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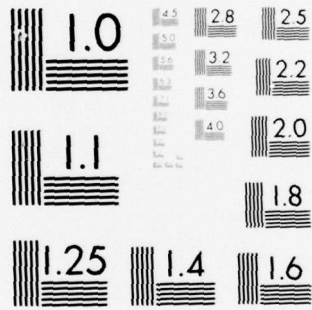
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Book 21
Right-of-Way Opportunities
and Avoidance Features

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Seafarer Site Survey Upper Michigan Region

for
U.S. Navy
Naval Electronic Systems Command
Washington, D.C.

by
EDAW inc.
under contract to
GTE Sylvania
Communication Systems Division

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<p>This report identifies right-of-way opportunities and avoidance features that occur within the Study Area. In order to identify opportunities and avoidance features, all environmental features of the area were examined relative to the following types of costs: construction; mitigation; operation and maintenance; biological costs (impacts); and social costs (impacts).</p> <p>The information is condensed into two maps which plot right-of-way opportunities and the locations of avoidance features, respectively.</p>		

BOOK 21

RIGHT-OF-WAY OPPORTUNITIES
AND AVOIDANCE FEATURES
of the
UPPER MICHIGAN REGION
PROJECT SEAFARER

for
U. S. Navy. Naval Electronic Systems Command

by
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GENERAL DESCRIPTION

This report identifies right-of-way opportunities and avoidance features that occur within the Upper Michigan Study Area. Right-of-way opportunities are defined as all existing rights-of-way that have potential for use as a SEAFARER antenna right-of-way, such as roads, transmission lines, telephone lines and abandoned railroads. Avoidance features are those areas within the Study Area that have been excluded from consideration for antenna siting due to high constraints, such as incorporated settlements, lakes, and unique natural areas.

The Site Survey report, of which this book is a part, will form the basis for identifying opportunities and constraints to SEAFARER system siting in each environmental data category. ROW opportunities and avoidance features represent the two extreme ends of the spectrum with all other data factors falling somewhere between in terms of level of constraint. Further definition of constraint levels by data category is beyond the scope of this site survey effort and will be the subject of a follow-on phase of work. The avoidance feature map represents the initial examination and identification of site characteristics that represent constraints to SEAFARER siting.

In order to identify opportunities and avoidance features, all environmental features of the Study Area were examined relative to five types of costs or impacts:

- o Construction costs are associated with antenna system construction and include such items as right-of-way acquisition, access roads, construction, vegetative clearing, dewatering, blasting, materials storage, equipment movement, field testing, waste disposal and environmental restoration.
- o Mitigation costs are associated with precluding electrical interference in telephone and utility distribution systems and induced coupling with long wire conductors such as fences. Examples of costs include upgrading single phase electrical distribution lines to three phase balanced lines, grounding long wire fences and upgrading rural telephone systems to eliminate interference.
- o Operation and maintenance costs include all costs required for reliable system transmission, surveillance, preventive maintenance and repair.

- o Biological costs (or impacts) include alteration of environmental features leading to loss of habitat, vegetative destruction, depletion of wildlife species or imbalance of the ecosystem. Biological impacts in this context refer to siting, construction, and maintenance activities; considerations relative to the operation of an ELF system are beyond the scope of this report.
- o Social costs (or impacts) include the restriction of existing or planned land use and potential effect on land values, employment, local services, public health, education, safety, recreation and historic or archaeological sites; also included is the more subjective area of public acceptability.

Right-of-way opportunities have been identified to minimize both engineering and environmental costs in siting; avoidance features have been identified to minimize social, environmental and mitigation costs.

Right-of-way Opportunities

Right-of-way opportunities are shown on the map on the following page. The information has been extracted directly from the Transportation Data Map (Book 7) and the Utilities Data Map (Book 8). Opportunities are linear in configuration and generally transect the site in a north-south and east-west direction. Table 1 lists each type of feature located on the map.

