LAKE COUNTY

Coastal Energy Impact Program

Transmission Line Policy Plan for Eastern Lake County

October, 1979

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The preparation of this report was financed under the Ohio Coastal Energy Impact Program for Lake County, under the Coastal Zone Management Act of 1976.

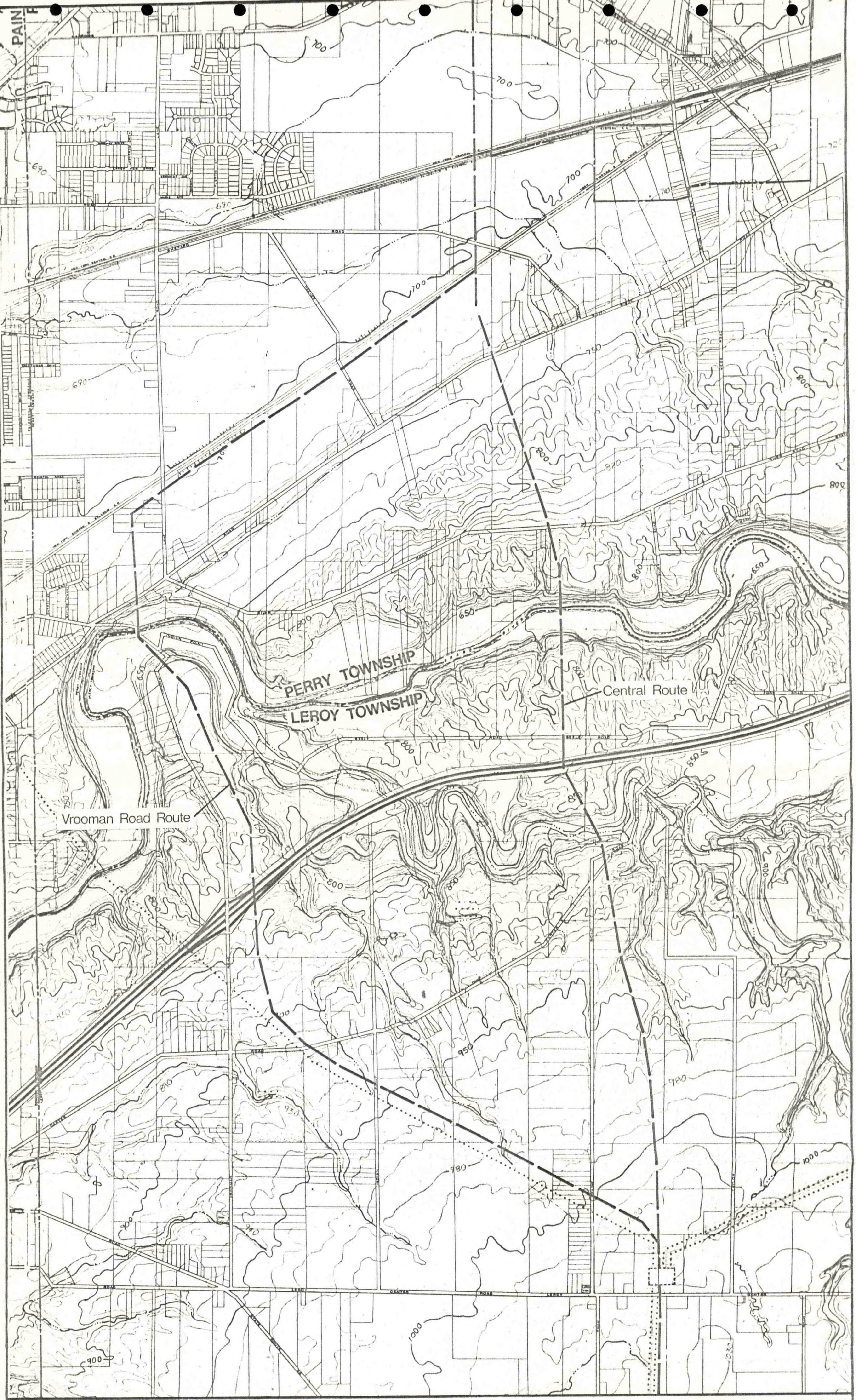
LAKE COUNTY
TRANSMISSION LINE POLICY PLAN

I. INTRODUCTION

With the development of the Perry Nuclear Power Plant, C.E.I. has projected a need for several high voltage transmission lines to cross Lake County from north to south. The electricity generated by the two planned power plant units is expected to be accomodated by two transmission lines: the Perry-Inland-Macedonia line, and the Perry-Hanna line. The first connection, between the Perry Plant and C.E.I.'s substation in Macedonia, has received certification by the Ohio Power siting Commission, and has been partly constructed. The second generating unit planned by C.E.I. will supply power to the Hanna Substation in Portage County. This transmission line route is currently being studied by O.P.S.C. for their approval.

For Lake County, the major issue to be addressed concerns an evaluation of each alternative route for the Perry-Hanna transmission line through the Grand River area. These alternatives include, the Central corridor, which is favored by C.E.I., and the alternate Vrooman Road corridor, which is similar to the approved Perry-Inland-Macedonia transmission line. (map 1) It should be understood that additional generating units could be developed at the Perry Plant in the future; and that the development of these "potential"[1] units would probably create a need for additional transmission lines. For the purposes of this report, however, only those impacts generated by the proposed Perry-Hanna transmission line will be evaluated. Generally, any additional transmission line through the Grand River area will greatly intensify the perceived impacts.

[1] To date, no additional generating units have been publicly proposed by C.E.I.



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While both Perry-Hanna transmission line alternatives require a Grand River crossing, the nature of the proposed crossings produces different kinds of impacts. The key difference between the two alternatives concerns the adverse visual and potentially detrimental land use impacts expected along the Vrooman Road corridor, versus the negative aesthetic and environmental impacts created along the Central corridor.

The Vrooman Road corridor would route the transmission line along an existing intrusion of the Grand River Valley, causing an impact to the visual beauty that is on display surrounding Mason's Landing. In addition, this route may also be disruptive to the growing residential area located on the Vrooman Road plateau south of the river. In this area, the presence of a high voltage transmission line would be more likely felt, then in a location where there are only a few year-round residents; as in the Central route.

On the other hand, the Central corridor crosses the river in a location that has as of yet been undisturbed. The construction and maintenance of a transmission line in this area could be disruptive to the existing natural environment of the river valley. Currently, most of the Grand River is designated as a wild river, attributing to the natural beauty and undisturbed nature of the area. With an intrusion such as the Perry-Hanna transmission line, some of this aesthetic and environmental quality would be disrupted; probably forever.

Before C.E.I. can commence development of the Perry-Hanna transmission line, however, the O.P.S.C. must approve one of these two alternative routes. After their recommendation has been made, a public hearing will be set up to receive testimony from legitimate parties concerning the location and development of the recommended transmission line. Upon completion of the public hearing, O.P.S.C. will issue a final decision, based only on their previous review and the additional evidence established in the hearing.

The major purpose of this report is to evaluate the relative adverse effects that each Perry-Hanna alternative would create if it was developed. Through this evaluation, a specific policy regarding the location of the Perry-Hanna transmission line could be established, enabling the County to be prepared to present its position during the O.P.S.C. hearings. It is in the County's best interest to actively pursue the transmission line corridor that 1) has the least physical and economic impacts on the area, and 2) that protects the County's options regarding potential circulation and servicing improvements.

The secondary thrust of this report is a policy plan for the mitigation of potential impacts resulting from the development of the two Perry transmission lines. These policies act as guidelines for assessing the impact of actions, taken by C.E.I., in constructing the transmission lines for the two planned C.E.I. corridors, and any other corridors that may be proposed in the future. With this set of guidelines, the County is better able to make decisions to protect the integrity of the area's natural environment and community atmosphere.

