, it is within easy

driving distance of two major population centers and has become a major stopping point as a "halfway" mark between those two population centers.

THE HISTORY OF THE AREA

The history of the Hinckley/Saint Croix State Park area is very diverse and includes Indian settlements in the area, "settlers" in the mid-1800s, logging, mining, railroad development, the Great Fire in 1894, the Depression in the 1930s and farming. A more in-depth look at the history can be found in Appendix A.

POTENTIAL TRAIL USERS

In order to determine the type(s) of trail to develop, it was necessary to examine who the potential users might be.

The trail distance (approximately 16 miles in length, one way, from the Hinckley Fire Trail to the Saint Croix State Park entrance and another 5 miles to the park's headquarters) and the trail location (within Mn/DOT right-of-way from Hinckley to Saint Croix State Park) were criteria used to evaluate who potential trail users might be. The following user groups were examined:

- ° all-terrain vehicle users
- ° horseback riders
- ° cross-country skiers
- ° hikers
- ° bikers, and
- ° snowmobilers.

ALL-TERRAIN VEHICLE USERS

All-terrain vehicle (ATV) use is prohibited on the Hinckley Fire Trail and in Saint Croix State Park. An ATV trail linking these facilities would serve little purpose.

HORSEBACK RIDERS

Currently there are 75 miles of horseback trails in Saint Croix State Park and an 11 mile treadway which parallels the Hinckley Fire Trail from General C. C. Andrews State Forest to the Darson Road near Banning State Park. Horseback riders who utilize Saint Croix State Park can also link up with the off-road Boundary Segment of the Munger State Trail. The 11 mile treadway along the Hinckley Fire Trail has relatively little horseback use. Given the nature of the proposed trail (along the highway) and amount of existing horseback trails in the vicinity, and it appears that the demand for a horseback trail along Trunk Highway 48 would be minimal.

CROSS-COUNTRY SKIERS

There are 21 miles of ski trails in Saint Croix State Park which receive a fair amount of use (depending on snow conditions). Cross-country skiing on the Hinckley Fire Trail, while permitted, is minimal, perhaps partly because of conflicts with snowmobile use along the trail. The amount of cross-country skiers who would desire to ski from the Hinckley Fire Trail, through the city of Hinckley and the 16 miles along highway right-of-way to the Saint Croix State Park entrance is thought to be negligible.

HIKERS

Although any trail development would be available to hikers and it is anticipated that hikers may use portions of a trail along this route

(particularly within the city of Hinckley), the demand for a contiguous 16 mile trail along the right-of-way would probably be negligible.

BICYCLISTS

Based on the Mn/DOT's bikeway design criteria, Trunk Highway 48 is rated "poor" to "unsatisfactory" for bicycling from the Junction of Interstate 35 to County State Aid Highway (CSAH) 21 in Cloverdale, a distance of nine miles. Beyond Cloverdale the road rates "fair" for bicycling to CSAH 22 (the Saint Croix State Park entrance), a distance of about six miles. Trunk Highway 48 rates "good" for bicycle trail from CSAH 22 to the Saint Croix River.

Bikers currently utilize both the Hinckley Fire Trail and the six miles of paved trail in Saint Croix State Park in relatively large numbers. A linkage from the Hinckley Fire Trail, through the city of Hinckley and along the right-of-way to Saint Croix State Park would receive some use, though it would be tempered by the number of bicyclists who are not willing to travel long distances.

SNOWMOBILERS

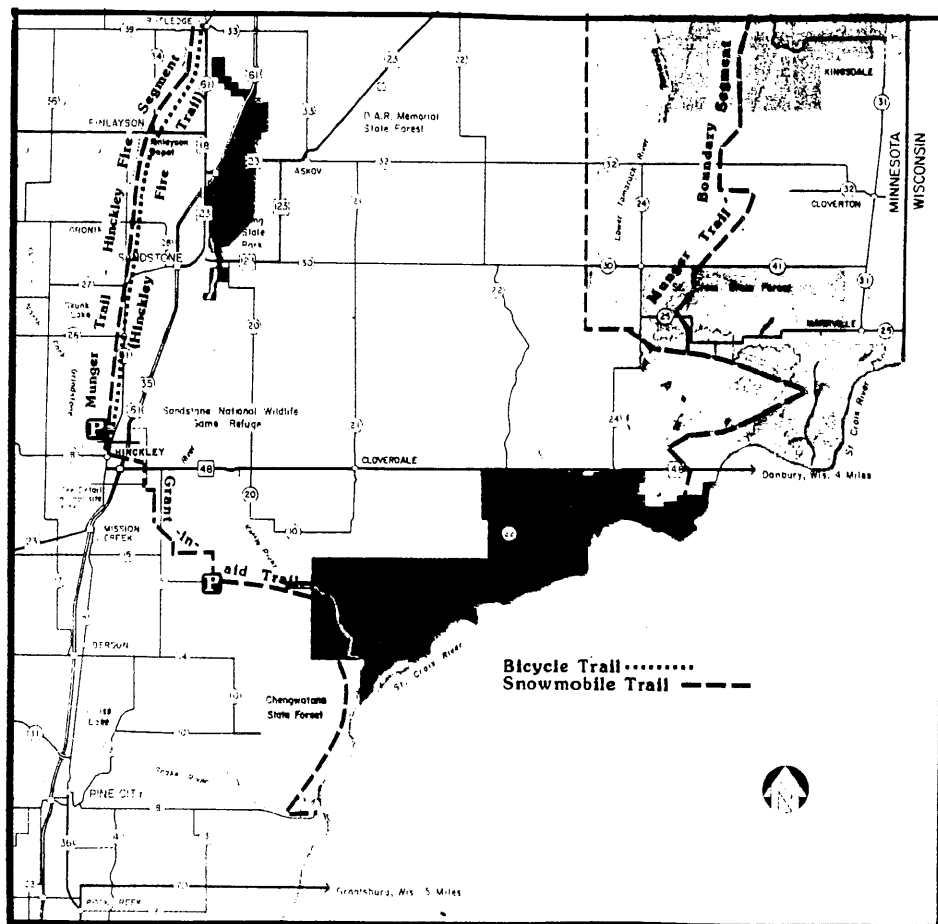
Snowmobilers also utilize both the Hinckley Fire Trail and Saint Croix State Park in relatively large numbers. However, snowmobilers can currently access Saint Croix State Park from the Hinckley Fire Trail by utilizing a combination of Department of Natural Resources (DNR) grants-in-aid trails, forestry and park trails. Although a trail along Trunk Highway 48 would provide a direct and permanent connection, it would not likely be as scenic as other existing opportunities. In addition, in order to utilize the right-of-way after dark it would be necessary to design only a one-way trail or a trail on both sides of the highway so that the snowmobilers are traveling in the same direction as adjacent roadway traffic (as per legislation).

PROJECTED USER GROUPS

Two groups, bicyclists and snowmobilers, utilize both the Hinckley Fire Trail and Saint Croix State Park in relatively large numbers and also have the capability to, fairly easily, travel the distance between the two facilities (although the distance will limit the number of bicyclists).