Table 1. RIGHTS-OF-WAY OPPORTUNITIES

<u>Data Category</u>	<u>Data Factor</u>	<u>Minimizes:</u>
Transportation	Highways Paved Roads Gravel Roads Dirt Roads Abandoned Railroads	construction cost operation and maintenance cost biological cost social cost
Utilities-Electrical	Transmission Lines Distribution Lines Underground Cables	construction cost operation and maintenance cost biological cost social cost
Utilities-Telephone	Underground Cables Aerial Cables Open Wires	construction cost operation and maintenance cost biological cost social cost

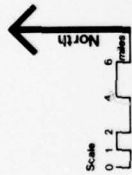
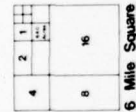
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R.O.W. OPPORTUNITIES

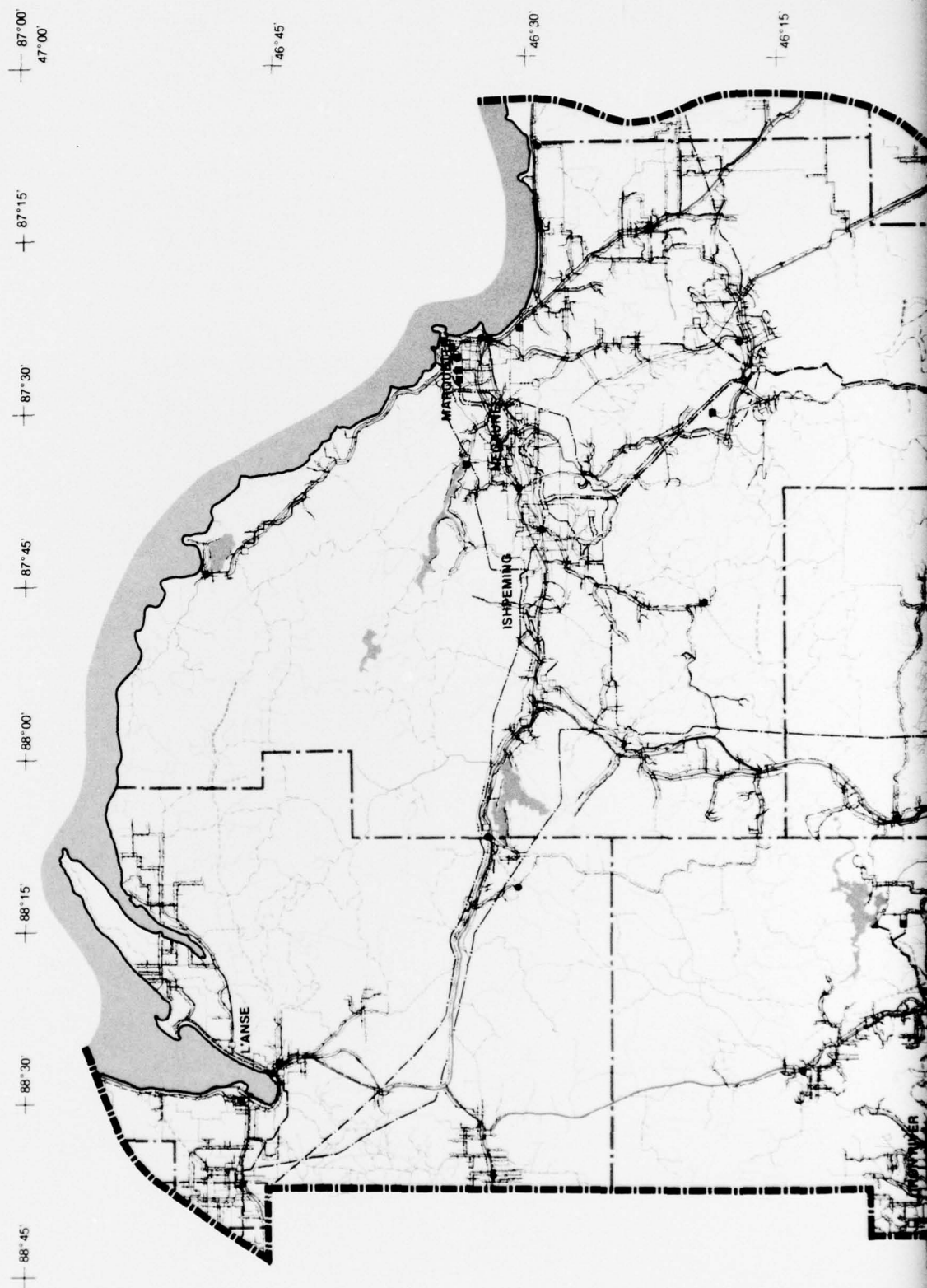
TRANSPORTATION
U.S. and State Highways
Other Paved Roads
Gravel Road
Good Dirt Road
Poor Dirt Road
Abandoned Railroad

