V. TOD Land Use Suitability

1. Madison Alternative

1.1 Model I

The suitability evaluation scores for the Madison alternative has been calculated from Expert Choice software based on the site ratings and weights in the total column of the table (Figure 44). The scores measure the potential of TOD in the current condition.

The highest suitability score in this model is within 0.10 mile buffer area (0.546). It indicates that the area has higher TOD potential elements than those in other places because Model I considers same weights for six TOD factors. The lowest suitability score is 0.25-0.50 mile buffer area (0.432). It may be due to fair mixed-use and low public uses. Low density is not a factor even though it has high weight in this case because other places are also defined as low.

Ideal mode		RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	RATINGS
Alternative	Total	Proximity to Station (L: .167)	Mixed-Use (L: .167)	Density (L: .167)	Network/Access (L: .167)	Public Uses (L: .167)	Infill (L: .167)
0-0.10 mile	.546	Near	Fine	Low	Grid		Moderate
0.10-0.25 mile	.501	Prox	Fine	Low	Hybrid	Low	High
0.25-0.50 mile	.432	Prox	Fair	Low	Hybrid	Low	High
>0.50 mile	.494	Far	Fine	Low	Hybrid	Moderate	High

Figure 44. Result of Data Grid: Madison Alternative, Model I

This suitability score can be mapped using GIS such as rating criterion maps (Figure 45). The ranges of legend are < 0.4, 0.4-0.45, 0.45-0.50, 0.50-0.55, and > 0.55 which are reflected on the map with graduated colors. Those ranges don't indicate the standard for implementation or achievement of TOD plan. They indicate the degree of the potential TOD in current condition. It means that the rank for more suitable and possible TOD places can be identified.

If an area on the map shows light yellow, it is less suitable for TOD in the current condition. If the map presents dark green, the area shows more suitable for TOD than other areas that indicate having more potential TOD elements in the current condition. As a result, within the 0.25 mile buffer area shows green color which shows higher suitability for TOD than other places in the current land uses. The 0.25-0.50 mile buffer area is evaluated to low suitability. Beyond the 0.5 mile buffer area is evaluated to low to moderate suitability.