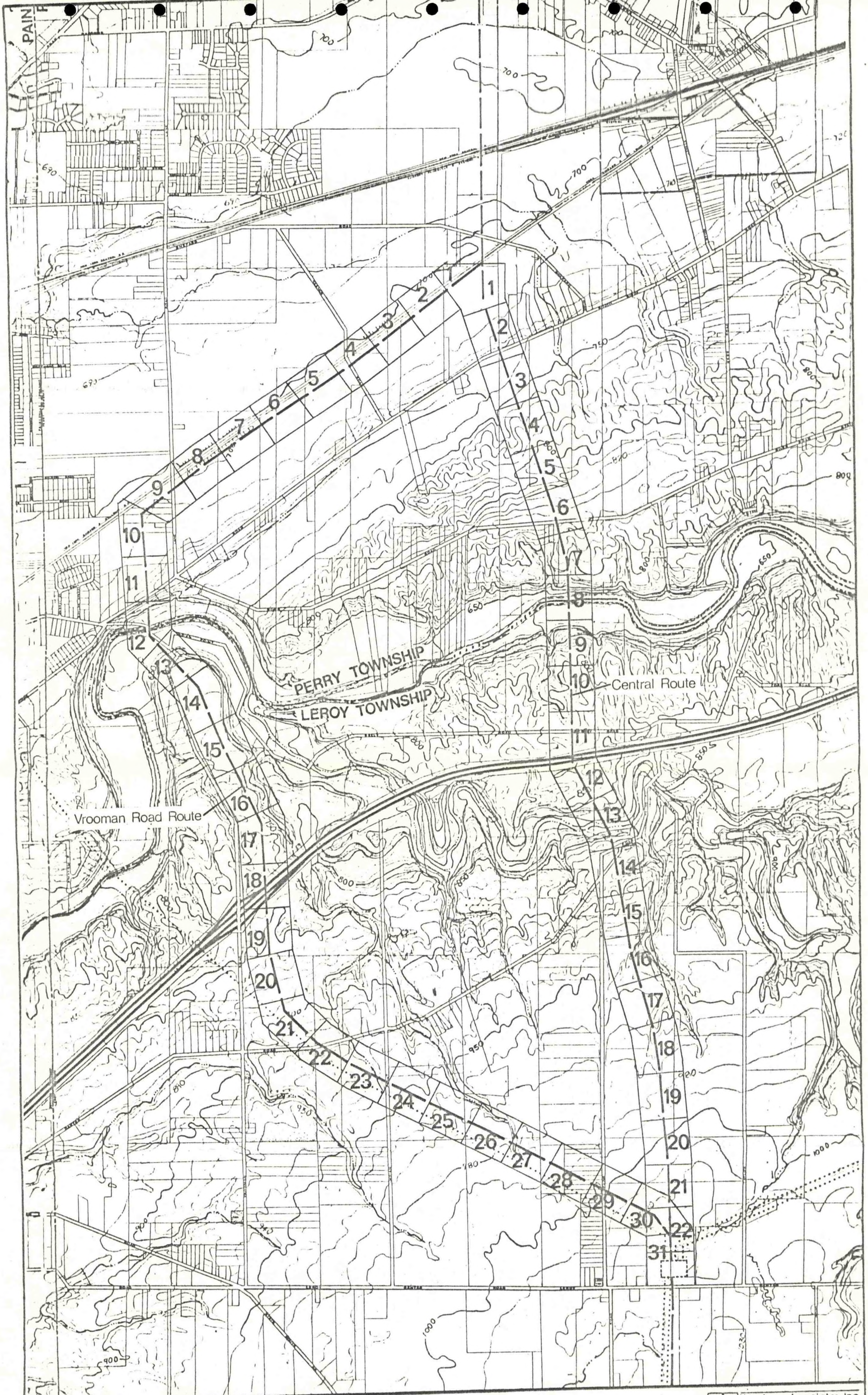
II. PERRY-HANNA ROUTE EVALUATION

In order to make an evaluation of the two alternative Perry-Hanna transmission line routes, an assessment was made of various impact and mitigation factors along each corridor. An impact consideration is defined as any natural or man-made element that is expected to be adversely effected (impacted) by development of the transmission line; while a mitigation consideration is any existing natural or man-made element that could be used to alleviate or moderate expected transmission line impacts.

MEANS OF EVALUATION

For the purpose of evaluating the relative impact of each transmission line alternative, the routes were divided into 1000' by 1000' square sections (map 2). The Vrooman Road Route was divided into 31 units, while the Central Route was broken into 22 units. Analysis of each impact and mitigation factor was performed entirely within these grid units. Since the factors were differenet in nature various methods were developed to measure the extent of impact or mitigation created by each alternative. For all these methods, however, a score or number was identified within each individual grid unit that represented the perceived impact felt within that land area. Composite scores were then attained by getting the total and average points of all the grid units of each alternative. Totals were obtained for each by adding all the individual unit scores; while the average scores were derived in a variety of ways, which are described in the separate explanations of each impact and mitigation factor, pages 7 through 20.

Two means of evaluating these scores were employed. First, the individual factor totals were compared in order to assess how well each alternative route fared for each individual factor. The route with the greater amount of higher scores was viewed as the most detrimental



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alternative. A chart was established (page 22) to illustrate these comparisons. In a second evaluation, average scores were used to combine all the factors into one comparative score for each alternative. Relative measures (expressed as percentages) were used so that the length of the route would not directly promote or hinder either alternative. For this evaluation the route that had the highest composite score, after combining all the individual scores, was identified as the most detrimental alternative. A second chart was devised (page 24) which illustrates this evaluation. It should be noted that through these evàluations both alternative routes were found to have considerable adverse impact on eastern Lake County.

Initially, these considerations were grouped into four broad categories. These groupings define the kind of impact or mitigation that would be expected for each factor. The original categories included:

A. Land Use Factors
B. Visual/Aesthetic Factors
C. Special Resource Factors
D. Government and Community Relations Factors

Through the process of this evaluation, the four original groupings were reduced down to three major categories. Similarly, the number of elements within each category was pared down to include only those considerations that proved to be significant within the Grand River area. Those items that were found to be either unquantifiable or common to both alternatives, were likewise discarded; leaving only the items which lent themselved to objective analysis to be used in the final evaluation. This final set of considerations include 11 expected impacts and 4 significant mitigation considerations.

EXPECTED IMPACTS

There are a variety of man-made and natural elements within the Grand River area that would be adversely effected by the development of high voltage transmission lines. These considerations are identified in the list below; organized into their respective categories. These items were evaluated for each alternative route to determine which route has the greatest expected impact.

A. Land Use Considerations

- Existing adjacent land use
- Potential adjacent land use
- Fragmented parcels

B. Visual/Aesthetic Considerations

- Impact on short-range views
- Impact on long-range views
- Clearing and defoliant after-effects

C. Special Resource Consideratings

- Historic sites and Landmarks (including cemetaries)
- River and creek crossings
- Woodland cover
- Construction difficulty
- Archeological sites (to be completed later)

An explanation of each impact and mitigation factor is necessary to identify how the county is expected to be impacted by the transmission line; and what the advantages would be for utilizing existing mitigation elements. The issues related here form the basis for determining what the county's position should be in regard to the two Perry-Hanna transmission line alternatives.

For each of the following impact and mitigation considerations there is a corresponding tally sheet which identifies the individual unit scores for both alternative routes. These tally sheets are provided in Appendix A-1 through A-15.

A. Land Use Considerations

Existing Adjacent Land Use (APPENDIX A-1)

A number of land use considerations become apparent with the development of high voltage transmission lines. Perhaps the most identifiable impact, however, would be the effect of a new transmission line on the existing pattern of development. It is largely held that the greatest impact created by the development of transmission lines would be felt in the more developed areas of the county. In these areas not only would more people be negatively effected by the presence of the line, but also since the area is more built-up there are generally fewer opportunities to develop an efficient and visually pleasing route. In addition, by avoiding built-up areas, relocation of effected buildings can be minimized.

In light of this objective of avoiding urban areas, the following weighting scale was devised. The more intensive uses are near the top of the scale, while the uses that would be least effected by a transmission line are toward the bottom. Generally, the developed uses that are more "land intensive" are nearer the top than those uses that require lesser amounts of land. Agriculture is not considered an intensive use of land since only a small portion of it is actually built upon.

LAND USE IMPACT SCALE

Weight	Land Use Classification	
1.	Agricultural, general farmland and open land.	Least Impact
2.	Industrial and extractive uses.	↑
3.	Commercial, isolated.	
4.	Residential, rural farm and non-farm.	
5.	Horticulture, orchards, woodlands.	
6.	Recreation, active, public, semi-public.	
7.	Residential, high-density urban.	
8.	Residential, medium-density urban.	
9.	Residential, suburban.	↓
10.	Commercial, aggregated.	Most Impact

This scale was then applied to the land within each grid unit to produce relative scores for each corridor. A total score was derived by adding all of the individual unit scores; while the average score was compiled by dividing the total by the number of grid units. The route with the higher score represents the greatest land use impact, and thus is the most detrimental route for this factor.

Potential Adjacent Land Use (APPENDIX A-2)

A less pronounced impact resulting from the development of a transmission line, is the adverse effect of tower location on the potential use of land. Generally, land adjacent to a transmission line does not have the same potential as it would if the line was located somewhere else. The net effect of the transmission line on potential adjacent land use was measured using the same scale that was used for the existing land use consideration. This time, however, the updated land use policy plan was used to make the evaluation. The same method of tabulating the total and average scores that was employed in the previous consideration was used for this impact factor. Again, the alternative with the higher score was expected to produce the greatest land use impact.

Land Fragmentation (APPENDIX A-3)

Another major impact consideration apparent along both alternative routes is the fragmentation of existing property ownership. When a transmission line is positioned diagonally across a property line, creating small triangular parcels, the ability to efficiently develop this land is generally impaired. As a result of improper tower placement, the development of land surrounding the transmission line may not occur; and if development does occur it may not be consistent with County land use and subdivision objectives.