Trail use projections determined that, were a trail connection developed, there would be between 8,850 to 18,250 bicycling and 1,425 to 2,850 snowmobiling user occasions annually (see Appendix D for use projections).

EXISTING TRAILS AND PUBLIC PROPERTY IN THE VICINITY



TRAILS

Existing biking and snowmobile trails in the vicinity were examined to determine if the trail connection under study would duplicate the functions of existing trails and to examine the potential of linking the proposed trail with existing trails, enhancing trail opportunities.

Biking Trails

- ° Thirty-two miles of biking trail have been developed on an abandoned railroad grade between Hinckley and Moose Lake (i.e., the Hinckley Fire Trail).
- ° Six miles of surfaced trail exist in Saint Croix State Park.

Snowmobile Trails

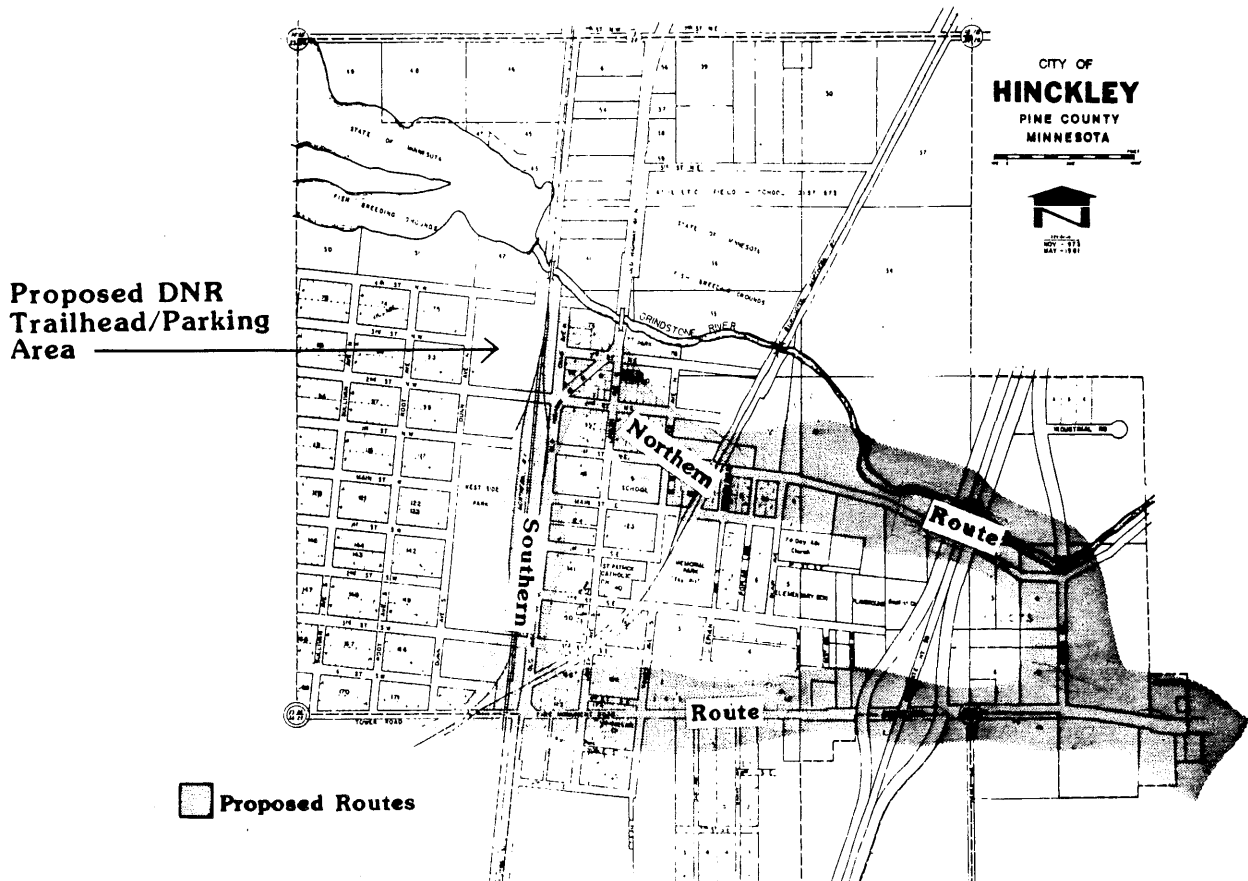
- ° Over 125 miles of snowmobile trails have been developed in the southern half of Pine County. Included in this are:
 - ° sixty-one and one-half miles of groomed and marked snowmobile trails within Saint Croix State Park,
 - ° trails within Chengwatana State Forest and Saint Croix State Forest, and
 - ° grants-in-aid trails.

The proposed route offers the opportunity to link together existing bike trails and offers an alternative route for snowmobilers.

PUBLIC PROPERTY

Public property was looked at to examine existing and potential recreational opportunities in the vicinity. A national wildlife game refuge, two state forests and two state parks are in close proximity to the proposed trail. These public facilities offer diverse recreational experiences. For a more detailed description of the public property in the vicinity, refer to Appendix B.

ALTERNATIVE ROUTES THROUGH HINCKLEY



One aspect of the study was to look at the different options of linking a proposed DNR trail head/parking area for the Hinckley Fire Trail with the Mn/DOT right-of-way leading to Saint Croix State Park. Two different routes that offered feasible options for crossing existing Burlington Northern railroad track and Interstate 35 are discussed below.

The northern route would follow city streets from the Hinckley Fire Trail to the east through a residential area. Crossing the Burlington Northern railroad track could be accomplished by either installing a culvert where the track runs above grade or crossing at

street level further south. (The track is utilized by Burlington Northern on a regular basis.) This route would continue east to Interstate 35, cross Interstate 35 by either running under it (adjacent to the Grindstone River), or installing an overpass near this location. The route would then go east and south, linking up with Trunk Highway 48. It would continue east utilizing Trunk Highway 48 right-of-way to Saint Croix State Park.

The southern route would go from the proposed new DNR trailhead/parking area south along Old Highway 61 south to Fire Monument Road (Trunk Highway 48), crossing the Burlington Northern railroad track at street level. It would then travel east, cross Interstate 35 and utilize the Trunk Highway 48 right-of-way to Saint Croix State Park. Six foot wide pedestrian sidewalks with curb cuts are in place on the bridge crossing Interstate 35 at Trunk Highway 48. A controlled intersection with crosswalks would enable trail users greater ease in crossing Interstate 35 entrance and exit ramps at this location.

