
A Transportation Plan for The Town of Manhattan



Prepared for

Thomas Dean and Hoskins, Inc.
West Mendenhall, Suite C-1
Bozeman, MT 59715

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Prepared by



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Introduction

The Town of Manhattan, Montana is located in the Gallatin Valley, along Interstate 90, approximately 20 miles west of Bozeman. **Figure 1** shows the location of the Town of Manhattan. As one of the fastest growing areas in the state, the Gallatin Valley is expected to add approximately 10,000 new homes in the next 20 years, bringing approximately 25,000 new residents¹. Countless natural amenities and its proximity to Bozeman make the Town of Manhattan a relocation destination for over 8,000 of those new residents moving into the valley².

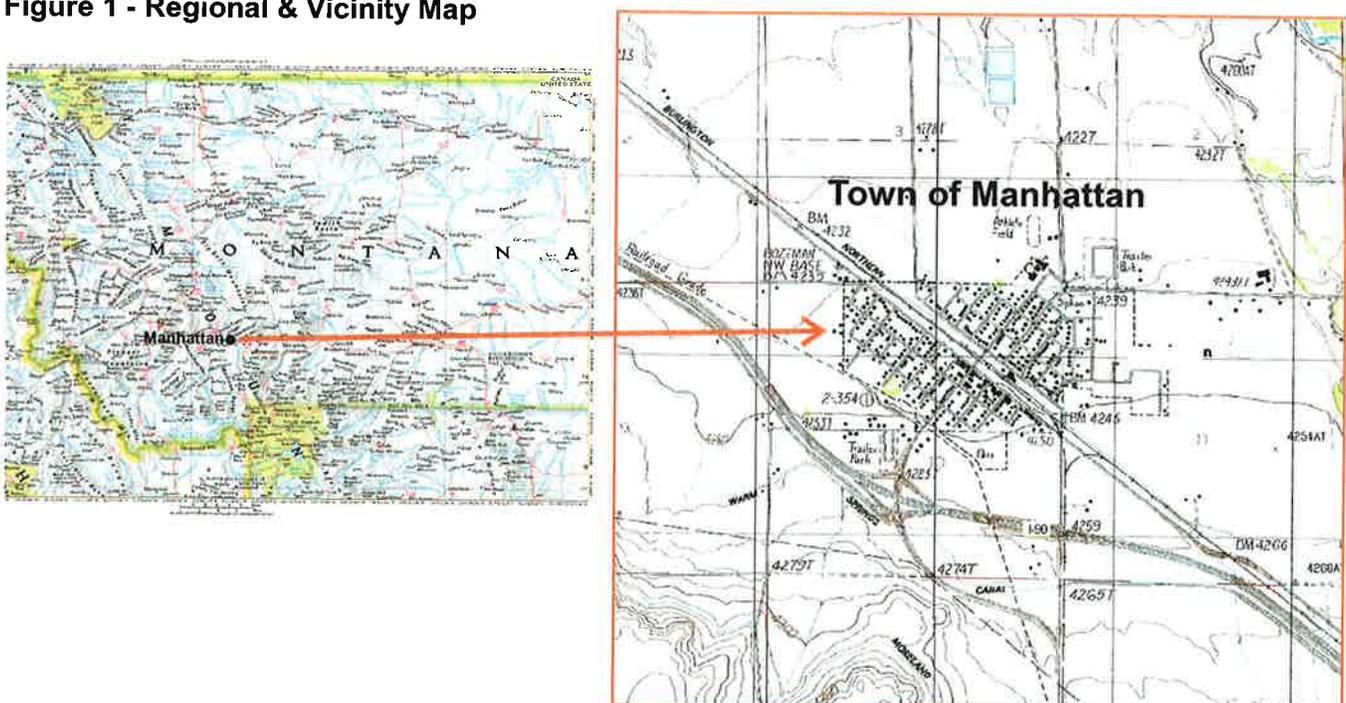
Characteristic of small western towns established in the late 1800s, The Town of Manhattan straddles the Burlington Northern Santa Fe Railroad on a grid street system. A small urban core serves the surrounding rural residents. Gravel roads extend beyond the city limits for miles—a fact that is exalted as a part of rural life. Gallatin County warns new residents to heed the “Code of the West,” and understand that expectations for county services in rural areas are unrealistic³. However, with increased population follows increased demand for these public services and a greater need to protect the health, welfare, and safety of a community’s citizenry.