Measurement of land fragmentation was achieved by assessing the amount of fragments produced by each alternative route. Each line was plotted on a map using the most recent C.E.I. proposals. Small, irregular parcels were produced whenever the proposed transmission line intersected a property line too close to the street frontage. The alternative with the greatest amount of land fragments (the total score) was seen as the most disruptive route for this factor. Since this factor produced a simple number score, no average was compiled, and thus it was omitted from the average score evaluation

B. Visual/Aesthetic Considerations

Impact on Short and Long-Range Views (APPENDIX A-4 and A-5)

Perhaps the most difficult impact to measure would be the visual or aesthetic effect of the proposed transmission lines. Every visual disruption would be impossible to evaluate since there is a seemingly endless number of points where transmission lines could be viewed. Generally, however, the view from the road is not only the most distracting, but also the most remembered visual impact. Therefore, for purposes of evaluation, the roads that intersect or run parallel to each route were used as the points of adverse impact.

In addition, there is an infinite number of viewing locations along each road; making it impossible to determine the total adverse impact even along one line. For purposes of simplification, however, two points were selected which would represent each routes' adverse impact on views. It was felt that the use of two viewing ranges would produce an average impact along both alternatives.

For short range views, measurement was made for the expected visual impact of points, on both sides of the intersection, at 500' from the area of the crossing. In the long-range evaluation, the effects were measured in the same manner, but at locations 2000' from the crossing. In some cases, the longer range view was negated by a bend in the road, or by existing tree coverage. Evaluation of this viewing distance reduced the score for certain sections of each alternative that could be screened by existing conditions. By factoring both sides of the viewing route, as well as the use of existing screening, a net visual impact was achieved for each alternative. In order to determine the visual impact at these points along the road, a calculation was made for the visual relationship between the kind of impact that the line has at highway crossings, and the relative volume of traffic along the impacted highway.

Separate weighting systems were used to represent the different levels of adverse visual effect; as well as the different amounts of traffic volume.

VISUAL IMPACT SCALES

Weights used for line crossing or paralleling roads:

1.0 - line generally perpendicular to the road.	(the higher the rating,
1.5 - line at slight diagonal across road.	2.5 for example, the
2.0 - line parallel to and unshielded from the road.	more adverse the expect-
2.5 - line at severe diagonal angle across road. (more than 45 to road)	ed impact)

Weights given to highway classification (related to degree of use):

1 - local street	(the higher the rating,
2 - collector	4 for example, the
3 - state or federal route	greater amount of
4 - interstate	expected use)

Calculations were made for each grid unit by multiplying the "crossing weight" times the "classification weight", and then determining the total score for each route. An average score was attained for each route by dividing the total score by the number of units for that particular route. In this way, the alternative with the higher total or average score would be identified as the most detrimental route for the Perry-Hanna connection.

<u>Clearing and Defoliant After-Effect (APPENDIX A-6)</u>

With the development of a transmission line, there is usually a certain amount of displacement of forested areas. For each corridor, C.E.I. must clear scrub and woodland areas, and then use a defoliant to maintain the clearing. The effects of this process are both visual and environmental.

In order to make this evaluation, these impacts were measured as a function of both the visual impact (already established) and the amount of clearing necessary for the right-of-way (the environmental impact). Within each grid unit the estimated length of woodland needing to be cut for purposes of line construction was multiplied by the long range view score for that particular unit. In this way, individual unit scores would represent the clearing/defoiliant after effect for that particular land area. A total score for each route alternative was then achieved by adding up all the individual unit totals. To obtain average scores, the route totals were then divided by the entire "potential"[2] adverse impact of each line. In order to combine these averages with scores from other factors, the averages were then multiplied by ten so that a similar numbering range was achieved. For example, most of the impact factors previously explained have relative scores ranging from 1.68 to 4.74 (basically on a scale from 0 to 10). Yet for this (and several other factors) average scores range from 0 to 1.0, and in order to make them compatible they were then multiplied by ten. A grand total could then be compiled by adding together all the relative scores of each factor (table 2, page 24). As before, the larger the net score, the greater the expected impact, and the more detrimental that particular route would be on eastern Lake County.

C. Special Resource Considerations

Historic Sites and Landmarks (APPENDIX A-7)

[2]The potential score refers to the total possible amount of points that could be achieved for that particular factor for each alternative route.

There are numerous sites throughout the eastern reached of Lake County which are considered local historic landmarks. While the vast majority of these sites are in no way effected by the location of the proposed transmission line alternative, a few sites are located along both routes, and could be disrupted by their development.

Improper tower placement is the primary impact concerning historic sites. Another related impact, however, is the need for service roads to provide heavy equipment access to the power lines. Impacts created by these access roads could be severe, especially if historic sites and landmarks are not well marked and protected. At this time, it cannot be determined whether the actual location of the towers or the service roads will disrupt adjacent historical sites. Therefore, for the purpose of this evaluation it was assumed that any contact between the transmission line corridor and a designated historic site would create an adverse impact. A total score was attained for each routing alternative by a simple number count of those sites that are located in, or partly in, the transmission line right-of-way. The alternative with the greater amount of effected sites would be viewed as the most detrimental route for the Perry-Hanna transmission line. Since this factor produced only a number count, no average score was compiled, and thus it was omitted from the average score evaluation.

Archeological Sites (APPENDIX A-8)

In a similar vein, the impact of the development of transmission lines could be particularly devastating to archeological sites.

While it may be possible to construct towers and access roads near known sites without causing adverse effects; the assumption could be strongly made that any disruption of the surrounding ground area would be detrimental to the recovery and analysis of these recent historical settlements. For the purpose of evaluation, an estimate of the "impacted area" would have to be established. These areas, compiled by the Ohio Historical Society would then be evaluated in a similar manner as historic sites; resulting in a tabulation of the number of sites effected. As before, the alternative with the higher amount of effected sites would be viewed as the least detrimental route. This evaluation should be completed after O.H.S. concludes their study.

River and Creek Crossings (APPENDIX A-9)

One of the more obvious effects of the construction of a transmission line corridor is the physical presence of towers created along major river and creek crossings. While both alternatives have the same beginning and ending points, the route they follow may be significantly different in regard to the extent of river and creek impacts. To evaluate this presence, a simple number tabulation was made; adding up all the major creek and river crossings of each alternative line. In this way, a total was compiled for each routing alternative which identified the net river and creek crossing impact of each route. However, since these scores represent the totals of numerical counts, no average score could be achieved, and thus this factor was left out of the average score evaluation.

Woodland Cover Impacted (APPENDIX A-10)

Since woodland cover represents a significant economic, environmental, and visual resource to the county, it was considered an important impact consideration. In this evaluation, an estimate was made of the amount of forested land that would be cleared for each alternative line. This estimation was completed for each grid unit, resulting in a total score for both lines. An average score was also compiled, by taking the total score, dividing it by the total "potential" score and then multiplying that figure by ten to produce a relative score. As before, the larger the score, the greater the expected impact.

Construction Difficulty Areas (APPENDIX A-11)

There are a variety of existing soil conditions that are not conducive to the development of transmission line towers including; erosion hazards, seasonal high water, severe slopes, flood-prone areas and other soil hazards. These conditions not only create construction difficulties for the development of transmission line but may also promote adverse environmental effects to the land within those areas. To measure this impact a scale was devised which identifies the varying degree of construction difficulty, based on these hazards.

SOIL HAZARD SCALE

0 - Slight limitations to building
1 - Moderate limitations to building (e.g., slope problems, unstable when wet).
2 - Severe limitations to building (e.g., high water table, ponding hazard, slope hazard, unstable material, high bedrock, steep slopes and subject to flooding).

In order to evaluate these construction difficulty areas, a measure was made within each grid unit (of both alternatives) for the length of the transmission line that experienced each hazard level. The scale was then used as multiplier to compound those areas with severe limitations, and remove those ares with only slight construction problems. By accumulating all the unit scores for each alternative, two total scores could then be established and compared. In the second evaluation, the totals were then divided by the total "potential" scores of each line, and then multiplied by ten to make them comparative to other factors. Again, the greater the score, the greater the potential impact. The least detrimental route was the corridor with the smallest construction hazard score.

POTENTIAL MITIGATION FACTORS

With the development of transmission lines, there is a variety of potential mitigation considerations that become apparent along each corridor. These mitigation factors are useful in moderating or alleviating some of the expected impacts already outlined in the last section.

The evaluation of these factors was undertaken in much the same manner as the impact evaluation except that in scoring, the highest comparative score was produced by the least detrimental route. In order to combine the impact and mitigation evaluations, the reciprocal score for each mitigation factor was used. A summary of results could then be made for both routes, with the higher composite score determining the most detrimental alternative transmission line route.

A. Land Use Factors

Use of Existing Land Patterns and Property Lines

While the construction of a transmission line may be a disruptive force to the existing land use pattern in eastern Lake County, their presence can also be a positive factor in reducing potential land use conflicts. If the location of the line separates opposing land uses, industrial and residential uses for example, then the line is beneficial as a land use segregator. In this way, the transmission line corridor acts as a land use buffer between the two conflicting uses.