DESCRIPTION OF DEVELOPMENT ALTERNATIVES AND COSTS

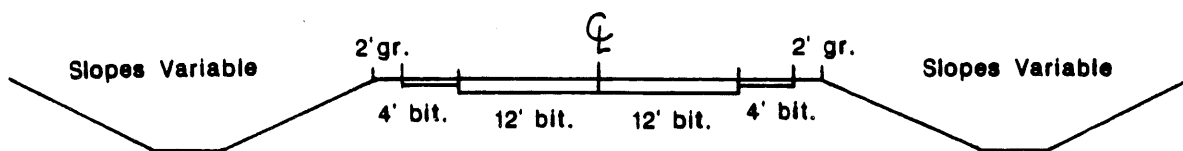
(See Appendix C for Cost Worksheets for Development Alternatives)

ALTERNATIVE A - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS, UNDEVELOPED ROAD DITCHES FOR SNOWMOBILERS

Alternative A consists of widening and paving four foot shoulders on Trunk Highway 48. This alternative will provide a facility rated "good" for bicycle travel. Snowmobilers, however, will be required to use undeveloped road ditches and will be required to cross rivers and creeks on the trunk highway bridges in accordance with existing law.

In addition to the benefits received by bicyclists with this design, traffic safety will be improved for motorists. Shoulder maintenance costs may also be reduced.

Alternative A Total Estimated Cost: \$1,027,000



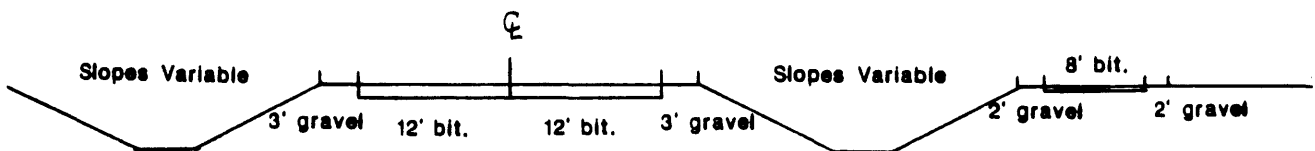
Alternative A: TYPICAL CROSS SECTION

ALTERNATIVE B - EIGHT FOOT PAVED DETACHED BICYCLE/SNOWMOBILE TRAIL

Alternative B consists of a single, detached and paved bicycle/snowmobile trail eight feet wide. The trail would be entirely within the Mn/DOT right-of-way on Trunk Highway 48 with the exception of the connection within the Hinckley city limits. The trail should have a minimum separation of 20 feet from the outside edge of the travel lane. All river crossings would be on separate bridge structures at least 12 feet wide with the capability of supporting a trail grooming machine. Although the trail would be wide enough to accommodate two way snowmobile traffic, it could only occur within daylight hours (to be kept within the existing law, snowmobiles in the right-of-way at night must travel in the same direction as adjacent road travel) therefore, due to potential enforcement and safety issues, we recommend only one way snowmobile traffic.

In addition to the benefits received by bicyclists and snowmobilers with this design, motorists safety may be enhanced due to reduced user conflicts.

Alternative B Total Estimated Cost: \$2,265,200



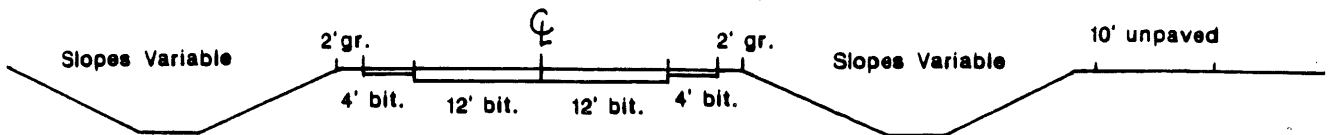
Alternative B: TYPICAL CROSS SECTION

ALTERNATIVE C - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS, DETACHED SNOWMOBILE TRAIL

Alternative C consists of four foot paved shoulders on the roadway for bikes, and an unpaved and detached snowmobile trail paralleling Trunk Highway 48. The trail would be entirely within the Mn/DOT right-of-way with the exception of the connection within Hinckley. River crossings would be on separated bridge structures at least 12 feet wide with the capability of supporting a trail grooming machine. Although the trail would be wide enough to accommodate two way snowmobile traffic, it could only occur within daylight hours (to be kept within the existing law, snowmobiles in the right-of-way at night must travel in the same direction as adjacent road travel) therefore, due to potential enforcement and safety issues, we recommend only one way snowmobile traffic.

In addition to the benefits received by bicyclists with this design, traffic safety will be improved for motorists. Shoulder maintenance costs may also be reduced.

Alternative C Total Estimated Cost: \$2,976,200



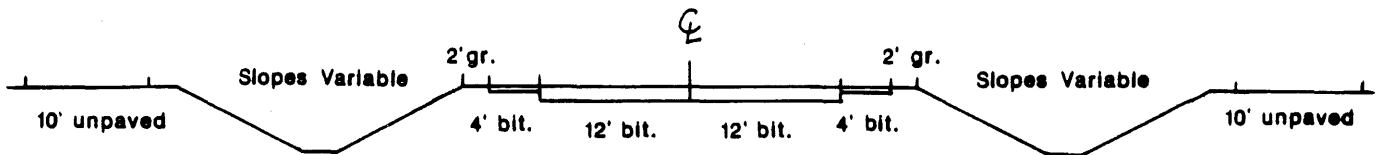
Alternative C: TYPICAL CROSS SECTION

ALTERNATIVE D - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS, TWO DETACHED SNOWMOBILE TRAILS

Alternative D consists of all the elements of Alternative C with the addition of another trail on the opposite side of Trunk Highway 48. This would be done to allow for legal two way snowmobile travel at night. Separated bridge structures at the rivers would be provided for snowmobile travel on both sides of Trunk Highway 48.

In addition to the benefits received by bicyclists with this design, traffic safety will be improved for motorists. Shoulder maintenance costs may also be reduced.

Alternative D Total Estimated Cost: \$4,637,400



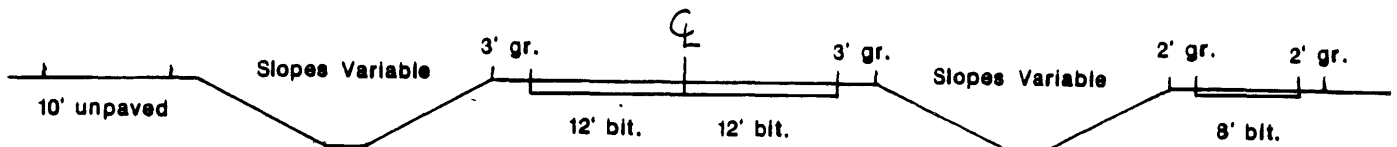
Alternative D: TYPICAL CROSS SECTION

ALTERNATIVE E - EIGHT FOOT PAVED DETACHED BICYCLE/SNOWMOBILE TRAIL, TEN FOOT UNPAVED DETACHED SNOWMOBILE TRAIL

Alternative E consists of two trails paralleling Trunk Highway 48, each with separate river crossings. One trail would be paved for bicycle and snowmobile use and the other trail would be unpaved for snowmobiles. This would allow for legal two way snowmobile travel at night. No shoulder work on the roadway would be necessary. Both trails would be combined within the Hinckley city limits to facilitate passage under/over Interstate 35 and the connection to the Hinckley Fire Trail.