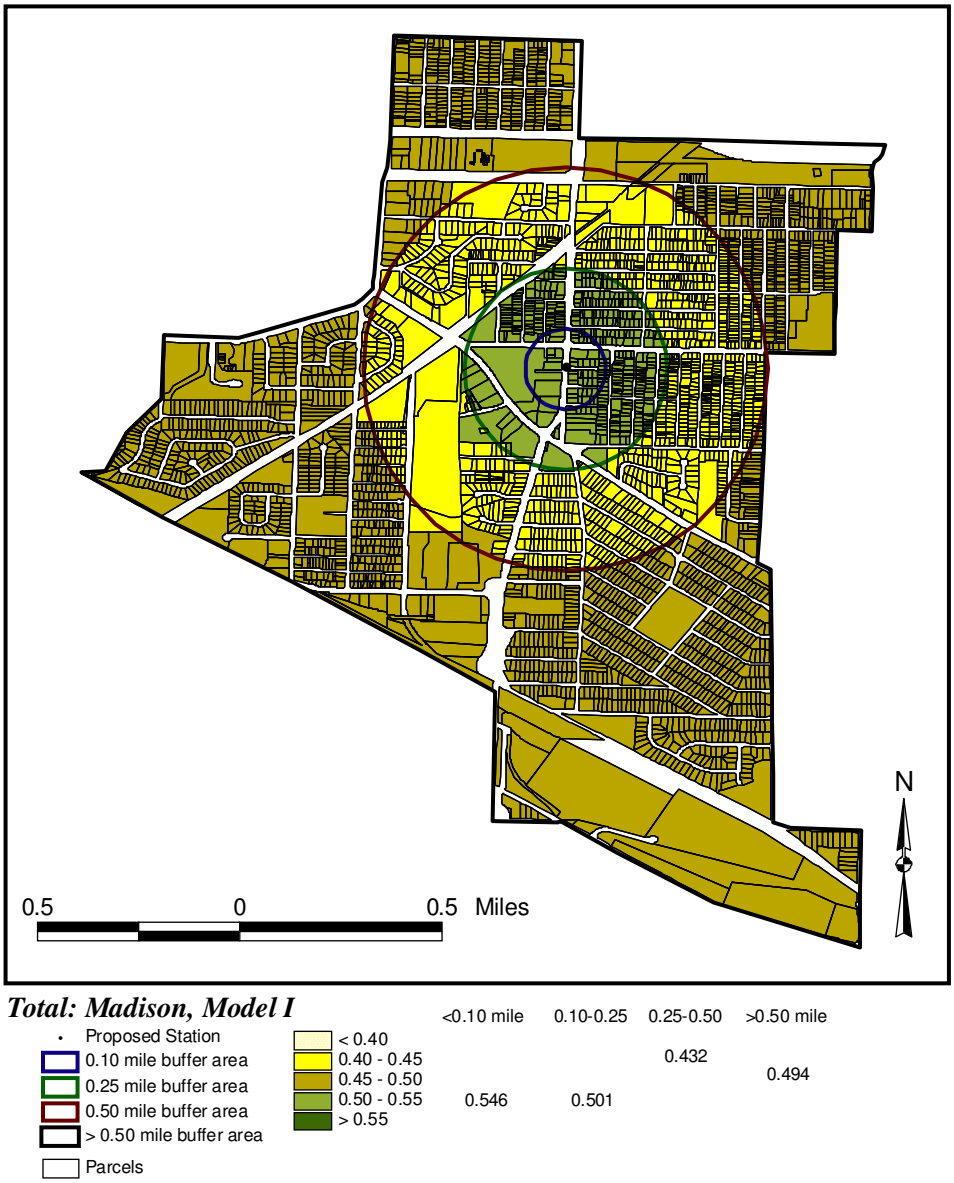


Figure 45. Suitability Map: Madison Alternative, Model I

1.2 Model II

The final suitability scores are calculated in the same way such as Model I. The highest score shows in the 0-0.10 mile buffer area (0.625) in Model II (Figure 46). It indicates that the area can be essential in TOD area because Model II considers the different weights based on the importance of factors for suitability.

This model also has the lowest score in the 0.25-0.50 mile buffer area because of fair mixed-use which has been weighted

more importantly than other factors. On the other hand, the highest score in 0.10 mile buffer area, even though it is not available for public uses, is reasonable because of low weight for public uses.

Ideal mode		RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	RATINGS
Alternative	Total	Proximity to Station (L: .259)	Mixed-Use (L: .235)	Density (L: .235)	Network/Access (L: .129)	Public Uses (L: .071)	Infill (L: .071)
0-0.10 mile	.625	Near	Fine	Low	Grid		Moderate
0.10-0.25 mile	.482	Prox	Fine	Low	Hybrid	Low	High
0.25-0.50 mile	.384	Prox	Fair	Low	Hybrid	Low	High
>0.50 mile	.406	Far	Fine	Low	Hybrid	Moderate	High