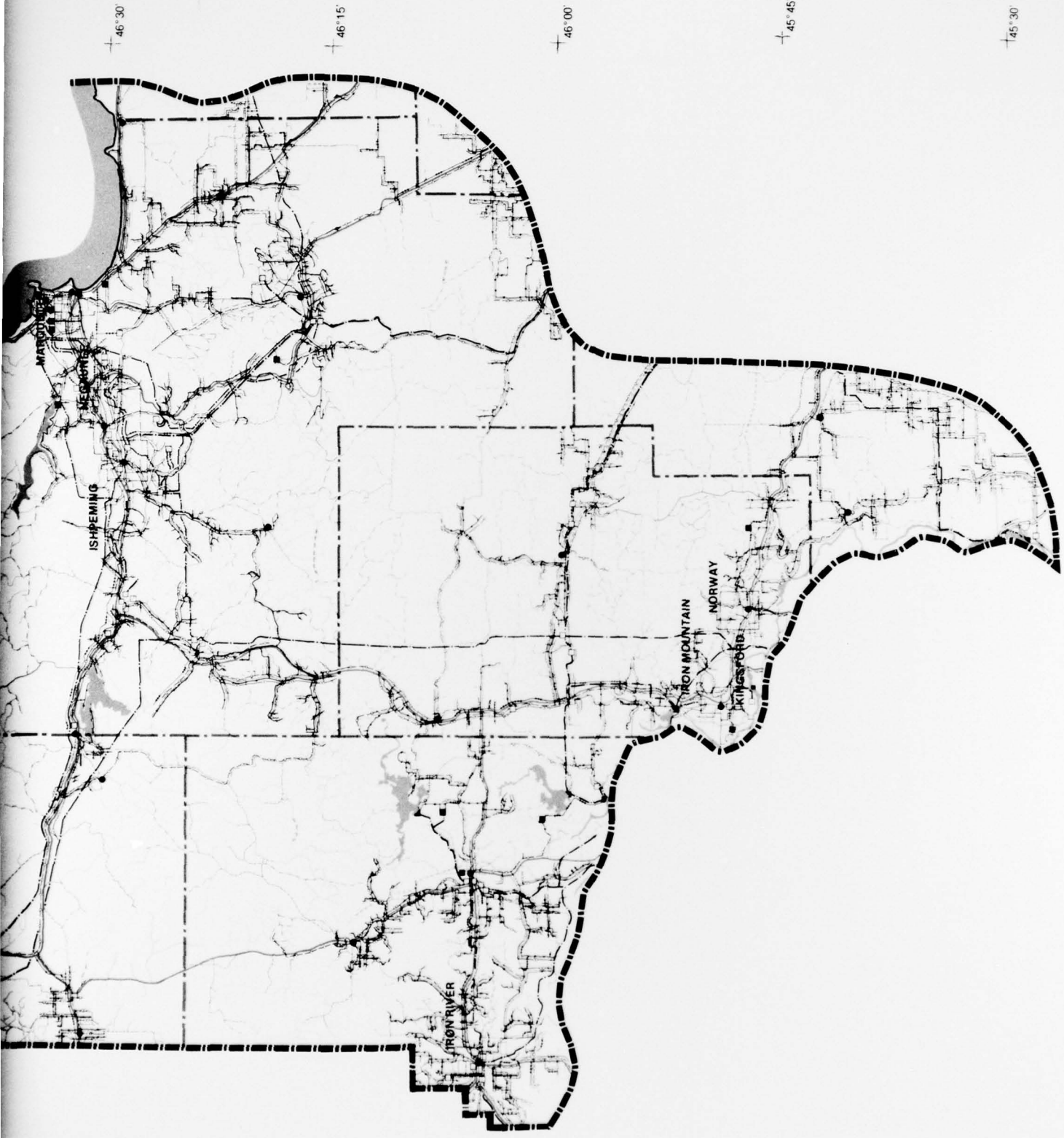


ELECTRICAL TRANSMISSION AND DISTRIBUTION SYSTEM
Transmission Line (69kV-138kV)
Three Phase Distribution Line (12.5kV-33kV)
Single Phase Distribution Line
Underground Cable
Substation
Switching Station
Generation Station



TELEPHONE SYSTEM
Underground Cable
Open Wire
Aerial Cable
Central Office





Avoidance Features

Avoidance Features are shown on the map on the following page. The map depicts those features felt to represent the highest level of constraint and therefore, these areas have been excluded entirely from consideration for SEAFARER system siting*.

Table 2 lists the features shown on the map. For a detailed discussion of the individual site features, see the following data books:

Book 5	Land Use
Book 7	Transportation
Book 8	Utilities
Book 9	Mineral Extraction
Book 14	Surface Water
Book 17	Cultural & Recreational
Book 19	Wildlife