In addition to the benefits received by bicyclists and snowmobilers with this design, motorists safety may be enhanced due to reduced user conflicts.

Alternative E Total Estimated Cost: \$3,574,400



Alternative E: TYPICAL CROSS SECTION

SAINT CROIX RIVER OPTION

The option of extending the trail along Trunk Highway 48 from Saint Croix State Park to the Minnesota-Wisconsin border at the Saint Croix River (approximately another eight miles) was also considered. This would provide the opportunity to connect up with the proposed route for the National Park Service's North Country Trail (NCT) in Wisconsin and also with Wisconsin snowmobile trails. The same design alternatives, A, B, C, D and E were used in determining the additional costs of the extension.

<u>Alternative</u>	<u>Hinckley to Saint Croix State Park</u>	<u>Saint Croix State Park to Saint Croix River</u>	<u>Total</u>
A	\$1,027,000	\$ 544,050	\$1,571,050
B	\$2,265,200	\$ 851,000	\$3,116,200
C	\$2,976,200	\$1,227,650	\$4,203,850
D	\$4,637,400	\$1,911,250	\$6,548,650
E	\$3,574,400	\$1,534,600	\$5,109,000

ISSUES WHICH MAY AFFECT TRAIL DEVELOPMENT

If it is determined that the trail is feasible and should be undertaken, the following issues should be looked at in greater depth to determine how and if they will affect trail development:

MINNESOTA RULES, CHAPTER 6105
DEPARTMENT OF NATURAL RESOURCES
WILD, SCENIC AND RECREATIONAL RIVERS, 6105.0600 TO 6105.0760
MANAGEMENT PLAN FOR THE KETTLE RIVER

This legislation addresses the management of the Kettle River and establishes "the manner in which public recreational use of the river and its shores will be provided for and controlled, and the manner in

which public and private development of the river shorelands may take place."

If the trail is developed, it must be done in conformity with these rules.

SNOWMOBILE STATUTES, RULES AND REGULATIONS

Current snowmobile legislation regulates, in part, that "No person shall operate a snowmobile within the right-of-way of any trunk, county state aid, or county highway between the hours of one-half hour after sunset to one-half hour before sunrise, except on the right hand side of such right-of-way and in the same direction as the highway traffic on the nearest lane of the roadway adjacent thereto."

Ways to develop snowmobile trails within the Trunk Highway 48 right-of-way that comply with the legislation the alternatives presented include:

- ° a one-way route on the south side of Trunk Highway 48 that runs from Hinckley to Saint Croix State Park. Trail users could loop back to Hinckley utilizing existing snowmobile trails in Saint Croix State Park, Chengwatana State Forest and grants-in-aid trails;

and,

- ° a two-way route which would run on both sides of the highway. Though this would double the development costs for the snowmobile portion of the trail, it would provide for a direct two-way linkage between Hinckley and Saint Croix State Park. If the Trunk Highway 48 trail were extended to the Saint Croix River, this option would also provide a direct linkage to the Boundary Segment of the Munger State Trail which runs north from Trunk Highway 48.

NORTH COUNTRY TRAIL

The NCT is a federally authorized trail that, when completed, will extend from New York to North Dakota. The federal designation, as a "National Scenic Trail," excludes motorized vehicles from trails having such a designation. The State has recommended that some segments of the NCT be open to permit snowmobile use by the general public. If the Trunk Highway 48 trail is completed over to the Saint Croix River and is to include snowmobile use, the use of snowmobiles should be pursued on the NCT as it would intersect the Trunk Highway 48 trail and increase trail options.

WETLAND MITIGATION

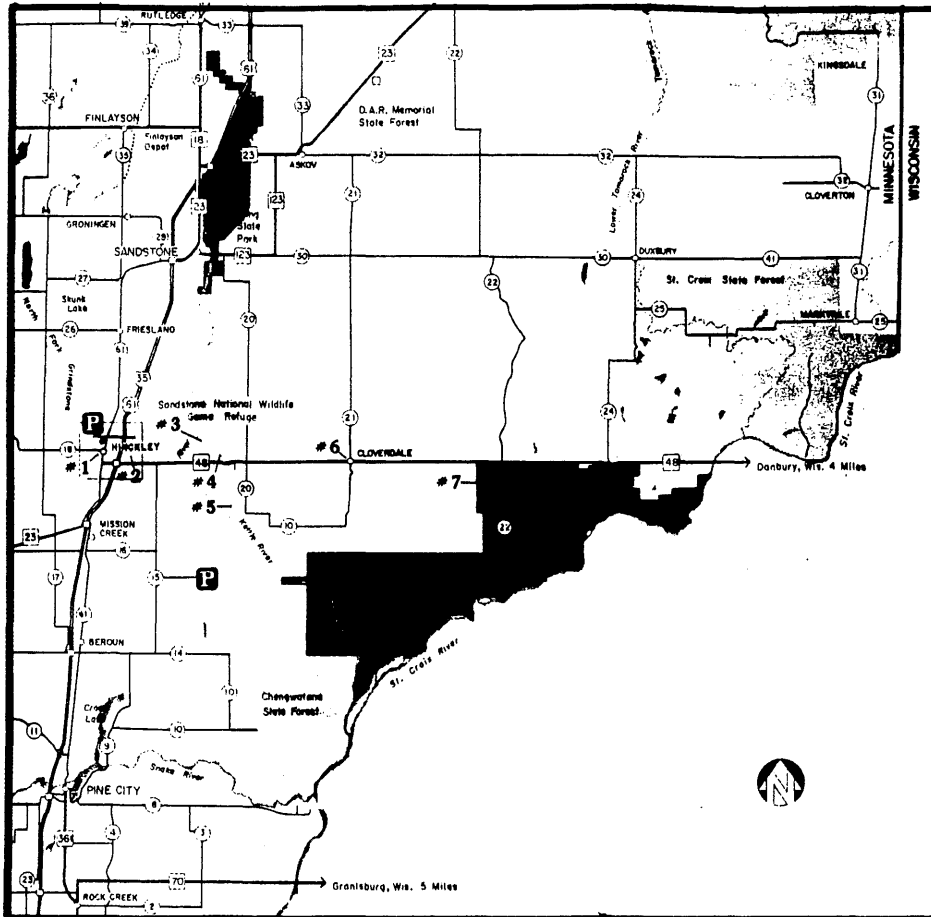
There are approximately 3.4 linear miles of wetland along Trunk Highway 48 between the city of Hinckley and Saint Croix State Park. Another 1.5 linear miles of wetland exist between Saint Croix State Park and the Saint Croix River. If a trail were to be developed, careful consideration must be given to ensure compliance with wetland mitigation procedures, where necessary.

MINNESOTA DEPARTMENT OF TRANSPORTATION DISTRICT 1, 20 YEAR PLAN

Currently Mn/DOT's long-range plans include resurfacing Trunk Highway 48 in the year 2000. At that time, an evaluation will be made to determine the need and feasibility of including paved shoulders in the resurfacing project. Typically, detached trails are not included in projects of this scope.