Figure 46. Result of Data Grid: Madison Alternative, Model II

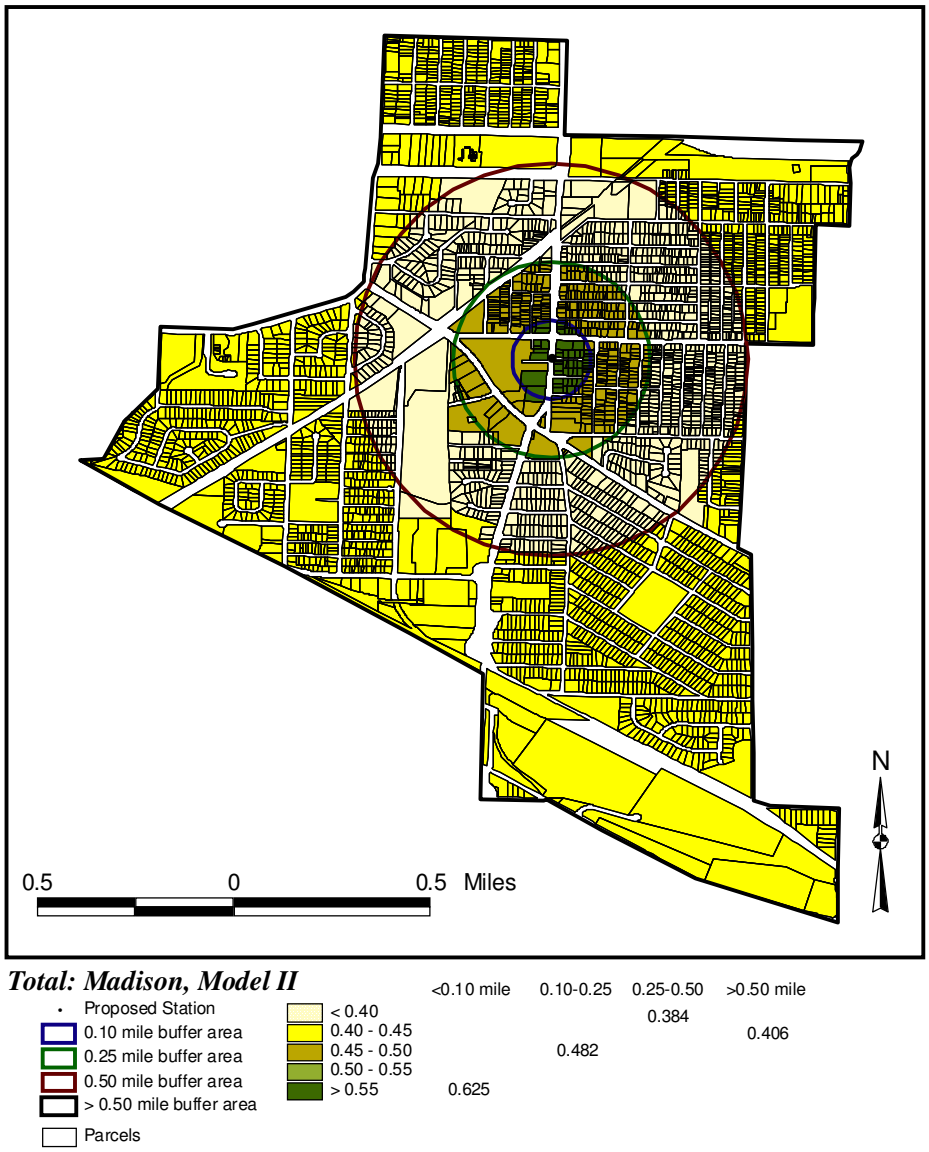
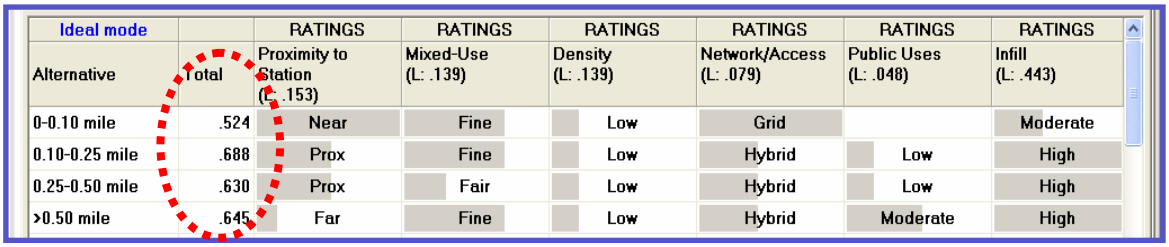


Figure 47. Suitability Map: Madison Alternative, Model II

1.3 Model III

The final suitability scores show on the total column in the table (Figure 48). The highest score is in the 0.10-0.25 mile buffer area. It indicates that the area more needs infill and redevelopment than do in other places because Model III considers higher weight for infill factors than those of other factors. In another word, the area has higher composition of vacant lands than those in other places. On the other hand, 0.10 mile buffer area has the lower composition of vacant lands than those in other places. Thus, the area has the lowest score.