This transportation plan serves as a policy document for coordinating efforts to meet the transportation needs of the Town of Manhattan as new development occurs. Primary objectives of the plan are to: evaluate transportation demands created by new growth; evaluate existing infrastructure; develop a plan for new infrastructure to accommodate the growth; estimate infrastructure costs; and develop a plan for funding needed (or identified) transportation improvements.

Having a plan in place as new development is proposed is key to thwarting future problems. Anticipating obstacles and identifying funding sources are critical to creating a street network that works to support a vibrant community. This plan examines existing conditions, and projects future conditions with the assistance of modeling software. Recommendations are made based on sound transportation planning and engineering principles.

1. According to the Greater Bozeman Area Transportation Plan: <http://www.bozeman.net/planning/TransPln/Intro.htm>
 2. Based on population projections identified in the Manhattan Growth Policy
 3. From Gallatin County’s website: <http://www.co.gallatin.mt.us/code.htm>

Figure 1 - Regional & Vicinity Map





Background

In compliance with new State laws, the Town of Manhattan initiated a process in 2001 to create a growth policy for its jurisdictional area. Adopted in 2004, the Town of Manhattan's Growth Policy is a guiding document with which all subdivision regulations and zoning ordinances must comply. The Growth Policy builds on the Town of Manhattan's Master Plan, which was adopted in 1978 and updated in 1998. In anticipation of increasing population, the Growth Policy identifies areas that are suitable for residential development; commercial and industrial development; and parks and open space. The Growth Policy also states the Town's intention of creating an integrated system of streets, bike lanes, pedestrian paths, and gravel trails to offer residents a variety of safe and appropriate travel routes in and around the community. The transportation plan is intended to supplement the Growth Policy with technical analyses and planning for transportation improvements. The Growth Policy includes a discussion of the goals of the transportation plan. A portion of that discussion is excerpted below.

The intention of the transportation plan is to create an integrated system of streets, bike lanes, pedestrian paths, and gravel trails offering residents of the community a wide variety of travel and recreational alternatives.

The street system is intended to be primarily a non-hierarchical neighborhood grid system similar to that which already exists within the Town of Manhattan. Streets within the neighborhood grid will have sidewalks to enhance pedestrian movement.

The arterial streets shown on the Transportation Plan are intended to collect the vehicular, pedestrian, and bicycle traffic from within the neighborhood grid and offer multiple means of north-south and east-west movement to the schools, central business district, HW 10, I-90 and the Gallatin river. Two new railroad crossings are proposed to create a loop around the town thus reducing the potential concentration of traffic on Broadway. The northern crossing is proposed approximately 3,000 feet north of the existing Broadway crossing. The new southern crossing is to replace the existing crossing at Manhattan Road South and is intended to be approximately 3,000 feet south of the existing Broadway crossing. The character of the arterial roads is intended to be similar to Broadway with the addition of a 5' paved bicycle path shoulder on each side plus a gravel path on one side to accommodate horseback riding. Nixon Gulch Road is to have a landscaped center median that can serve as a turning lane at east-west intersections.

The trails are intended to be paved for accessibility and link all of the community's parks, open space, and Gallatin River access into an interconnected system.

In general streets, bike paths, sidewalks, and trails will be funded and built incrementally at the expense of subdivision developers. It is the responsibility of the Town of Manhattan to begin negotiations with Montana Rail Link and the State Highway Department to secure the two new railroad crossings. Funding for the railroad crossings could be at the expense of subdivision developers or by road impact fees⁴.