APPENDICES

APPENDIX A



(Numbers on map correspond with numbers in Appendix A)

HISTORY OF THE AREA

The history of the area was examined to determine what aspects, if any, might entice potential trail users to the area. It was also looked at from the perspective of pointing out areas of interest along the route from the Hinckley Fire Trail to Saint Croix State Park.

Pine County was originally surveyed in the 1850s. At that time roughly two-thirds of the county was heavily timbered. The majority of the timber was a mixed forest of pines, hardwoods, aspen, spruce and tamarack. There were also some areas which consisted exclusively of pine. One of these areas was around the present day city of Hinckley and to the east between the Kettle and Saint Croix rivers. The largest pines in the state were located in Pine County. Some were as tall at 150 feet.

Military Road

In July 1850, a military wagon road (#3) was authorized by an Act of Congress to run from Point Douglas on the Saint Croix River to Superior, Wisconsin. Its purpose was for protection of the Lake Superior communities against the Indians. The road was built in the early 1850s. Mail was transported over this road and from 1861 to 1870, before the completion of the railroad, stage coaches were operated when weather conditions permitted. The road was located several miles east of the city of Hinckley on the west side of the Kettle River and followed the general direction of the river. Some sections of the road are still used today.

Logging

Logging was one of the main reasons that settlers were attracted to the area. The heavily wooded forests appeared endless and offered ample opportunity for financial reward. As a result, the valley's extensive forests of white pine, red pine and jack pine were soon harvested. Once the pine was removed, hardwoods and other softwoods were harvested. Logging originally centered along the rivers and streams such as the Grindstone, Snake, Kettle, Bear, two Sands, Crooked and Tamarack. The

logging companies would cut huge trees and float them down river to the lumber mills in Stillwater. Once the railroad was built, sawmills and lumber camps became centered around the rails and the lumber was shipped by rail.

The Railroad

The first railroad in Pine County was a line running between Saint Paul and Duluth. Construction for this rail was started in 1867 and completed in 1870. The Superior and Mississippi railroad arrived in the city of Hinckley in 1869 (at that time Hinckley was called Central Station by the Railroad, it was renamed in 1870 after Isaac Hinckley, the president of the Philadelphia, Wilmington and Baltimore Railroad). The railroad became the lifeline for the Hinckley settlers, connecting them with the outside world. Logging and railroads were the two sole reasons for the city of Hinckley's beginning and growth.

The City of Hinckley

On November 27, 1885, the city of Hinckley was officially incorporated. By 1890 the population of Hinckley was 618. By 1894 the population had increased to between 1,200 and 1,700 (the number fluctuated with the coming and going of lumberjacks).

The Fire

On September 1, 1894, after a very dry summer, a massive fire wiped out the city of Hinckley and many adjoining towns and blackened 200,000 acres in western and central Pine County. Over 400 people perished in the city of Hinckley alone. The fire greatly changed the Hinckley area. The burned land was settled and farms began in what was forest. By 1898 Hinckley was almost rebuilt to its former size with farms in all directions.

The Fire Museum

A Fire Museum (#1) now exists in what once was the Northern Pacific Railroad depot. Located off of Old Highway 61 south, approximately four blocks south of the DNR's proposed trailhead/parking area in Hinckley, the museum has a regular program which tells about the Great Hinckley Fire of 1894. The proposed southern route through Hinckley could connect with this facility.

The Monument

Many of the people who perished in the fire were buried in trenches at Memorial Cemetery (#2). A monument was erected in memory of the victims. The cemetery and monument are located approximately one half-mile east of Interstate 35 on the north side of Trunk Highway 48.

Copper Mining

Copper was discovered in the area in the early 1880s. An abandoned copper mine (#4) exists just north of Trunk Highway 48 on the west side of the Kettle River. A few attempts were made to set up prosperous operations but were abandoned and copper mining was a short-lived industry in the area.

Kettle River

The Kettle River (#5), in 1975, was the first river to be designated as a component of the State's Wild and Scenic Rivers Act which was passed in the Minnesota legislature in 1973. This legislation protects river resources without requiring the purchase of land by the public government. The waters of the river are deeply brown-stained, reflecting the bog sources of headwaters and tributaries.

Cloverdale

Cloverdale (#6) is a small community located approximately nine-and-one-half miles east of Hinckley. It is the only town located on Trunk Highway 48 between Hinckley and Saint Croix State Park. The town was originally called Turpville and was the site of a turpentine producing plant. Many of the old stumps and fire burned timber went to this plant for processing into turpentine. Settlers clearing out stumps to make fields would bring the stumps into Turpville for processing.

The soils in this area of the state are not highly developed. Due to the cold climate and tundra environment near the glaciers which had covered this part of the state, soil development was very slow until the final retreat of the ice from Minnesota about 11,500 years ago. The farms, which grew in numbers after the great fire, often operated at subsistence level. Few farmers prospered. The Depression of the 1930s left many more farmers struggling on the thin, sandy soil and many of the original farms began to decline. When the Federal Government, under Franklin D. Roosevelt, offered to move them, many welcomed the opportunity.

Saint Croix State Park

Saint Croix State Park (#7) was one of the areas which the Federal Government acquired. The park had its beginnings when the Resettlement Administration purchased farms for \$10.00 per acre and provided assistance in moving and rebuilding. In 1934, the National Park Service (NPS) was authorized to establish the Saint Croix Recreational Demonstration Area. Work began in 1935 when the Civilian Conservation Corp (CCC) workers arrived and cut brush, trails, fire lanes and road, all which became incorporated into the park. In the following years,

under the direction of the NPS, the CCC and Work Progress Administration built campgrounds, group camps, bridges, trails, dams and beaches. In 1943, under a joint act of Congress and the Minnesota Legislature, the Saint Croix Recreation Demonstration Area became Saint Croix State Park. In 1968 the Saint Croix River was declared a National Wild and Scenic River.

The park now has numerous campsites, 127 miles of hiking trail, over 60 miles of snowmobiling and horse trail, 21 miles of ski trail and 6 miles of paved bike trail. Canoe and bicycles are available in the park for rentals.

Summary

A trail connecting the Hinckley Fire Trail to Saint Croix State Park along Trunk Highway 48 provides an opportunity to view a slice of the rich history of the area. While the possibility exists to provide interpretive facilities along the route which could increase user enjoyment, it is difficult to determine how much these opportunities would increase trail use or draw additional trail users to the area.

APPENDIX B

MAJOR RECREATION AMENITIES

Sandstone National Wildlife Game Refuge

The refuge is located approximately four miles east of Hinckley on the north side of Trunk Highway 48. The Kettle River makes up the west boundary of the refuge which contains 2,240 acres and a diverse variety of vegetation and wildlife. The many lowland marshes within the area provide valuable waterfowl habitat and higher, rock ledges support varied plant and animal communities. The refuge harbors grouse, deer, bald eagle nesting sites, black bear and many small animals.