The higher weight for infill factor has been impacted for increase of the suitability scores in Model III. Thus, all areas have the green colors which indicate more suitable for TOD in Model III because of abundant vacant lands as the rating standard of infill factor.



Ideal mode		RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	RATINGS
Alternative	Total	Proximity to Station (L: .153)	Mixed-Use (L: .139)	Density (L: .139)	Network/Access (L: .079)	Public Uses (L: .048)	Infill (L: .443)
0-0.10 mile	.524	Near	Fine	Low	Grid		Moderate
0.10-0.25 mile	.688	Prox	Fine	Low	Hybrid	Low	High
0.25-0.50 mile	.630	Prox	Fair	Low	Hybrid	Low	High
>0.50 mile	.645	Far	Fine	Low	Hybrid	Moderate	High

Figure 48. Result of Data Grid: Madison Alternative, Model III

Figure 49. Suitability Map: Madison Alternative, Model III

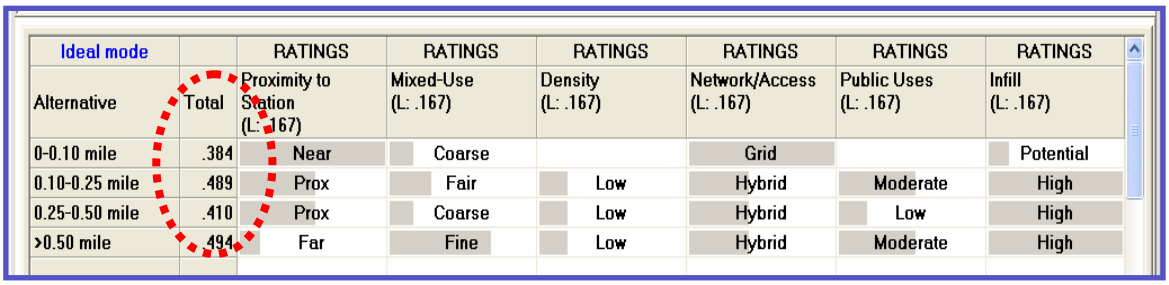
2. Lamar Alternative

2.1 Model I

Suitability scores have also been calculated for the Lamar alternative based on the site ratings and existing condition of the area. The highest score (0.494) is beyond 0.5 mile buffer area in Model I (Figure 50). It indicates beyond 0.5 mile buffer area has high TOD potential elements in the current condition because Model I considers the same weights for all criteria.

On the other hand, 0.10 mile buffer area has the lowest suitability score (0.384) because of non-available for density and public uses (Figure 50). It means the area

doesn't include residential and public uses. Also, coarse mixed-use and low potential infill affect to the low degree of TOD suitability.



Ideal mode		RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	RATINGS
Alternative	Total	Proximity to Station (L: .167)	Mixed-Use (L: .167)	Density (L: .167)	Network/Access (L: .167)	Public Uses (L: .167)	Infill (L: .167)
0-0.10 mile	.384	Near	Coarse		Grid		Potential
0.10-0.25 mile	.489	Prox	Fair	Low	Hybrid	Moderate	High
0.25-0.50 mile	.410	Prox	Coarse	Low	Hybrid	Low	High
>0.50 mile	.494	Far	Fine	Low	Hybrid	Moderate	High

Figure 50. Result of Data Grid: Lamar Alternative, Model I

The suitability scores for Lamar can be mapped using GIS with same range of suitability scores in Madison alternative models (Figure 51). The interpretation of colors for suitability maps is also same of Madison alternative models. The 0.10 mile buffer area shows light yellow which indicates low suitability for TOD. The 0.25-0.50 mile buffer area is evaluated to low to moderate suitability which shows yellow. The 0.10-0.25 and beyond 0.5 mile buffer areas can be interpreted to moderate suitability.