In a similar manner, the use of existing property lines for locating a transmission corridor can be beneficial in reducing potential development problems. By developing a route with the most consistent alignment to existing property lines, C.E.I. can diminish some of the future problems of small inefficient lots, while it may also promote a possible land use separation along an existing ownership boundary.

A composite score was acheived for these related factors, by adding the length of each route that follows or parallels current property lines, and the length of each route that separates potentially conflicting land uses. Again, these lengths were plotted within the individual grid units, producing a total score. For this factor, the lower total score produced the least effective mitigation. An average score was then attained by dividing the composite scores by the total "potential" length of mitigation.

Use of Existing Utility Routes

Another mitigation factor involves the use of multiple transmission line right-of-ways. By positioning transmission lines two abreast, wherever possible (instead of separate corridors for each line), there can be a net reduction in the expected physical impacts. For example, the overall visual impact is expected to be greater by separating the Perry-Macedonia and Perry-Hanna lines simply because more properties would be adjacent to the separate lines. On the whole, this separation creates the potential for more visual and land development impacts. Conversely, the use of multiple transmission line right-of-ways reduces the net impact, and could provide benefits to the community as well. These benefits would include:

- Maximization of open space for recreation and community use,
- Potential use of land beneath the multiple corridor for bicycle and hiking paths,
- Overall continuation of existing land uses and protection of the undisturbed character of the area,
- Preservation of aesthetic purity of natural area.

For the community, the major disadvantages of a multiple transmission line corridor would include:

- Further impact on critically sensitive areas,
- Potential "uglification" of non-shielded portions of the ROW (especially where more than two transmission lines are combined).

To evaluate this factor, a measurement was made of the length of each route where it would be adjacent to an existing transmission line. The total scores were compiled for each route and then compared (see Total Score Evaluation, Table 1 page 22). Since one of the routes produced a score of zero, an average could not be determined in the same manner as before. In this case, an average score was compiled by subtracting the total score of each route from the total "potential" score of that particular route. The resulting number is the reciprocal value for that particular route. This number was then divided by the "potential" score for that route, and then multiplied by 10, as before, to achieve a comparable score (on a scale from 1 to 10). Since the reciprocal value was used to determine the average score, no reciprocal percentage was needed to apply the factor to the comparative analysis.

Potential Multiple Use Corridor

Generally, most kinds of land use are adversely effected by the development of adjacent transmission lines. There are, however, a few uses that may benefit from being close to these lines. Agricultural land, for example, is largely unaffected by the development of a transmission line since much of this land can be kept active even directly under the line. Industrial areas, particularly heavy manufacturing, have a similar kind of negative visual appeal as transmission lines, and thus would be largely unaffected by new transmission line construction. Additionally, bicycle paths and foot trails can sometimes be made possible through the shared use of these transmission line corridors. Overall, these three land uses can be compatible to transmission lines, and thus they have potential within multiple use corridors.

For purposes of evaluation, a measurement was made of the length of each line that was adjacent to one of these three land uses. This measure was totalled and an average score was attained. In this comparison, the lower the composite score the less effective that route would be as a multiple use corridor.

B. Visual/Resource Factors

Use of Existing Woodland

A final mitigation factor to be evaluated in this analysis concerns the use of existing forested areas along each route. Since alot of land in eastern Lake County is wooded, there is a reasonable potential for utilizing some of this woodland to shield the proposed transmission line corridors. For this evaluation, the length of woodland along each alternative right-of-way was measured, using the same grid units as before. From these unit measures, both a total and an average score was compiled. As before, these totals were then used in the separate Total and Average evaluations. The alternative route with the higher raw score was viewed as having the best shielding potential, and thus would be identified as the most effective route.

ROUTE EVALUATION

A. Total Score Evaluation

In the first evaluation, the two alternative routes were assessed based on individual comparisons of each set of factor scores. For the impact factors, the alternative with the highest score for any one factor was viewed as the route with the most detrimental effect on the Grand River area. In this assessment, a total was made of the number of times each route was found to be most detrimental. Based on this set of impact factors it was determined that the Vrooman Road Route had a more significant adverse effect than did the Central Route (largely because it is a longer route).

Conversely, for the mitigation factors, a total was made of the number of times each route was viewed as having the least effective use of the individual mitigation factors (by adding up the number of lower scores). From this total, it was found that the Central Route was the least effective corridor for taking advantage of various mitigation factors.

By combining these two totals into <u>one</u> grand total a composite score was achieved which represents how compatible each route would be if it was developed in the Grand River area. The lower the score the more compatible that route would be. Neither route, however, proved to have a distinct advantage in this evaluation (the Vrooman Road Route 7 points,versus the Central Route 6 points). Indeed, the size and similarity of these scores indicates the significant incompatibility of <u>both</u> of these routes on the Grand River area.

NA - score not yet available
a - most detrimental route for that particular impact factor.
b - least detrimental route for that particular mitigation factor.

Table 1. TOTAL SCORES EVALUATION

IMPACT AND MITIGATION FACTORS — TOTAL SCORES FOR THE ALTERNATIVE PERRY-HANNA TRANSMISSION LINE CORRIDORS

IMPACT FACTORS	Vrooman Road Route Total Scores	Vrooman Road Route Most Detri-mental	Central Route Total Scores	Central Route Most Detri-mental
1. Existing Adjacent Land Use	116	a	71	
2. Potential Adjacent Land Use	52		73	a
3. Fragmented Parcels	7	a	4	
4. Impact on Short-Range Views	77.5	a	28	
5. Impact on Long-Range Views	147	a	55	
6. Clearing/Defoliant After-Effect	40,950	a	26,900	
7. Historic Sites and Landmarks	2		2	
8. Archaeological Sites (to be determined)	N A		N A	
9. River and Creek Crossings	1		2	a
10. Woodland Cover Impacted	13,700	a	12,300	
11. Construction Difficulty Areas	37,300	a	24,400	
NUMBER OF TIMES THE ROUTE WAS FOUND TO BE MOST DETRIMENTAL		7		2

MITIGATION FACTORS	Vrooman Road Route Total Scores		Central Route Total Scores	Least Effective Use of Mitiga-tion Factor
12. Use of Land Use Patterns and Property Lines	14,400		5,100	b
13. Use of Existing Utility Route	11,000		0	b
14. Potential Multiple Use Corridor	12,000		8,000	b
15. Use of Existing Woodland	32,800		23,000	b
NUMBER OF TIMES THE ROUTE WAS VIEWED AS HAVING THE LEAST EFFECTIVE USE OF MITIGATION FACTOR		0		4
GRAND TOTAL		7		6

B. Average Score Evaluation

In the second evaluation, percentages were assigned to each impact and mitigation factor to illustrate the relative adverse impact found between the Vrooman Road route and the Central Corridor route. In this way, the evaluation would be made on the basis of the "average" impact or mitigation that would be experienced in any one location along the line, instead of the "total" impact or mitigation. Percentages were used in this analysis to achieve a net comparison of all factors. These comparative percentages were obtained by adding both route score averages to achieve a composite score, then dividing the individual average scores by this composite score. The resulting percentage was added to the other comparative percentages to complete the comparison. As before, the higher score represented the greatest potential negative effect on this area of Lake County. The net results of this weighting of factors is illustrated in table 2.

Overall, this table indicates that the Vrooman Road alternative would be very slightly favored in the average score evaluation. However, the relative similarity of many of these impact and mitigation scores precludes a final decision based soley on this table.

In order to gauge the usefulness of these evaluations, the impact and mitigation factors were analyzed based upon two sets of established goals. First, C.E.I.'s goals were assessed to determine how these corridors meet their stated objectives. For this, an assumption was made

Table 2. AVERAGE SCORES EVALUATION

IMPACT AND MITIGATION FACTORS NA - scores not yet available	ALTERNATIVE PERRY-HANNA TRANSMISSION LINE CORRIDORS Vrooman Road Route		Central Route	
	Average Scores	Comparative Percentages	Average Scores	Comparative Percentages
1. Existing Adjacent Land Use	3.74	54%	3.22	46%
2. Potential Adjacent Land Use	1.68	34%	3.30	66%
3. Fragmented Parcels	-	-	-	-
4. Impact on Short-Range Views	2.50	66%	1.27	34%
5. Impact on Long-Range Views	4.74	65%	2.50	35%
6. Clearing/Defoliant After Effect	1.32	52%	1.22	48%
7. Historic Sites and Landmarks	-	-	-	-
8. Archaeological Sites (to be determined)	NA	NA	NA	NA
9. River and Creek Crossings	-	-	-	-
10. Woodland Cover Impacted	4.42	44%	5.59	56%
11. Construction Difficulty Areas	6.00	52%	5.54	48%
12. Use of Land Use Patterns and Property Lines (reciprocal %)	2.32	34%[a]	1.16	66%[a]
13. Use of Existing Utility Route (reciprocal average scores)	6.45[b]	39%	10[b]	61%
14. Potential Multiple Use Corridor (reciprocal %)	3.87	48%[a]	3.63	52%
15. Use of Existing Woodland (reciprocal %)	5.29	51%[a]	5.41	49%
TOTAL PERCENTAGE POINTS		539		561

Comparative percentages were obtained by adding both route score averages to achieve a composite score; then dividing the individual average scores by this composite score.