Banning State Park

Banning State Park is located approximately seven miles north of Trunk Highway 48 on the north side of the Sandstone National Wildlife Game Refuge. The Kettle River bisects the length of the park and is the park's primary scenic attraction. The park includes remnants of the former Banning town site, a quarrying settlement; which was platted in 1896 and flourished for about 20 years. Recreational facilities in the park include a picnic area, campground, river access and trail system. The park also contains the famous Kettle River Dalles and Hell's Gate which is a dangerous rapids on the Kettle River.

Chengwatana State Forest

Chengwatana State Forest is located approximately eight miles southeast of the city of Hinckley and about five miles south of Highway 48. Roughly one-half of the 29,240 acres in the forest is privately owned and three-quarters of the forest area consists of lowland surrounded by forested islands. The Snake, Kettle and Saint Croix

rivers traverse the area and offer scenic attraction, fishing and canoeing. Recreational activities include deer and waterfowl hunting, snowshoeing, snow-skiing and snowmobiling.

Saint Croix State Park

Saint Croix State Park is located approximately 15 miles east of Hinckley on the south side of Highway 48. With over 33,000 acres, it is the largest state park in Minnesota. The Saint Croix River establishes the south and east boundaries of the park. The parks topography is relatively flat with a few steep hillsides bordering the streams that flow through the area. The park includes a second growth of pine, spruce and hardwoods which are intermixed with open meadows. Recreation activities include camping, swimming, picnicking, fishing, canoe landings, and equestrian, snowmobile, hiking and biking trails.

Saint Croix State Forest

Saint Croix State Forest is located approximately 22 miles east of Hinckley (roughly six miles east of the entrance to Saint Croix State Park). The forest is on the north side of Trunk Highway 48 and encompasses 44,558 acres, including 27,105 acres administered by the Department of Natural Resources. The remaining acreage is privately owned or managed by county and federal agencies. The forest was established in 1933 by the Minnesota Legislature. The Lower Tamarack River runs through the forest and the Saint Croix River constitutes the southeastern boundary.

The topography varies from gently rolling uplands to steep valleys along the rivers. Outdoor recreation facilities include a campground,

an equestrian camp, a portion of the Willard Munger State Trail and trails for hiking, horseback riding and snowmobiling.

Willard Munger State Trail

The Willard Munger State Trail is a complex system of interconnecting trails offering hiking, bicycling, snowmobiling, ski touring, and horseback riding. The trail will eventually be developed from the Twin Cities area to Duluth. It currently contains three developed segments:

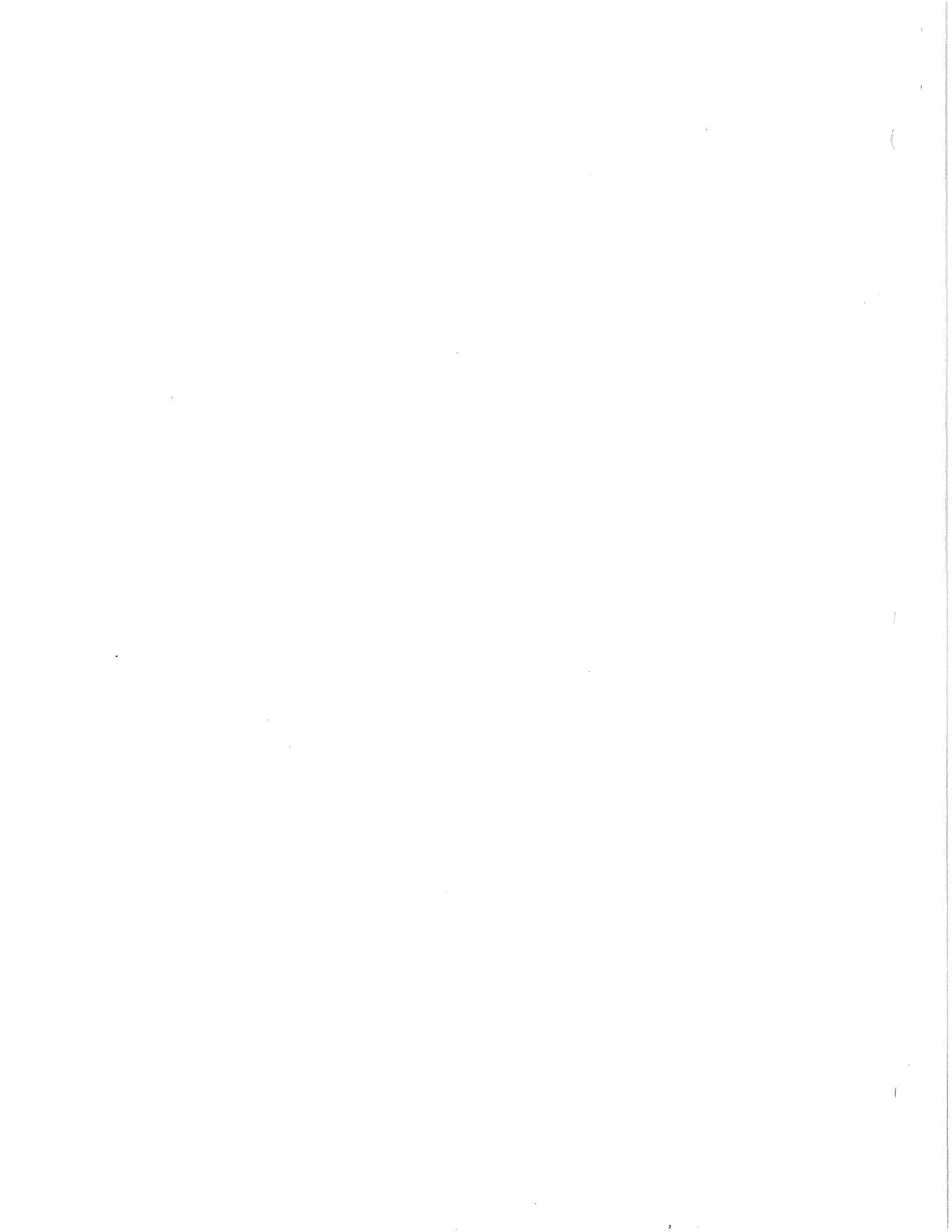
1. Hinckley Fire Segment (referred to as the Hinckley Fire Trail in this report)--runs from Hinckley north to Barnum.
2. Boundary Segment--runs from Chengwatana State Forest north through Nemadji State Forest.
3. Duluth Segment--runs from Carlton to Duluth.

Commercial

Hinckley's strategic location as a "halfway point" between the Twin Cities and Duluth is a draw both for those commuting between the two large population centers and as a destination in itself. As such, Hinckley offers numerous commercial amenities which draw the public to the community. The City hosts restaurants, gift shops, convenience stores, a theme park, and other services which play a part in making Hinckley a place to visit.