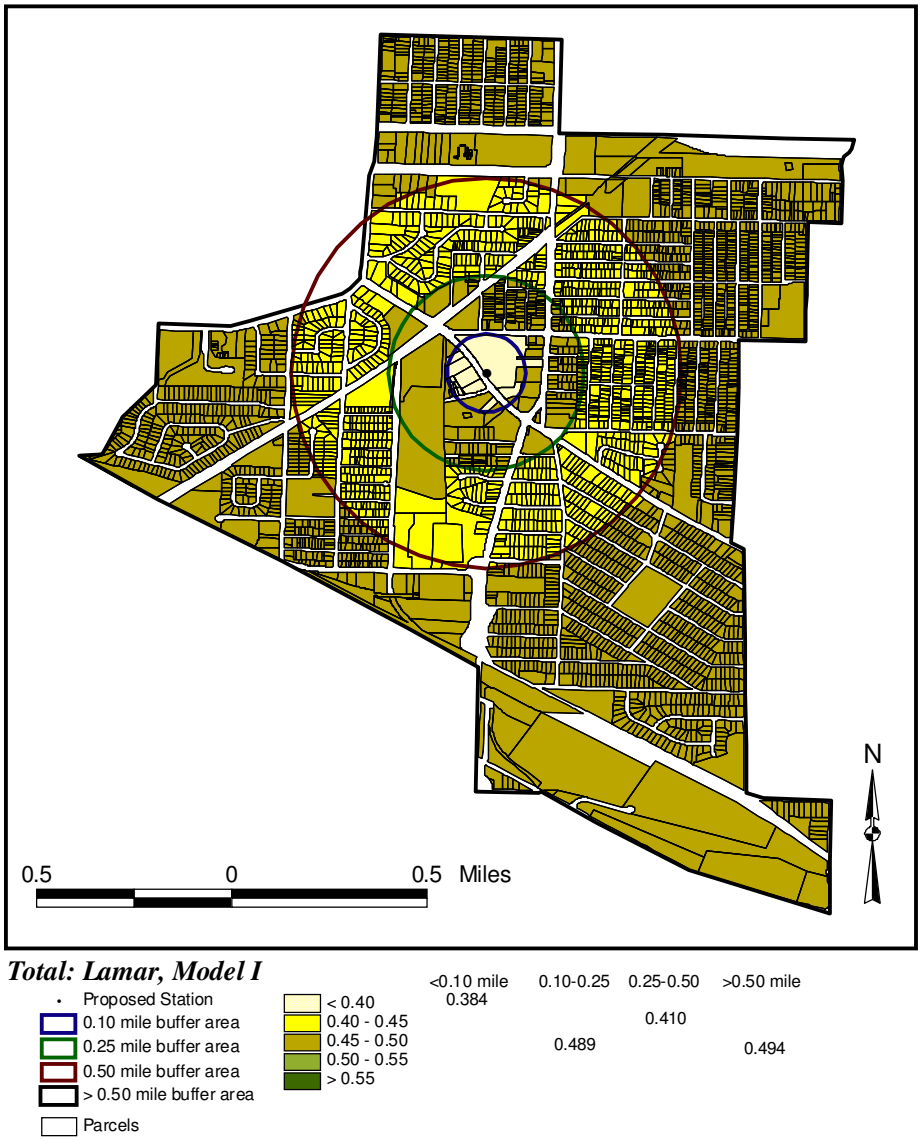


Figure 51. Suitability Map: Lamar Alternative, Model I

2.2 Model II

The total suitability scores are evaluated in Model II for the Lamar alternative as well (Figure 52). In this model 0.10 mile buffer area has the highest score. It indicates that this area can be essential in TOD area. This model gives different weights to the six criteria. Thus, this area can have high suitability score because of highly weighted factors, even though it is not available for density and public uses. The 0.25-0.50 mile buffer area needs to be focused on developing of mixed-use, density, and public uses to be improved for TOD.