4. From Town of Manhattan Growth Policy, p. 29

Existing Conditions

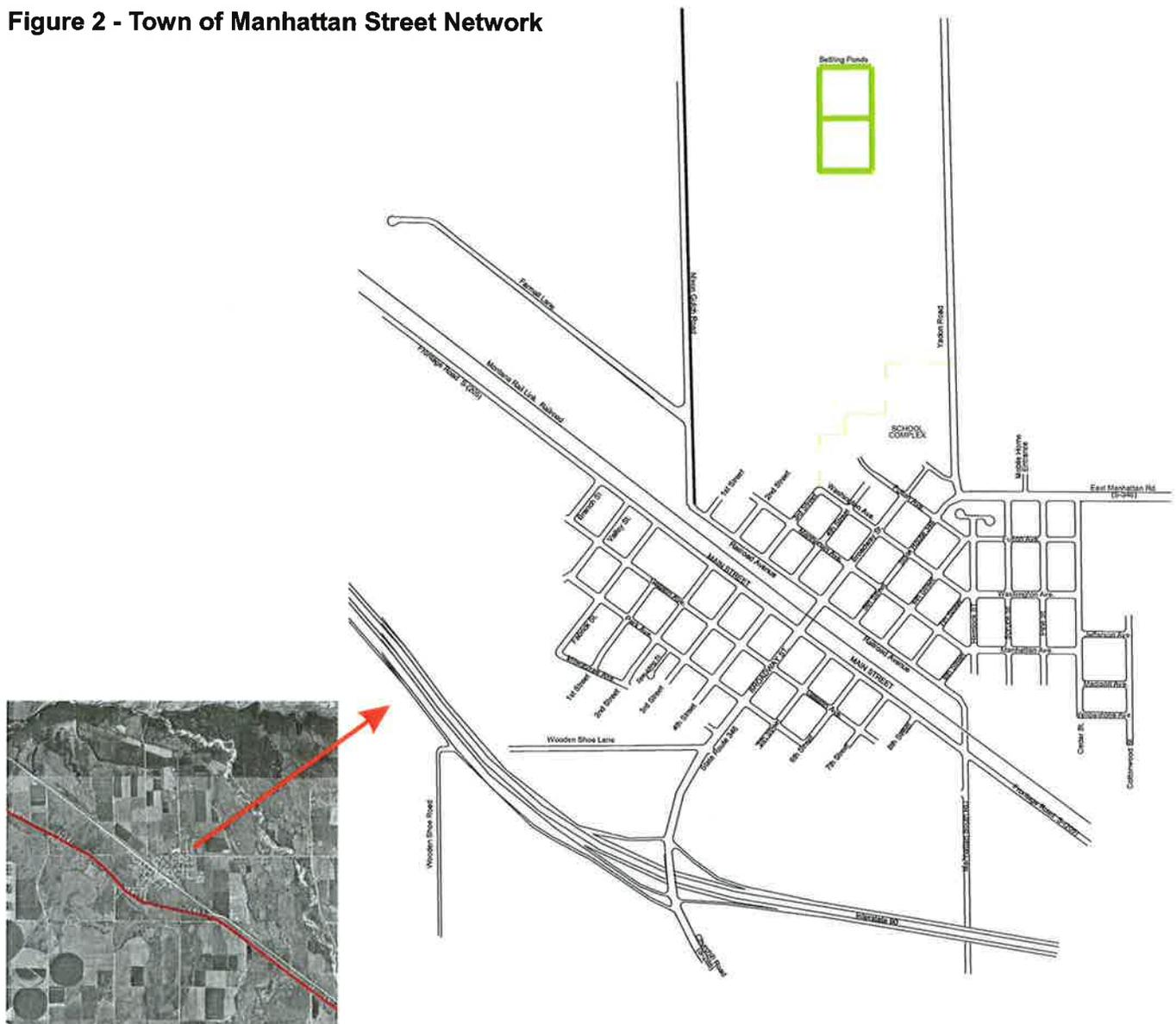
The existing street network consists of Broadway and Main Streets (Hwy 10) as primary/arterial routes; and Nixon Gulch Road, Yadon Road, Dry Creek Road, Railroad Avenue, and Manhattan Road South as secondary/collector routes. The remaining streets are classified as local streets. Broadway Street is the controlled point of access on and off Interstate 90. **Figure 2** shows the existing street network for the Town of Manhattan.

Geographically separated by a railroad, the north and south areas of the Town are only linked by one at-grade crossing. As has been pointed out by the drafters of the Growth Policy, this is a formidable obstacle, particularly when the Growth Policy and Land Use Plan (contained within the Growth Policy) target the area north of town for most of the future residential growth.

According to the 2000 Census, 68% of Manhattan residents over 16 years of age are employed. Of those, 500 are employed locally⁵. However, as the community continues to grow, more and more residents travel to work in Bozeman, approximately 20 miles east.