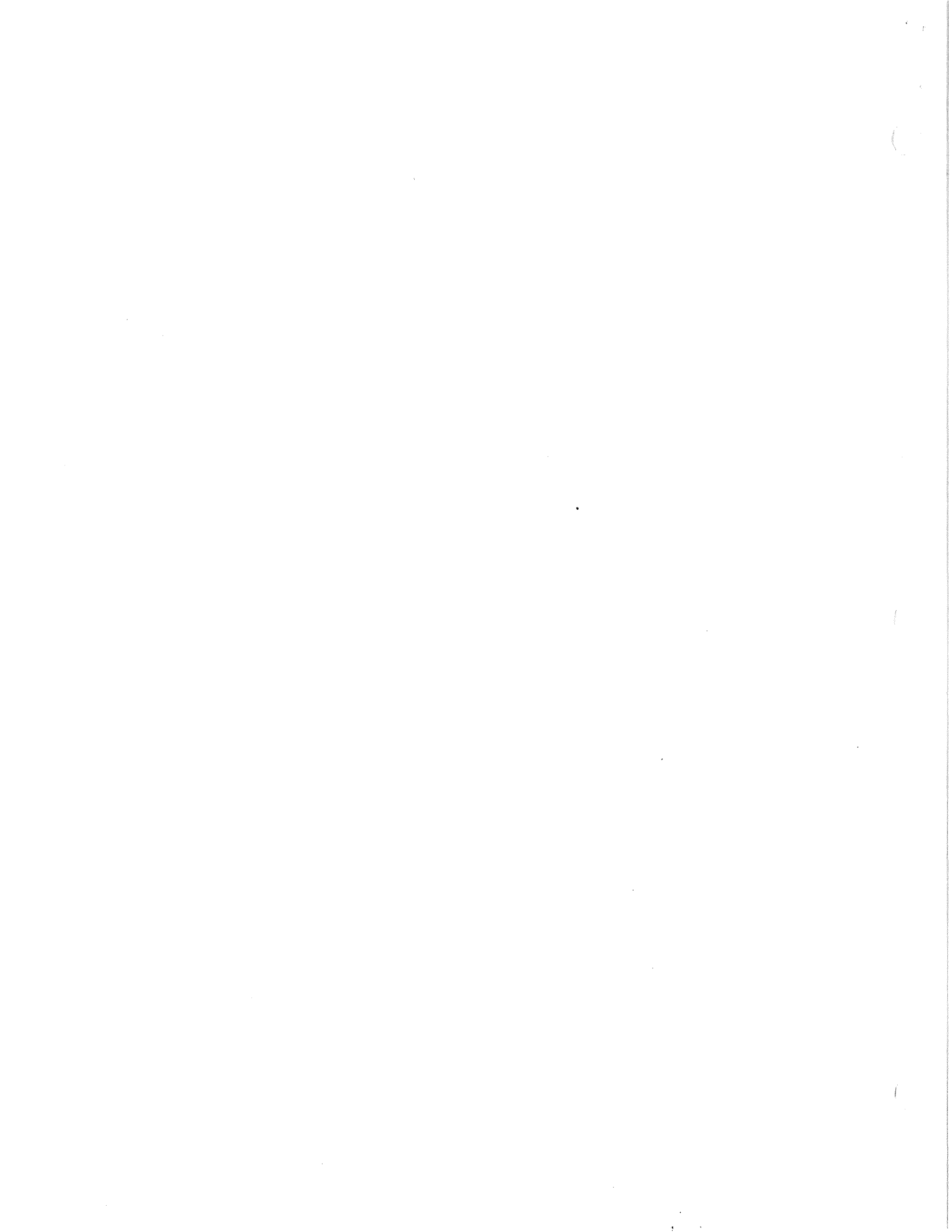
Summary

The Hinckley area offers recreational and commercial amenities. The proposed trail would provide an opportunity to link the Hinckley Fire Trail with Hinckley's commercial amenities and Saint Croix State Park, in and of itself, that would be reason for some to use the trail.



APPENDIX C

COST WORKSHEETS FOR DEVELOPMENT ALTERNATIVES



WORKSHEET: ALTERNATIVE A - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS,
UNDEVELOPED ROAD DITCHES FOR SNOWMOBILERS

	<u>Estimated Cost*</u>
<u>Trail Development</u>	
15.80 miles (four feet wide both sides of road, fill and grading) at \$65,000 per mile	<u>\$1,027,000</u>
Total	\$1,027,000
SAINT CROIX RIVER OPTION	
<u>Paved Shoulders</u>	
8.37 miles (four feet wide both sides of road) at \$65,000 per mile	<u>\$ 544,050</u>
Total	\$1,571,050

(*) Figures provided by Mn/DOT.

WORKSHEET: ALTERNATIVE B - EIGHT FOOT PAVED DETACHED BICYCLE/SNOWMOBILE TRAIL

	<u>Estimated Cost*</u>
<u>Trail Development</u>	
15.80 miles (grading, paving, bridge approaches and Interstate 35 underpass at Grindstone River) at \$100,000 per mile	\$1,580,000
<u>Bridges</u>	
- Interstate 35 overpass (12' x 300') at \$80 per square foot (option)	288,000
	<u>Estimated Length</u>
- East Grindstone River	75 feet 16,500
- West Grindstone River	200 feet 149,600
- Kettle River	260 feet 194,700
- Bear Creek	45 feet 8,800
- Sand River	85 feet 22,400
- Little Sand Creek	25 feet 5,200
Total	<u>5,200</u> \$2,265,200

SAINT CROIX RIVER OPTION

<u>Trail Development</u>	
8.37 miles (grading, paving, and bridge approaches) at \$100,000 per mile	\$ 837,000
<u>Bridges</u>	
	<u>Estimated Length</u>
- Clover Creek	25 feet 5,200
- Crooked Creek	45 feet 8,800
Total	<u>8,800</u> \$3,116,200

(*) Figures provided by Mn/DOT.

WORKSHEET: ALTERNATIVE C - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS,
DETACHED SNOWMOBILE TRAIL

	<u>Estimated Cost*</u>
<u>Paved Shoulders</u>	
15.80 miles (four foot wide both sides of road, fill and grading) at \$65,000 per mile	\$1,027,000
<u>Trail Development</u>	
15.80 miles (grading and bridge approaches, underpass on Interstate 35 at Grindstone River) at \$80,000 per mile	1,264,000
<u>Bridges</u>	
- Interstate 35 overpass (12' x 300') at \$80 per square foot (option)	288,000
	<u>Estimated Length</u>
- East Grindstone River	75 feet
- West Grindstone River	200 feet
- Kettle River	260 feet
- Bear Creek	45 feet
- Sand River	85 feet
- Little Sand Creek	25 feet
	<u>5,200</u>
Total	\$2,976,200

SAINT CROIX RIVER OPTION

<u>Paved Shoulders</u>	
8.37 miles (four feet wide both sides of road) at \$65,000 per mile	\$ 544,050
<u>Trail Development</u>	
8.37 miles (grading and bridge approaches) at \$80,000 per mile	669,600
<u>Bridges</u>	
	<u>Estimated Length</u>
- Clover Creek	25 feet
- Crooked Creek	45 feet
	<u>5,200</u>
	<u>8,800</u>
Total	\$4,203,850

(*) Figures provided by Mn/DOT.