Ideal mode		RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	RATINGS
Alternative	Total	Proximity to Station (L: .259)	Mixed-Use (L: .235)	Density (L: .235)	Network/Access (L: .129)	Public Uses (L: .071)	Infill (L: .071)
0-0.10 mile	.435	Near	Coarse		Grid		Potential
0.10-0.25 mile	.409	Prox	Fair	Low	Hybrid	Moderate	High
0.25-0.50 mile	.354	Prox	Coarse	Low	Hybrid	Low	High
>0.50 mile	.406	Far	Fine	Low	Hybrid	Moderate	High

Figure 52. Result of Data Grid: Lamar Alternative, Model II

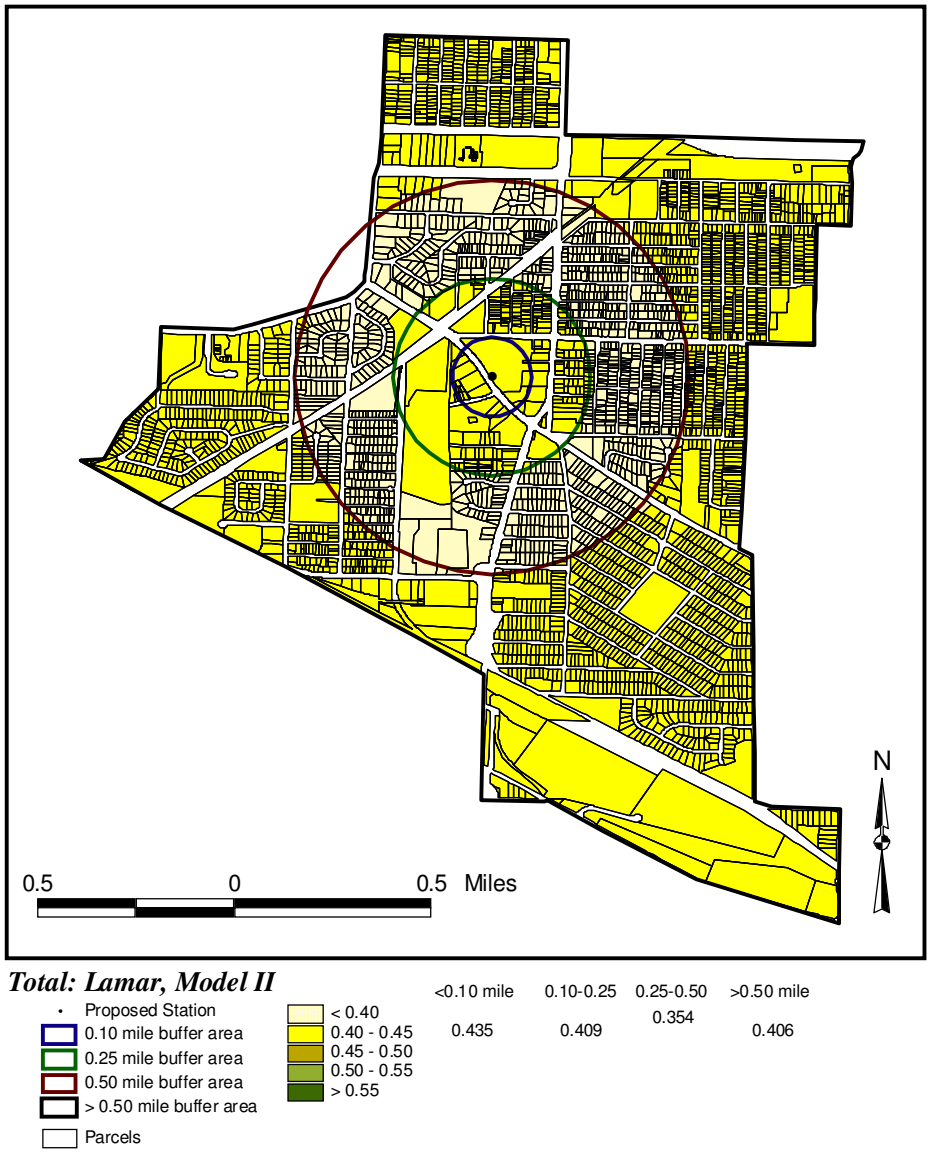


Figure 53. Suitability Map: Lamar Alternative, Model II

2.3 Model III

The highest suitability score in Model III shows in 0.10-0.25 mile buffer area (Figure 54). It means that the area needs to be redeveloped and infill vacant lands. Also, proximate to station and moderate public

uses in this area affect for high suitability under the same condition for infill factor in other places.