[a]A reciprocal percentage was achieved by subtracting the original percentage from 100%.

[b]A reciprocal average score was achieved by subtracting the original average score from 10.

that each goal would be given equal weight. A second assessment was then made of the County's major preservation and development goals as they relate to the impact and mitigation factors. From this analysis, a list of problems was identified for each route which allude to the negative implications of developing either route through the Grand River area.

Based upon the results indicated in tables 1 and 2, and the evaluations of the two sets of goals, a final recommendation was made regarding the two Perry-Hanna transmission lines alternatives.

C. Application of C.E.I. Objectives

Table 3 brings together C.E.I.'s stated objectives for routing and alignment of the transmission line, with the impact and mitigation factors that were developed in this evaluation. Each objective was evaluated based on a set of related critereia. The alternative route which best met the applied criteria was seen as the least detrimental transmission line corridor.

Taken as unprioritized elements it was determined that there is no significant difference between the Vrooman Road Route and the Central Route. Consequently, by applying the impact and mitigation criteria to a variety of C.E.I. objectives, it could be said that neither route predominantly meets the needs of the Lake County community. However, if certain objectives were emphasized over the others, a different conclusion may be achieved.

Table 3. Application of C.E.I. Objectives

Goal	Applied Criteria	Which best meets objective Vrooman Road	Central
1) Transmission line should be routed to least interfere with established community facilites.	• Existing adjacent land use		X
	• Historic sites and land works	-NO DIFFERENCE-	
	• Archaeological sites	-DATA NOT YET AVAILABLE-	
2) Transmission line should be located to least interfere with opportunity for community development.	• Fragmented parcels		X
	• Potential adjacent land uses	X	
	• Use of existing land patterns and property lines.	X	
3) Disturbance to the natural resource system should be minimized.	• River and creek crossings	X	
	• Woodland cover impacted	X	
	• Construction difficulty areas	X	
4) Transmission line and rights-of-way should harmonize with surounding land form, vegetation and landscape character.	• Impact on short-range views		X
	• Impact on long-range views		X
	• Clearing/defoliant after-effect		X
	• Use of existing woodland for shielding		X
5) The transmission line rights-of-way should contain self-maintaining biotic systems which contribute to terrestrial system diversity and health. Such rights-of-way become beneficial to wildlife, provide open space, and may be useful for recreation.	• Potential multiple use opportunities	X	
6) Each transmission line must be related to the total system for efficiency and reliability.	• Use of existing utility route	X	
TOTAL		7	6

D. Application of Lake County Goals

Basically, the County has two general goals regarding the development of a transmission line corridor. First, any corridor that is proposed should have the least physical and economic impact on the area; and secondly, the County's options should be protected regarding future circulation and servicing improvements. In assessing the Perry-Hanna transmission line, in regard to these goal statements, a series of major considerations were identified for each alternative, which indicate significant difficulties in developing either transmission line route.

Major Vrooman Road Route Considerations

The Vrooman Road Route would:

- greatly reduce the county's options of promoting a new Vrooman Road realignment (This is especially true if two or more lines are located through the Vrooman Road corridor);
- (probably) significantly effect several notable archeological sites that are "expected" all along the corridor;
- have high visibility for much of the surrounding community;
- be disruptive to an established residential area that has developed along Vrooman Road;
- be located close to the Vrooman Road/I-90 interchange, possible causing future land development difficulties.

Major Central Route Considerations

The Central Route would:

- create a new man-made intrusion of the Grand River valley;
- require two major river and creek crossings; spanning the Grand River and Paine Creek valleys;
- (probably) negatively effect the historic cemetary that is situated at the crest of the Grand River valley near the intersection of Carter and Paine Roads. (It is in this approximate area that a key transmission line tower is expected to be located);
- greatly disrupt heavily wooded areas in and around the Grand River and Paine Creek valleys;
- create a massive negative visual impact in one of the region's unique wilderness areas;
- be contrary to the County's revised land use plan, which stresses the protection of environmentally sensitive areas.

E. Conclusion

As noted in this evaluation, neither alternative route has a significantly smaller perceived impact on eastern Lake County, and therefore neither should be promoted. Consequently, continued effort should be made to identify additional alternative routes for the Perry-Hanna transmission line; one that would be more in keeping with the best interests of the county.

For the current evaluation only those impacts and mitigation elements that were apparent within the Grand River area were applied; with the assumption that each factor was of equal importance. In order to identify additional alternatives, a similar evaluation could be employed, with the understanding that a more comprehensive set of impacts and mitigation elements would probably have to be assessed (since the evaluation would not be limited to the Grand River area). In that evaluation a decision should be made regarding the relative importance of each impact and mitigation factor. Priority should be given to those factors that directly reflect major County-helds goals and objectives. Since no transmission line alternative will meet all the objectives of the County, care should be taken that at the very least, the major goals espoused by the County are not compromised.

III. TRANSMISSION LINE POLICY GUIDELINES

A. Goal Statements for Constructed Transmission Lines

Regardless of which alternative route is selected, there will be a variety of land use and environmental impacts within the Perry and Leroy areas of the county. In order to minimize these adverse effects the County should be prepared to encourage proper location and development of any proposed transmission line. In this regard, a set of general goals were established, which promote the county's best interests. The county should:

1. Ensure that adjacent and surrounding land uses can be properly maintained or developed as planned without being adversely impacted by the transmission line right-of-way or towers and lines.

2. Develop and implement applicable aesthetic guidelines to enable a minimization of adverse visual impacts of the rights-of way and lines throughtout the county.

3. Make use of an implementable variety of objectives for land uses in and adjacent to transmission line corridors to both minimize land use impacts and possible visual impacts, while, taking advantage of potentially positive impacts of the routes on surrounding activities.

4. Ensure that identifiable special features, resources or designated lands will not be unduly impacted as an after-effect of transmission line construction.

5. Maximize cooperative efforts between the local units of government, the power companies constructing the line, and various community organizations and interests so that the above goals can be reached in a concerted effort by the participating groups.

B. Guideline Objectives

The following guidelines were developed as potentially workable objectives which, when implemented, will enable the county to reach their transmission line goals. Some of these guidelines should be utilized long before the power company makes a proposal for developing a transmission line. Others, can be implemented throughout the construction process, as cooperative efforts to minimize harmful effects

1. Residential areas

   a) Locate the acutal right-of-way at a distance from dwelling units as determined by expected levels of tower interference and strength. C.E.I. should provide detailed data for determining this.

   b) Make use of subdivision area boundaries, lot lines and year yards for actual placing of the line.

c) Make provisions for private use of right-of-way where alignment "fragments" residential property; where several adjacent properties are framented, thought can be given to common private usage to the right-of-way where desirable.

2. Other land-use areas

a) Line alignment should follow or run parallel to property lines.

b) Alignment should enable the siting of towers(in relation to smaller, vertical elements, such as silos, smokestacks and water-towers) to be positioned as far away as possible.

c) Transmission lines should cut across roads in an alignment as close to 90° as possible to the road and avoid intersections entirely.

d) The County should set a limit on the number of lines allowable for any given right-of-way. Beyond 1991, C.E.I.'s plans are unclear as to the number of lines needed which would run through the community.

3. Aesthetic impact mitigation

a) Topographic

1) Route lines on opposite side of hills away from roads.

2) Avoid cutting straight down a valley center.

3) Avoid lining along hilltops to avoid silhouette effect.

4) Completely span narrow V-shaped valleys.

b) Woodland

1) Alignment should be adjacent to woodland edges.

2) Alignment should "angleback" through wooded area.

3) Efforts should be made to preserve existing woodland in right-of-way areas.

c) Road relationship

1) Keep lines as far away from roads as possible.

2) Line should not be run parallel to a road unles it is far enough back where it can be shielded by vegetation.

d) Clearing

1) Make use of indigenous vegetation

2) Where a new line shares right-of-way with older lines, apply screening guidelines to the entire right-of-way

3) Screen structures near intensive land uses; use roadside vegetation where possible

e) Tower and line materials

1) Use long-span or multi-circuit towers at highway crossings to reduce number of visible towers at multi-lined corridors at their intersection with highways.

2) Make use of newer, less-offensive looking tower styles.

3) Make use of materials in towers to blend in with surrounding landscape.

4) Color towers to blend in with landscape.

5) Use a nonsheening conductor material.