WORKSHEET: ALTERNATIVE D - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS,
TWO DETACHED SNOWMOBILE TRAILS

	Estimated Cost*
<u>Paved Shoulders</u>	
15.80 miles (four foot wide both sides of road, fill and grading) at \$65,000 per mile	\$1,027,000
<u>Trail Development</u>	
31.60 miles (grading and bridge approaches, underpass on Interstate 35 at Grindstone River) at \$80,000 per mile	2,528,000
<u>Bridges</u>	
- Interstate 35 overpass (12' x 300') at \$80 per square foot (option)	288,000

	Estimated Length		
- East Grindstone River	75 feet	\$ 16,500 x 2 =	33,000
- West Grindstone River	200 feet	\$149,600 x 2 =	299,200
- Kettle River	260 feet	\$194,700 x 2 =	389,400
- Bear Creek	45 feet	\$ 8,800 x 2 =	17,600
- Sand River	85 feet	\$ 22,400 x 2 =	44,800
- Little Sand Creek	25 feet	\$ 5,200 x 2 =	10,400
Total			\$4,637,400

SAINT CROIX RIVER OPTION

<u>Paved Shoulders</u>			
8.37 miles (four feet wide both sides of road) at \$65,000 per mile	\$ 544,050		
<u>Trail Development</u>			
16.74 miles (grading, paving and bridge approaches) at \$80,000 per mile	1,339,200		
<u>Bridges</u>			
	Estimated Length		
- Clover Creek	25 feet	\$ 5,200 x 2 =	10,400
- Crooked Creek	45 feet	\$ 8,800 x 2 =	17,600
Total			\$6,548,650

(*) Figures provided by Mn/DOT.

WORKSHEET: ALTERNATIVE E - EIGHT FOOT PAVED DETACHED BICYCLE/SNOWMOBILE TRAIL, TEN FOOT UNPAVED DETACHED SNOWMOBILE TRAIL

	<u>Estimated Cost*</u>
<u>Trail Development</u>	
15.80 miles (grading, paving, bridge approaches and Interstate 35 underpass at Grindstone River) at \$100,000 per mile	\$1,580,000
15.00 miles (grading and bridge approaches) at \$80,000 per mile	1,200,000

Bridges

	<u>Estimated Length</u>		
- East Grindstone River	75 feet	\$ 16,500 x 2 =	33,000
- West Grindstone River	200 feet	\$149,600 x 2 =	299,200
- Kettle River	260 feet	\$194,700 x 2 =	389,400
- Bear Creek	45 feet	\$ 8,800 x 2 =	17,600
- Sand River	85 feet	\$ 22,400 x 2 =	44,800
- Little Sand Creek	25 feet	\$ 5,200 x 2 =	10,400
	Total		<u>\$3,574,400</u>

SAINT CROIX RIVER OPTION

Trail Development

8.37 miles (grading, paving, bridge approaches) at \$100,000 per mile	\$ 837,000
8.37 miles (grading and bridge approaches) at \$80,000 per mile	669,600

Bridges

	<u>Estimated Length</u>		
- Clover Creek	25 feet	\$ 5,200 x 2 =	10,400
- Crooked Creek	45 feet	\$ 8,800 x 2 =	17,600
	Total		<u>\$5,109,000</u>

(*) Figures provided by Mn/DOT.

APPENDIX D

USE PROJECTIONS

BICYCLE OCCASIONS CALCULATED AS FOLLOWS: USE PROJECTIONS

I. Alternatives With Paved Shoulders (Based on Mn/DOT's Minnesota Comprehensive Bike Plan) = 8,850

Minnesota Bicycling Factors:

- A. Minnesotans 16 and older who bicycle annually (M): 59%
- B. All Minnesotans who bicycle annually (B): 66%
- C. Average bicycle trips per season per person (T): 21.28
- D. Percent of overnight bicycle trips (one to nine nights) (Ø): 0.9%
- E. Percent of bicycle trips for general fitness (F): 9.7%
- F. Percent of bicycle trips for racing/training (R): 0.3%
- G. Percent of bicycle day trips (D): 15.0%
- H. Use factor for Hinckley Trail options (U): 50.0%

1. Saint Croix State Park Annual Overnight Users: 60,000

60,000 (M) x (T x Ø) = Bicycle attraction for Saint Croix State Park users

$60,000 (.59) x (21.28 x .009) =$
 $35,400 x (0.19152) = 6,780$ 6,780

2. Annual Hinckley Fire Trail Bicyclists: 27,795

$27,795 (Ø) =$
 $27,795 (.009) = 250$ 250

3. Hinckley Area Residents = 1,000

1,000 (B) = 660 Hinckley residents who bike

$660 (T) x (F + R + D + Ø) x (U)$
 $14,044 x (.259) (.50) = 1,819$ 1,819

Total Annual Trail Users Projection: 8,849

II.* Alternatives With Detached Paved Bike Paths = 15,400
 (Assumption was made that a detached trail would be similar in nature to that of the Hinckley Fire Trail, therefore, use would be similar.)

Hinckley Fire Trail is approximately twice the length of the proposed trail, therefore, the assumption was made that use on the Trunk Highway 48 facility would be approximately half the amount of the Hinckley Fire Trail.

1987 Hinckley Fire Trail summer users = $30,800 \div 2 = 15,400$.

SNOWMOBILE OCCASIONS CALCULATED AS FOLLOWS: USE PROJECTIONS

Based on the assumption that approximately 50 percent of the Hinckley to Saint Croix grants-in-aid (GIA) trail users would use the Trunk Highway 48 trail if a two way route were developed.

III.* Hinckley to Saint Croix GIA annual users = $5,700 \div 2 = 2,850$

IV.* If a one way route were developed: $2,850 \div 2 = 1,425$

ANNUAL USER PROJECTIONS FOR ALTERNATIVES A THROUGH E

ALTERNATIVE A - FOUR FOOT PAVED SHOULDERS FOR BICYCLISTS,
 UNDEVELOPED ROAD DITCHES FOR SNOWMOBILERS I = 8,850

ALTERNATIVE B - EIGHT FOOT PAVED DETACHED
 BICYCLE/SNOWMOBILE TRAIL II + IV = 16,825

ALTERNATIVE C - FOUR FOOT PAVED SHOULDERS FOR
 BICYCLISTS, DETACHED SNOWMOBILE TRAIL I + IV = 10,275

ALTERNATIVE D - FOUR FOOT PAVED SHOULDERS FOR
 BICYCLISTS, TWO DETACHED SNOWMOBILE
 TRAILS I + III = 11,700

ALTERNATIVE E - EIGHT FOOT PAVED DETACHED
 BICYCLE/SNOWMOBILE TRAIL, TEN FOOT
 UNPAVED DETACHED SNOWMOBILE TRAIL II + III = 18,250

(*) Figures provided by the DNR's Trails and Waterways Unit, Trail Programs Section.