5. Employment figures provided by the Montana Department of Transportation

Figure 2 - Town of Manhattan Street Network



Problem Identification

The Manhattan Growth Policy identified the following transportation concerns:

- Traffic Concentration on Broadway
- I-90 Interchange
- Railroad Crossings
- Infrastructure Costs
- Traffic Volumes on Residential Streets

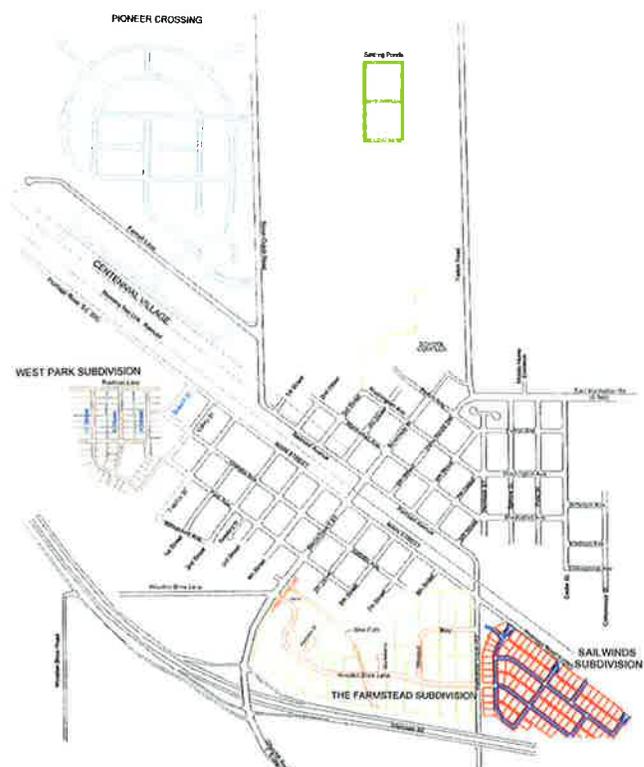
The biggest challenge the Town of Manhattan faces as it prepares to accommodate additional homes and residents is the very limited connection between its north and south sides. Broadway Street experiences the heaviest traffic volumes in Manhattan, and is the only access across the railroad tracks and to Interstate 90. The Growth Policy identified two additional railroad crossings that would diffuse the traffic bottleneck and create a circular traffic pattern. Any additional railroad crossings would necessitate extensive negotiations with Montana Rail Link.

A traffic impact study was conducted in 2004 for a new major subdivision in Manhattan. The traffic counts are shown on **Figure 4** and illustrate the bottleneck areas on Broadway.

Interstate access poses an additional problem for the community. The Interstate 90 interchange is a diamond-shaped interchange that was constructed with minimal improvements or right-of-way acquisition. The diamond-shaped interchange accommodates a level of service and access customary for rural communities.

New developments in the Town of Manhattan currently propose cul-de-sac street systems (see **Figure 5**⁷). However, the Growth Policy identifies a grid system to accommodate the town's transportation needs. A grid street system is highly recommended as it allows for an easily graduated collection system to disperse traffic onto the street network.