4. Multiple right-of-way usage

a) As much as possible make use of existing transmission line routes to locate new lines. Care should be taken, however, to avoid corridors with more than three lines.

b) Continue farming and related activites under transmission lines where possible. Such typical uses might include; orchards, vineyards, pastures, tree and shrub nurseries and sod farms, small fruit plantations such as blueberry Christmas tree plantings.

c) Make use of innovative recreational uses in the right-of-way especially in multi-use routes where possible. These might include: hiking or biking trails, cross-country skiing or equestrian trails, golf courses, off road vehicle paths and gardens.

d) Other potential uses which might have application in transmission line corridors in Lake County include:

1) Archaeological & Geologic explorations.

2) Geophysical purposes.

3) Wild life sanctuaries.

4) Parking lots.

5) Noncombustible item storage.

e) For these, or any other uses which could conceivably be listed, there are several considerations which must be taken into accounts in right-of-way facility planning:

1) Need or demand for the facility.

2) Ownership and easement of the property.

3) Restrictive convenants

4) Adjacent land uses

5) Zoning

6) Potential development funding for a special project.

7) Dedicated uses.

8) Local policies for growth, development and land use.

9) If applicable, source of users' fees.

10) Height of planned buildings or other objects.

11) Adequate grounding for all fences and metal structures.

12) Safety precautions against vandalism and personal crimes.

5. Special features, resources

a) Minimize slope run-off by making use of available erosion control techniques where appropiate.

b) Avoid placing access roads in areas of 10% or more slopes.

c) Make use of helicopter to construct towers where soil or ecology is fragile.

d) Avoid placing towers at river or creek banks.

e) Site structures to minimize archaeological area impact if area cannot be avoided.

f) Site tower well back from the edge of valley-crossing in order to enable proper retainment of wooded growth between tower and valley.

g) Cut vegetation (rather than grubing), reseed and/or replant areas.

6. Government, utility and community relations

a) Local governments should take steps to ensure that where transmission line crosses specifically-designated areas, whether publicly or privately owned, the owner is contacted by the locality in order to coordinate local planning with C.E.I. plans.

b) Participating parties should work toward establishing a vehicle for facilitating cooperation among themselves to institute or explore the feasibility of undertaking the above-mentioned land use, visual and special resource objectives.

c) The County should endeavor to provide incentives for participants to actively work with the Lake County Planning Commission to classify all rights-of way for multiple uses in consideration of both the needs and characteristics of the right-of-way and surrounding areas.

C. Potential Governmental Controls

Historically, almost all controls regulating the location and development of transmission lines have been limited to either the federal government, through the Atomic Energy Commission or to the state level, through Ohio Power Siting Commission. In recent years, however, courts have become more involved in deciding transmission line routing and alignment issues. For example, over the past fifteen years opposition against power companies has grown significantly regarding transmission line construction policies. The primary conflict has been between the demand for electrical power versus the concern for environmental issues. As a result of this controversy, there has been an increase in the procedural opportunities for local governments. This increased opportunity has been made available to localities by the federal and state governments; allowing counties, cities and townships to participate indirectly in the regulation of both route selection and environmental impact of transmission lines.

As a part of this local participation in the transmission line routing process there are a variety of tools and techniques which local governments should utilize, as policy, in order to directly mitigate any land use or environmental impact. These procedures would include the following items.

1. Since the power company must seek permits from all local units of government, local officials should coordinate all relevant aspects of the project with planning or zoning commissions, fire and police departments, or conservation and development commisions to ensure a minimization of conflict between existing plans and proposed development by the power company.

2. Communities should include, where appropriate, specific routing alignment guideline and land-use plan implementation provisions to zoning ordinances, zoning resolutions and subdivision control regulations in order to ensure impact mitigation of existing and all future transmission line routings.

3. Localities should develop written land use agreements with the utility companies defining development, maintenance, supervision, and liability responsiblities for the lines. Such agreements can also include provisions for encouraging or stipulating the multiple use of corridors, planting and maintenance of vegetation for screening, and safety precautions to prevent trespassing on private property, littering, noise and vandalism.

4. The County should continue and amplify its participation in the Ohio Power Siting Commission's transmission line approval process. That is, continued input to O.P.S.C. should not only be undertaken for the purpose of voicing the County's preference in line route selection but also to ensure that C.E.I. and participating companies make use of appropriate guidelines and methods for mitigating potentially adverse impacts of the routing and will indeed put into effect those consistent with local objectives.

5. Lands should be purchased by the County (or the County can provide incentives to local private owners) for the purpose of implementing right-of-way planting and screening measures.

6. Local governments should keep detailed maps available for public use depicting exact right-of-way boundaries, transmission line alignments and tower locations. This will avoid property disputes and prevent accidents.

APPENDIX A

INDIVIDUAL CORRIDOR SCORES FOR EACH IMPACT AND MITIGATION FACTOR

A-1 EXISTING ADJACENT LAND USE

Vrooman Road Route

1. Open - 1
2. Open - 1
3. Open - 1
4. Forest - 5
5. Forest - 5
6. Forest - 5
7. Open - 1
8. Open - 1
9. Open - 1
10. Rural Res. - 4
11. Industry - 2
12. Forest - 5
13. Forest - 5
14. Rural Res. - 4
15. Forest - 5
16. Forest - 5
17. Forest - 5
18. Open - 1
19. Forest - 5
20. Forest - 5
21. Forest - 5
22. Rural Res. - 4
23. Open - 1
24. Rural Res. - 4
25. Forest - 5
26. Forest - 5
27. Forest - 5
28. Suburban Res. - 9
29. Forest - 5
30. Forest - 5
31. Open - 1

TOTAL SCORE 116
AVERAGE SCORE 3.74

Central Route

1. Open - 1
2. Rural Res. - 4
3. Open - 1
4. Open - 1
5. Open - 1
6. Forest - 5
7. Open - 1
8. Forest - 5
9. Forest - 5
10. Open - 1
11. Rural Res. - 4
12. Open - 1
13. Forest - 5
14. Rural Res. - 4
15. Open - 1
16. Forest - 5
17. Forest - 5
18. Forest - 5
19. Forest - 5
20. Forest - 5
21. Forest - 5
22. Open - 1

TOTAL SCORE 71
AVERAGE SCORE 3.22

A-2 POTENTIAL ADJACENT LAND USE

Vrooman Road Route

1. Industrial - 2
2. Industrial - 2
3. Industrial - 2
4. Industrial - 2
5. Industrial - 2
6. Industrial - 2
7. Industrial - 2
8. Industrial - 2
9. Industrial - 2
10. Industrial - 2
11. Industrial - 2
12. Recreation - 6
13. Recreation - 6
14. Open - 1
15. Open - 1
16. Open - 1
17. Open - 1
18. Open - 1
19. Open - 1
20. Open - 1
21. Open - 1
22. Open - 1
23. Open - 1
24. Open - 1
25. Open - 1
26. Open - 1
27. Open - 1
28. Open - 1
29. Open - 1
30. Open - 1
31. Open - 1

TOTAL SCORE 52
AVERAGE SCORE 1.68

Central Route

1. Industrial - 2
2. Open - 1
3. Open - 1
4. Open - 1
5. Open - 1
6. Recreation - 6
7. Recreation - 6
8. Recreation - 6
9. Recreation - 6
10. Recreation - 6
11. Recreation - 6
12. Recreation - 6
13. Recreation - 6
14. Recreation - 6
15. Recreation - 6
16. Open - 1
17. Open - 1
18. Open - 1
19. Open - 1
20. Open - 1
21. Open - 1
22. Open - 1

TOTAL SCORE 73
AVERAGE SCORE 3.3

A-3. FRAGMENTED PARCELS

Vrooman Road Route

1.	---
2.	---
3.	---
4.	---
5.	---
6.	---
7.	---
8.	---
9.	2
10.	2
11.	---
12.	---
13.	---
14.	---
15.	---
16.	---
17.	---
18.	---
19.	---
20.	---
21.	---
22.	---
23.	---
24.	---
25.	---
26.	---
27.	---
28.	2
29.	1
30.	---
31.	---

TOTAL SCORE 7
AVERAGE SCORE -

Central Route

1.	---
2.	2
3.	---
4.	1
5.	1
6.	---
7.	---
8.	---
9.	---
10.	---
11.	---
12.	---
13.	---
14.	---
15.	---
16.	---
17.	---
18.	---
19.	---
20.	---
21.	---
22.	---

TOTAL SCORE 4
AVERAGE SCORE -

A-4. IMPACT ON SHORT RANGE VIEW (500' AWAY)

Vrooman Road Route

1.	0
2.	0
3.	0
4.	0
5.	0
6.	0
7.	0
8.	2 x 2.5 = 5
9.	2 x 2.5 = 5
10.	0
11.	3 x 1.5 = 4.5
12.	3 x 1.5; 2 x 2.5 = 9.5
13.	2 x 2.5; 1 x 2 = 7
14.	2 x 2 = 4
15.	0
16.	2 x 2 = 4
17.	2 x 2 = 4
18.	2 x 2; 4 x 2.5 = 14
19.	4 x 1.5 = 6
20.	0
21.	1 x 1 = 1
22.	1 x 2.5 = 2.5
23.	1 x 2.5 = 2.5
24.	1 x 2.5 = 2.5
25.	0
26.	0
27.	0
28.	2 x 1.5 = 3
29.	2 x 1.5 = 3
30.	0
31.	0

TOTAL SCORE 77.5
AVERAGE SCORE 2.50

Central Route

1.	0
2.	3 x 1 = 3
3.	3 x 1 = 3
4.	0
5.	0
6.	2 x 1 = 2
7.	2 x 1 = 2
8.	0
9.	0
10.	1 x 1 = 1
11.	1 x 1; 4 x 1 = 5
12.	4 x 1 = 4
13.	2 x 1 = 2
14.	2 x 1 = 2
15.	2 x 2 = 4
16.	0
17.	0
18.	0
19.	0
20.	0
21.	0
22.	0

TOTAL SCORE 28
AVERAGE SCORE 1.27

The first number is the "crossing weight" which is multiplied by the second number, which is the "classification weight," to produce the total impact rating from one direction along the road. Where there are two viewing directions (usually east and west) two sets of numbers were multiplied. Where there is one viewing direction (the other one being shielded) only one set of numbers was multiplied. A unit score of "0" means that there is no route through that specific unit.