The 0.10 mile buffer area has the lowest suitability score in this model because of potential infill. It indicates the area includes a few vacant lands. Thus, it is an active place. However, there are not residential and public uses. It means the land uses are not mixed enough. It is an active place only for one or two land uses. As the result, the suitability map shows light yellow color in this area.

Ideal mode		RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	RATINGS
Alternative	Total	Proximity to Station (L: .153)	Mixed-Use (L: .139)	Density (L: .139)	Network/Access (L: .079)	Public Uses (L: .048)	Infill (L: .443)
0-0.10 mile	.318	Near	Coarse		Grid		Potential
0.10-0.25 mile	.647	Prox	Fair	Low	Hybrid	Moderate	High
0.25-0.50 mile	.612	Prox	Coarse	Low	Hybrid	Low	High
>0.50 mile	.645	Far	Fine	Low	Hybrid	Moderate	High

Figure 54. Result of Data Grid: Lamar Alternative, Model III

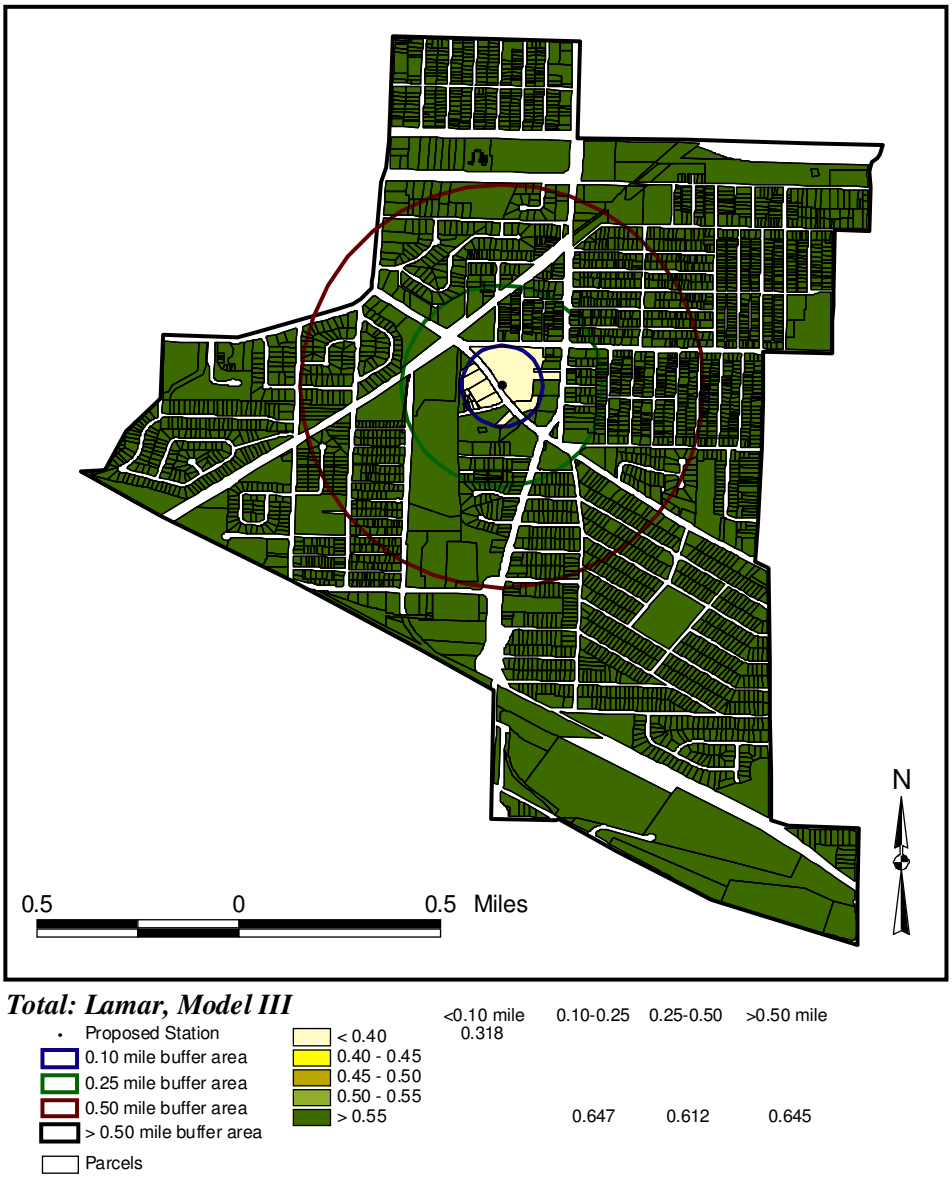


Figure 55. Suitability Map: Lamar Alternative, Model III

3. Comparisons

The Madison alternative has higher average suitability scores than the Lamar alternative in Model I, II, and III (Table 15). It means the Madison alternative can be recommended for TOD centered on the light rail station rather than the Lamar alternative based on these models.

In Model I, the highest score in the Madison alternative is 0.10 mile buffer area. However, the Lamar alternative has the highest score beyond 0.50 mile buffer area even though the suitability score is the same

in the Madison alternative. Which area has a higher potential for TOD can be known from the Model I that considers the same weights for evaluation criteria. The 0.10 mile buffer area shows the highest suitability score for Madison and Lamar alternatives in Model II. It indicates that the area near the station area can be an essential place in the Madison alternative as well as in the Lamar alternative.

0.10-0.25 mile buffer area has the highest suitability score for both alternatives in Model III. It means that this area needs to be redeveloped and infill vacant lands to be capitalized and to be active place.