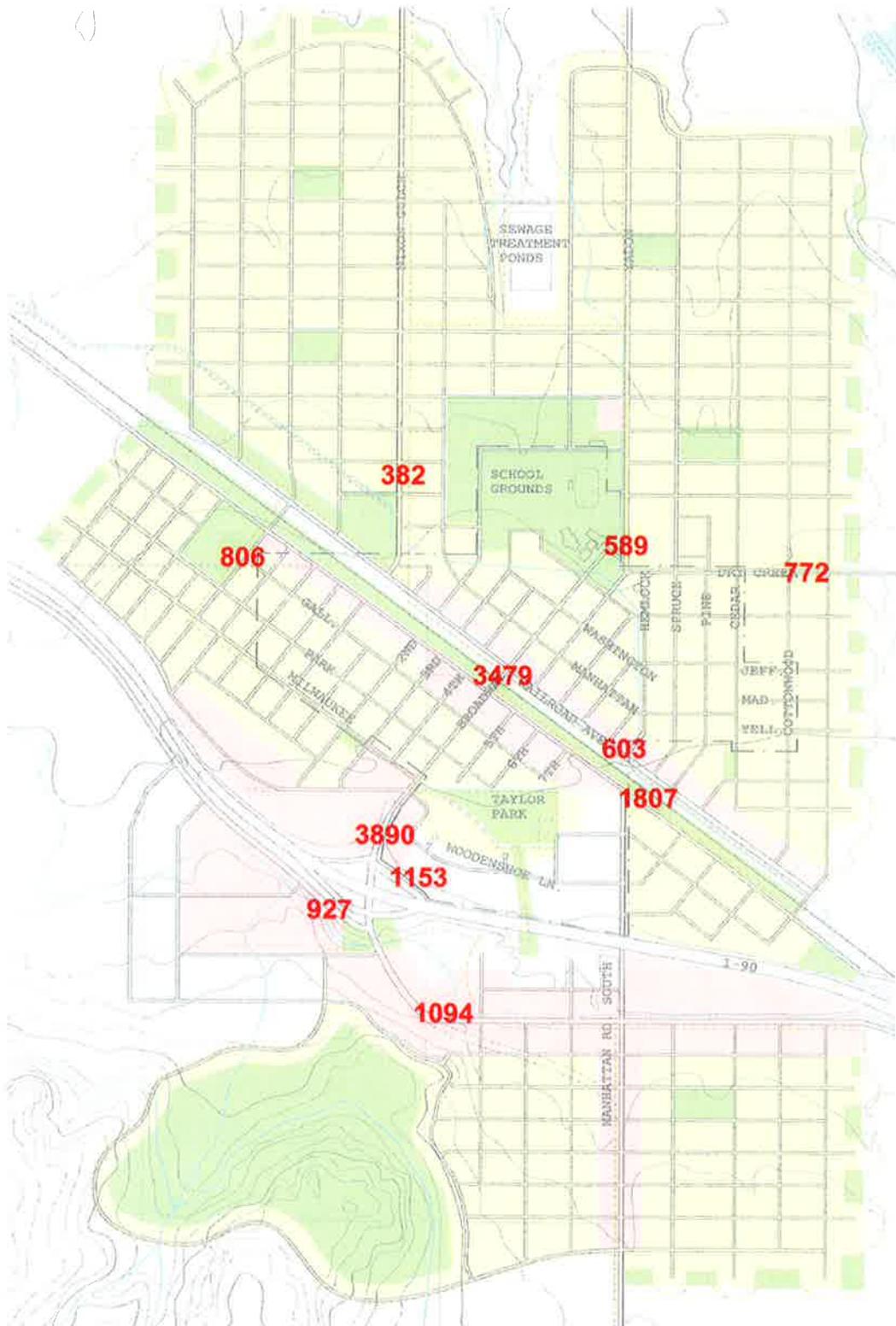
Figure 5 - Proposed New Development



7. Image courtesy of Marvin & Associates

Problem Identification

Figure 4 shows Average Daily Traffic (ADT) counts for 2004⁶.



5. Traffic counts from Traffic Impact Study for Pioneer Crossing & Centennial Village subdivisions prepared by Marvin & Associates.