A-5. IMPACT ON LONG RANGE VIEWS (2000' AWAY)

Vrooman Road Route

1.	0
2.	3 x 2 = 6
3.	3 x 2 = 6
4.	3 x 2 = 6
5.	0
6.	3 x 2 = 6
7.	3 x 2 = 6
8.	3 x 2; 2 x 2.5 = 11
9.	3 x 2; 2 x 2.5 = 11
10.	2 x 2 = 4
11.	3 x 1.5; 1 x 1 = 5.5
12.	2 x 1; 3 x 1.5 = 6.5
13.	2 x 1 = 2
14.	2 x 2 = 4
15.	2 x 2 = 4
16.	0
17.	2 x 2; 4 x 1.5 = 10
18.	4 x 1.5; 2 x 2 = 10
19.	4 x 1.5; 2 x 2 = 10
20.	4 x 1 = 4
21.	1 x 1.5 = 3
22.	1 x 1.5; 1 x 1.5 = 6
23.	1 x 1.5; 1 x 1.5 = 6
24.	1 x 1.5; 1 x 1.5 = 6
25.	1 x 1 = 1
26.	0
27.	0
28.	0
29.	2 x 1.5 = 3
30.	2 x 1.5; 2 x 1.5 = 6
31.	2 x 2 = 4

TOTAL SCORE 147
AVERAGE SCORE 4.74

Central Route

1.	3 x 1 = 3
2.	3 x 1 = 3
3.	3 x 1 = 3
4.	3 x 1 = 3
5.	0
6.	2 x 1 = 2
7.	2 x 1 = 2
8.	0
9.	0
10.	2 x 1 = 2
11.	2 x 1; 4 x 1 = 6
12.	0
13.	2 x 1 = 2
14.	1 x 1; 2 x 2 = 5
15.	2 x 2 = 4
16.	2 x 2 = 4
17.	2 x 2 = 4
18.	2 x 2 = 4
19.	0
20.	2 x 2 = 4
21.	0
22.	2 x 2 = 4

TOTAL SCORE 55
AVERAGE SCORE 2.5

The first number is the "crossing weight" which is multiplied by the second number, which is the "classification weight," to produce the total impact rating from one direction along the road. Where there are two viewing directions (usually east and west) two sets of numbers were multiplied. Where there is one viewing direction (the other one being shielded) only one set of numbers was multiplied. A unit score of "0" means that there is no route through that specific unit.

A-6. CLEARING/DEFOILANT AFTER EFFECT

Vrooman Road Route

1. 800 x 0 = 0
2. 0 x 6 = 0
3. 0 x 6 = 0
4. 500 x 6 = 3,000
5. 1,000 x 0 = 0
6. 600 x 6 = 3,600
7. 0 x 6 = 0
8. 0 x 11 = 0
9. 0 x 11 = 0
10. 200 x 4 = 800
11. 0 x 5.5 = 0
12. 700 x 6.5 = 4,550
13. 900 x 2 = 1,800
14. 500 x 4 = 2,000
15. 0 x 4 = 0
16. 700 x 0 = 0
17. 400 x 10 = 4,000
18. 0 x 10 = 0
19. 0 x 10 = 0
20. 800 x 4 = 3,200
21. 1,000 x 3 = 3,000
22. 0 x 6 = 0
23. 0 x 6 = 0
24. 0 x 6 = 0
25. 1,000 x 1 = 1,000
26. 1,000 x 0 = 0
27. 1,000 x 0 = 0
28. 800 x 0 = 0
29. 800 x 5 = 4,000
30. 1,000 x 10 = 10,000
31. 0 x 4 = 0

TOTAL SCORE 40,950
(out of a potential of 310,000 points)
AVERAGE SCORE 1.32

Central Route

1. 600 x 3 = 1,800
2. 0 x 3 = 0
3. 0 x 3 = 0
4. 400 x 3 = 1,200
5. 200 x 0 = 0
6. 700 x 2 = 1,400
7. 400 x 2 = 800
8. 1,000 x 0 = 0
9. 1,000 x 0 = 0
10. 400 x 2 = 800
11. 0 x 6 = 0
12. 0 x 0 = 0
13. 1,000 x 2 = 2,000
14. 500 x 5 = 2,500
15. 0 x 4 = 0
16. 1,000 x 4 = 4,000
17. 1,000 x 4 = 4,000
18. 1,000 x 4 = 4,000
19. 1,000 x 0 = 0
20. 800 x 4 = 3,200
21. 1,000 x 0 = 0
22. 300 x 4 = 1,200

TOTAL SCORE 26,900
(out of a potential of 220,000 points)
AVERAGE SCORE 1.22

The first number is the estimated length of woodland needing to be cut for purposes of line construction.

The second number is the total long range view score for that particular unit (see APPENDIX A-5).

These numbers were then multiplied to produce a score representing the clearing/defoiliant after effect within each unit.

A-7. HISTORIC SITES AND LANDMARKS

Vrooman Road Route

1. ---
2. ---
3. ---
4. ---
5. ---
6. ---
7. ---
8. ---
9. ---
10. ---
11. 1 Indian Burial Ground
12. 1 Park Entrance
13. ---
14. ---
15. ---
16. ---
17. ---
18. ---
19. ---
20. ---
21. ---
22. ---
23. ---
24. ---
25. ---
26. ---
27. ---
28. ---
29. ---
30. ---
31. ---

TOTAL SCORE 2
AVERAGE SCORE -

Central Route

1. ---
2. ---
3. ---
4. ---
5. ---
6. ---
7. ---
8. ---
9. ---
10. ---
11. ---
12. 1 Mill
13. ---
14. 1 Cemetery
15. ---
16. ---
17. ---
18. ---
19. ---
20. ---
21. ---
22. ---

TOTAL SCORE 2
AVERAGE SCORE -

A-8. ARCHEOLOGICAL SITES

Vrooman Road Route | Central Route

(to be completed based on information supplied by the Ohio Historical Society)

A-9. RIVER AND CREEK CROSSINGS

Vrooman Road Route

1.	---
2.	---
3.	---
4.	---
5.	---
6.	---
7.	---
8.	---
9.	---
10.	---
11.	---
12.	1
13.	---
14.	---
15.	---
16.	---
17.	---
18.	---
19.	---
20.	---
21.	---
22.	---
23.	---
24.	---
25.	---
26.	---
27.	---
28.	---
29.	---
30.	---
31.	---

TOTAL SCORE 1
AVERAGE SCORE -

Central Route

1.	---
2.	---
3.	---
4.	---
5.	---
6.	---
7.	---
8.	1
9.	---
10.	---
11.	---
12.	---
13.	1
14.	---
15.	---
16.	---
17.	---
18.	---
19.	---
20.	---
21.	---
22.	---

TOTAL SCORE 2
AVERAGE SCORE -

A-10. WOODLAND COVER IMPACTED

Vrooman Road Route

1.	800
2.	0
3.	0
4.	500
5.	1,000
6.	600
7.	0
8.	0
9.	0
10.	200
11.	0
12.	700
13.	900
14.	500
15.	0
16.	700
17.	400
18.	0
19.	0
20.	800
21.	1,000
22.	0
23.	0
24.	0
25.	1,000
26.	1,000
27.	1,000
28.	800
29.	800
30.	1,000
31.	0

TOTAL SCORE 13,700
(out of a potential of 31,000 points)
AVERAGE SCORE 4.42

Central Route

1.	600
2.	0
3.	0
4.	400
5.	200
6.	700
7.	400
8.	1,000
9.	1,000
10.	400
11.	0
12.	0
13.	1,000
14.	500
15.	0
16.	1,000
17.	1,000
18.	1,000
19.	1,000
20.	800
21.	1,000
22.	300