A number of avoidance features such as cemeteries, quarries, nesting sites and historic sites have been shown as point data since the scale of mapping does not permit individual site configurations to be shown.

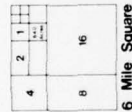
Many other environmental characteristics represent constraints to system siting (such as dense vegetation, steep topography, exposed bedrock, etc.) but none have been classified as absolute avoidance. Each data factor within each data category will be assessed in terms of the level of constraint it represents to system siting and will then be used in the siting analysis as part of a subsequent phase of work.

* The types of features to be treated as avoidances were identified by the Navy as part of system design specifications.

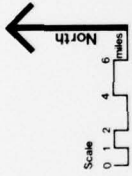
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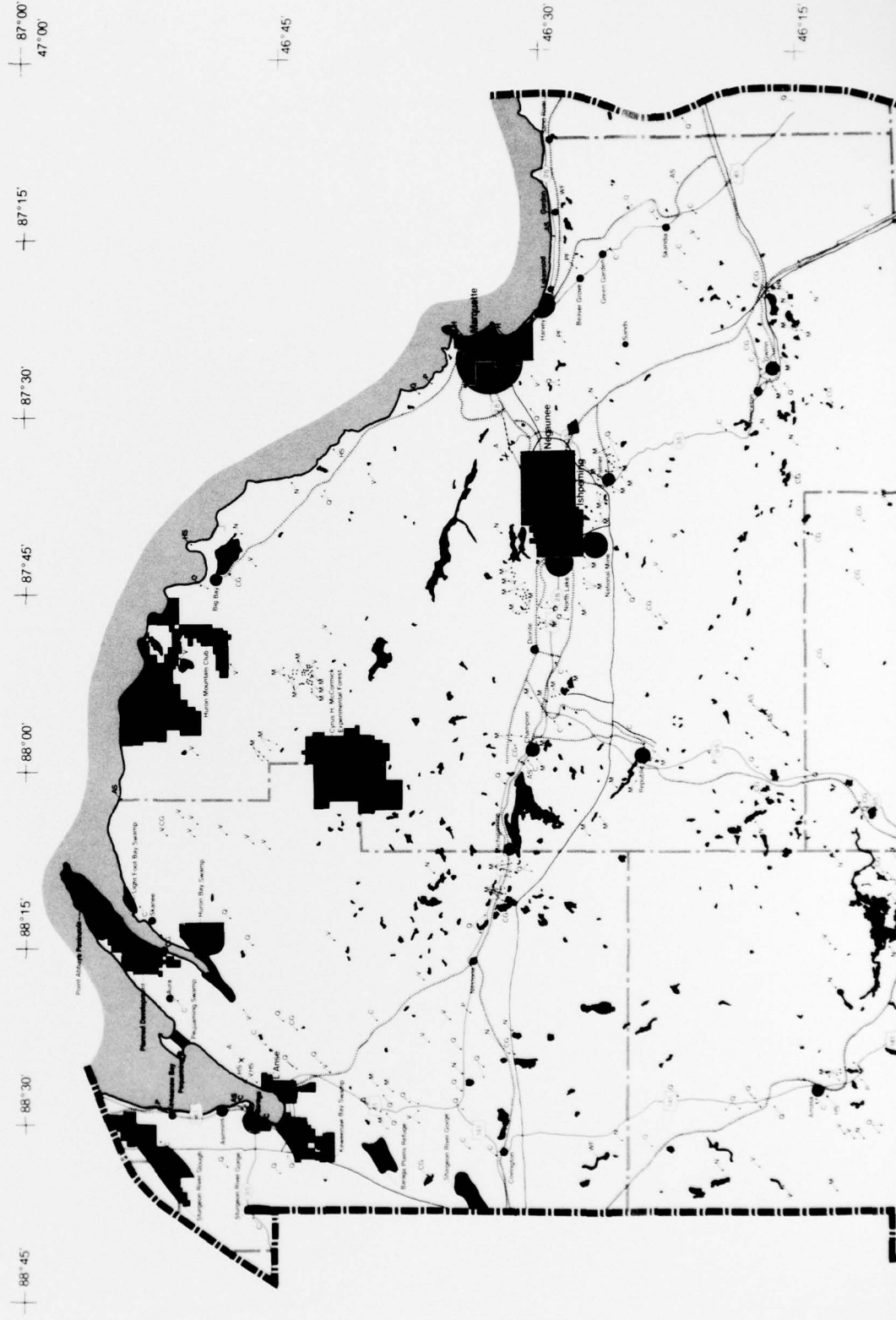