Model III suitability scores which consider highly weighted infill factor are higher than those of other models. Airways/Lamar area is desirable for TOD due to higher potential infill and redevelopment of the area.

Table 15. Suitability Scores of Madison and Lamar Alternatives in Model I, II, and III

Models	**Model I**			**Model II**			**Model III**		
Distance	Madison	Lamar	Ratio	Madison	Lamar	Ratio	Madison	Lamar	Ratio
< 0.10 mile	**0.546**	0.384	1.42	**0.625**	**0.435**	1.44	0.524	0.318	1.65
0.10-0.25 mile	0.501	0.489	1.03	0.482	0.409	1.18	**0.688**	**0.647**	1.06
0.25-0.50 mile	0.432	0.410	1.05	0.384	0.354	1.09	0.630	0.612	1.03
> 0.50 mile	0.494	**0.494**	1.00	0.406	0.406	1.00	0.645	0.645	1.00
Average	**0.493**	0.444	1.11	**0.474**	0.401	1.18	**0.622**	0.556	1.12

4. Conclusion

Three models have been developed to evaluate the suitability as a potential TOD using current land use pattern of two proposed light rail station alternatives. Model I has given equal importance to the six TOD factors. However, in Model II the factors are weighted based on the importance of suitability. In Model III, conditions of localities and specialties of the proposed station areas are considered. Infill factor is weighted highly because the area has an abundance of vacant lands and dilapidated houses.

The Madison alternative has been evaluated as a better choice for TOD in

current land uses than the Lamar alternative in all models. It means that the Madison alternative station can be recommended as a center of TOD. Also, 0.10-0.25 mile buffer area in the Madison alternative may focus on redevelopment and infill according to the result of Model III.

If the Madison alternative is chosen as a TOD station site for Airways/Lamar station area, the Lamar alternative area could be used as a Transit Adjacent Development (TAD) which is characterized by a compact growth pattern with mixed-use and higher density near the transit stop such as TOD, but it is not influenced by transit and station directly (Parker and Mori 2002).

The Next chapter shows how different land use types are distinguished and considered for the TOD suitability analysis in Airways/Lamar area. The results by distance and each land use type are given.