TOTAL SCORE 12,300
(out of a potential of 22,000 points)
AVERAGE SCORE 5.59

A-11. CONSTRUCTION DIFFICULTY AREAS

Vrooman Road Route

1. 1,000 x 2 = 2,000
2. 1,000 x 2 = 2,000
3. 1,000 x 2 = 2,000
4. 1,000 x 2 = 2,000
5. 1,000 x 2 = 2,000
6. 400 x 2; 600 x 1 = 1,400
7. 1,000 x 1 = 1,000
8. 1,000 x 1 = 1,000
9. 1,000 x 1 = 1,000
10. 1,000 x 1 = 1,000
11. 800 x 1; 200 x 0 = 800
12. 200 x 0; 800 x 2 = 1,600
13. 600 x 2; 400 x 1 = 1,600
14. 1,000 x 1 = 1,000
15. 1,000 x 1 = 1,000
16. 700 x 1; 300 x 2 = 1,300
17. 400 x 2; 600 x 1 = 1,400
18. 1,000 x 1 = 1,000
19. 1,000 x 1 = 1,000
20. 1,000 x 1 = 1,000
21. 1,000 x 1 = 1,000
22. 1,000 x 1 = 1,000
23. 1,000 x 1 = 1,000
24. 900 x 1; 100 x 0 = 900
25. 1,000 x 0 = 0
26. 600 x 0; 400 x 2 = 800
27. 700 x 2; 300 x 0 = 1,400
28. 500 x 1; 500 x 0 = 500
29. 900 x 2; 100 x 1 = 1,900
30. 700 x 1; 300 x 0 = 700
31. 500 x 2; 500 x 0 = 1,000

TOTAL SCORE 37,300
(out of a potential of 62,000 points)
AVERAGE SCORE 6.0

Central Route

1. 1,000 x 2 = 2,000
2. 800 x 2; 200 x 0 = 1,600
3. 400 x 1; 600 x 0 = 400
4. 1,000 x 1 = 1,000
5. 1,000 x 1 = 1,000
6. 1,000 x 1 = 1,000
7. 500 x 2; 500 x 1 = 1,500
8. 1,000 x 2 = 2,000
9. 600 x 1; 400 x 2 = 1,400
10. 1,000 x 1 = 1,000
11. 1,000 x 1 = 1,000
12. 1,000 x 1 = 1,000
13. 100 x 1; 900 x 2 = 1,900
14. 100 x 2; 900 x 1 = 1,100
15. 1,000 x 1 = 1,000
16. 500 x 2; 500 x 1 = 1,500
17. 400 x 1; 600 x 0 = 400
18. 1,000 x 0 = 0
19. 300 x 0; 600 x 1; 100 x 2 = 800
20. 700 x 2; 300 x 1 = 1,700
21. 300 x 1; 700 x 0 = 300
22. 600 x 0; 400 x 2 = 800

TOTAL SCORE 24,400
(out of a potential of 44,000 points)
AVERAGE SCORE 5.54

The first number is the length of the transmission line that has the corresponding soil hazard rating.

The second number is the soil hazard rating (multiplier).

A-12. USE OF EXISTING ADJACENT LAND USE PATTERNS AND PROPERTY LINES

Vrooman Road Route

1.	1,000 ; ---
2.	1,000 ; ---
3.	1,000 ; ---
4.	1,000 ; ---
5.	1,000 ; ---
6.	1,000 ; ---
7.	1,000 ; ---
8.	1,000 ; ---
9.	800 ; 300
10.	500 ; 500
11.	800 ; 500
12.	--- ; ---
13.	--- ; ---
14.	1,000 ; ---
15.	--- ; ---
16.	1,000 ; ---
17.	1,000 ; ---
18.	--- ; ---
19.	--- ; ---
20.	--- ; ---
21.	--- ; ---
22.	--- ; ---
23.	--- ; ---
24.	--- ; ---
25.	--- ; ---
26.	--- ; ---
27.	--- ; ---
28.	--- ; ---
29.	--- ; ---
30.	--- ; ---
31.	--- ; ---

TOTAL SCORE 13,100 + 1,300 = 14,400
(out of a potential of 62,000 points)
AVERAGE SCORE 2.32

Central Route

1.	1,000 ; 300
2.	--- ; 200
3.	--- ; ---
4.	--- ; ---
5.	--- ; ---
6.	--- ; ---
7.	400 ; ---
8.	--- ; ---
9.	--- ; ---
10.	--- ; ---
11.	--- ; 400
12.	--- ; ---
13.	--- ; ---
14.	--- ; 800
15.	500 ; ---
16.	200 ; ---
17.	--- ; ---
18.	--- ; ---
19.	1,000 ; ---
20.	300 ; ---
21.	--- ; ---
22.	--- ; ---

TOTAL SCORE 3,400 + 1,700 = 5,100
(out of a potential of 14,000 points)
AVERAGE SCORE 1.16

The first score is the measured distance of the transmission line parellel to the property line.

The second score is the measured distance that the line is considered as a land use segragator.

A-13. USE OF EXISTING UTILITY ROUTE

Vrooman Road Route

1.	---
2.	---
3.	---
4.	---
5.	---
6.	---
7.	---
8.	---
9.	---
10.	---
11.	---
12.	---
13.	---
14.	---
15.	---
16.	---
17.	---
18.	---
19.	---
20.	---
21.	1,000
22.	1,000
23.	1,000
24.	1,000
25.	1,000
26.	1,000
27.	1,000
28.	1,000
29.	1,000
30.	1,000
31.	1,000

TOTAL SCORE 11,000
(out of a potential of 31,000 points)
AVERAGE SCORE 3.54
RECIPROCAL
AVERAGE SCORE 6.45

Central Route

1.	---
2.	---
3.	---
4.	---
5.	---
6.	---
7.	---
8.	---
9.	---
10.	---
11.	---
12.	---
13.	---
14.	---
15.	---
16.	---
17.	---
18.	---
19.	---
20.	---
21.	---
22.	---

TOTAL SCORE 0
(out of a potential of 22,000 points)
AVERAGE SCORE -
RECIPROCAL
AVERAGE SCORE 10

A-14. POTENTIAL MULTIPLE USE OF CORRIDOR

Vrooman Road Route

1.	---
2.	1,000
3.	1,000
4.	700
5.	---
6.	400
7.	1,000
8.	1,000
9.	---
10.	---
11.	---
12.	---
13.	---
14.	500
15.	500
16.	400
17.	600
18.	1,000
19.	700
20.	200
21.	---
22.	800
23.	1,000
24.	700
25.	---
26.	---
27.	---
28.	---
29.	---
30.	---
31.	500

TOTAL SCORE 12,000
(out of a potential of 31,000 points)
AVERAGE SCORE 3.87

Central Route

1.	300
2.	1,000
3.	1,000
4.	300
5.	700
6.	---
7.	800
8.	---
9.	---
10.	600
11.	1,000
12.	600
13.	---
14.	200
15.	600
16.	---
17.	---
18.	---
19.	---
20.	400
21.	---
22.	500

TOTAL SCORE 8,000
(out of a potential of 22,000 points)
AVERAGE SCORE 3.63

A-15. USE OF EXISTING WOODLAND FOR SCREENING

Vrooman Road Route

1. 900 ; 900
2. --- ; 1,000
3. 100 ; 1,000
4. 900 ; 1,000
5. 0 ; 1,000
6. 1,000 ; 1,000
7. 0 ; 1,000
8. 0 ; 200
9. 0 ; 0
10. 0 ; 200
11. 0 ; 100
12. 1,000 ; 800
13. 1,000 ; 600
14. 1,000 ; 1,000
15. 1,000 ; 0
16. 1,000 ; 600
17. 1,000 ; 400
18. 200 ; 0
19. 900 ; 0
20. 700 ; 0
21. 600 ; 1,000
22. 0 ; 500
23. 0 ; 0
24. 0 ; 400
25. 900 ; 400
26. 1,000 ; 600
27. 1,000 ; 1,000
28. 600 ; 1,000
29. 700 ; 200
30. 1,000 ; 0
31. 300 ; 200

TOTAL SCORE 16,800 + 16,000 = 32,800
(out of a potential of 62,000 points)
AVERAGE SCORE 3.29

Central Route

1. 0 ; 400
2. 0 ; 200
3. 0 ; 0
4. 0 ; 800
5. 200 ; 1,000
6. 800 ; 600
7. 0 ; 500
8. 800 ; 1,000
9. 1,000 ; 1,000
10. 300 ; 900
11. 0 ; 0
12. 600 ; 900
13. 1,000 ; 1,000
14. 900 ; 700
15. 700 ; 0
16. 1,000 ; 700
17. 1,000 ; 200
18. 1,000 ; 0
19. 1,000 ; 200
20. 700 ; 300
21. 1,000 ; 1,000
22. 300 ; 100

TOTAL SCORE 12,300 + 11,500 = 23,000
(out of a potential of 44,000 points)
AVERAGE SCORE 5.41

The first score is the measured distance of woodland screening on the eastern side of the line.

The second score is the measured distance of woodland screening on the western side of the line.