6 Mile Square



AVOIDANCE FEATURES

	Corporate Boundaries, Planned Developments or Special Preserve Areas		Quarries and Pits
	Urban and Rural Settlements		Park Sites with Campgrounds
	Railroads		Small Parks and Picnic Areas
	Pipelines		Ski Areas
	Lakes and Reservoirs		Recorded View Points
	Airports		Archaeological Sites
	Harbors		Historic Sites
	Cemeteries		Nesting Sites
	Prison Facilities		Wildlife Flooding Areas
	Mines		





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Table 2. AVOIDANCE FEATURES

<u>Data Category</u>	<u>Data Factor</u>	<u>Minimizes:</u>
Land Use	Corporate Boundaries	Mitigation Cost
	Urban and Rural Settlements (U-1, U-2, U-3, R-1, R-2)	Operation and Maintenance Cost Social Cost
	Planned Developments	Mitigation Cost Operation and Maintenance Cost Social Cost
	Special Preserve Areas	Biological Cost Social Cost
	Sturgeon Gorge	
	Keweenaw Bay Swamp	
	Pequaming Swamp	
	Huron Bay Swamp	
	Light Foot Bay Swamp	
	Point Abbaye Peninsula	
	Sturgeon Sloughs	
	Cemeteries	Social Cost
	Prison Facilities	Social Cost
Transportation	Railroads (operational)	Mitigation Cost
	Airports	Mitigation Cost Social Cost
	Harbors	Social Cost
Utilities	Pipelines	Mitigation Cost
	Mines (active and inactive)	Construction Cost Mitigation Cost Social Cost

Table 2. AVOIDANCE FEATURES (continued)

<u>Data Category</u>	<u>Data Factor</u>	<u>Minimizes:</u>
	Quarries and Pits (active and inactive)	Construction Cost Mitigation Cost Social Cost
Surface Water	Lakes and Reservoirs	Construction Cost Social Cost
Cultural and Recreational	McCormick Experimental Forest	Biological Cost Social Cost
	Park Sites with Campgrounds	Social Costs
	Small Parks and Picnic Areas	Social Cost
	Recorded View Points	Social Cost
	Ski Areas	Social Cost
	Historic Sites	Social Cost
	Archaeologic Sites	Social Cost
Wildlife	Nesting Sites	Biological Cost Social Cost
	Wildlife Flooding Areas	Biological Cost Social Cost