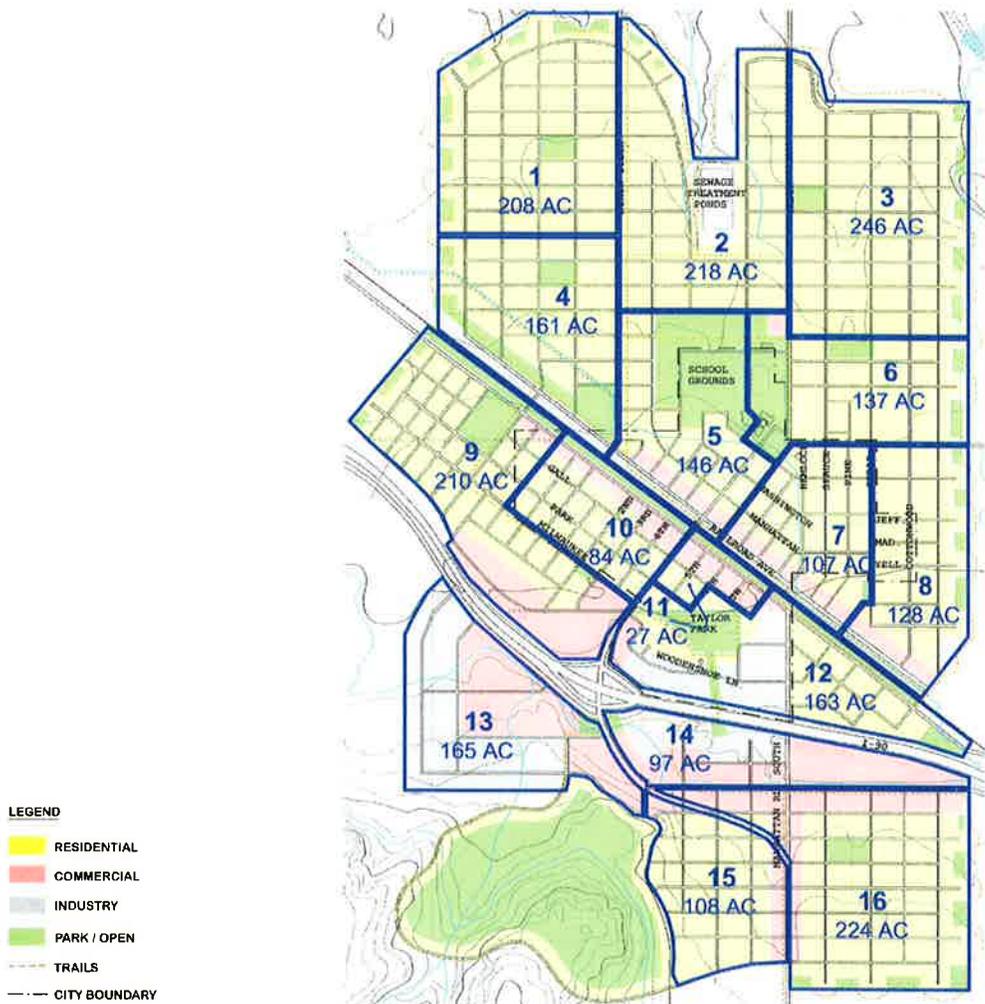
Process - Travel Demand Forecasting

The first step in modeling future transportation conditions is to identify Transportation Analysis Zones (TAZs). TAZs are subdivisions of geographic areas that are delineated for land use and travel analysis purposes. TAZ boundaries fall either along census block boundaries, primary travel corridors, or some other appropriate distinct separation, such as changes in land use. Population and employment data are used to estimate transportation demand and project future street usage. Variables such as household income, household size, and the number of cars in a household all affect daily vehicle trip rates. Proximity to services is also a factor, though more difficult to capture. **Figure 6** shows the TAZ boundaries used in the traffic modeling work.

The Town of Manhattan is entirely within Block Group 1 of Census Tract 4 for Gallatin County. As defined by the US Census Bureau, a census tract is a small statistical subdivision of a county defined by population. Block groups are geographic subdivisions of census tracts, providing a geographic summary unit for census block data. Each census tract contains a minimum of one block group, with up to a maximum of nine block groups⁸. The planning boundary contains a few blocks from Block Groups 2 and 3 (see **Appendix A**). The 16 TAZs shown below are drawn to account for the anticipated development for which the Growth Policy has planned in their land use designations, and were used to model the impact of the Growth Policy. Projected population numbers were allocated to each of the TAZs according to the amount of developable land and land-use categorization.

8. From the U.S. Census Bureau website: <http://www.census.gov/geo/www/psapage.html#BG>

Figure 6 - Transportation Analysis Zones





Demographics

Demographic information is used to project future population, housing, and employment levels. The following assumptions were made in projecting this data:

1. The Growth Policy Land Use Plan does not border evenly with census blocks, therefore approximations for existing population were made based on 2000 U.S. Census data for the blocks that overlapped with the plan boundary.
2. Existing employment data was supplied by the Montana Department of Transportation. The existing number of employees, as a percentage of the population, was projected into the 2020 conditions. However, in TAZs where no residential land use is designated in the plan, a constant of 1.45 employees per acre was allotted for retail employment and 0.87 employees per acre for non-retail employment.
3. Housing development in the Town of Manhattan is currently occurring at a rate of 2.5 dwelling units per acre. This rate was carried forward into the build-out projections, as was an occupancy rate of 2.45 persons per household.

Table 1 lists then number of existing and projected demographic data used for this analysis. Existing data is taken from the year 2000 census. The projections are based on the planning assumptions listed above. **Appendix B** summarizes the detailed projection calculations.

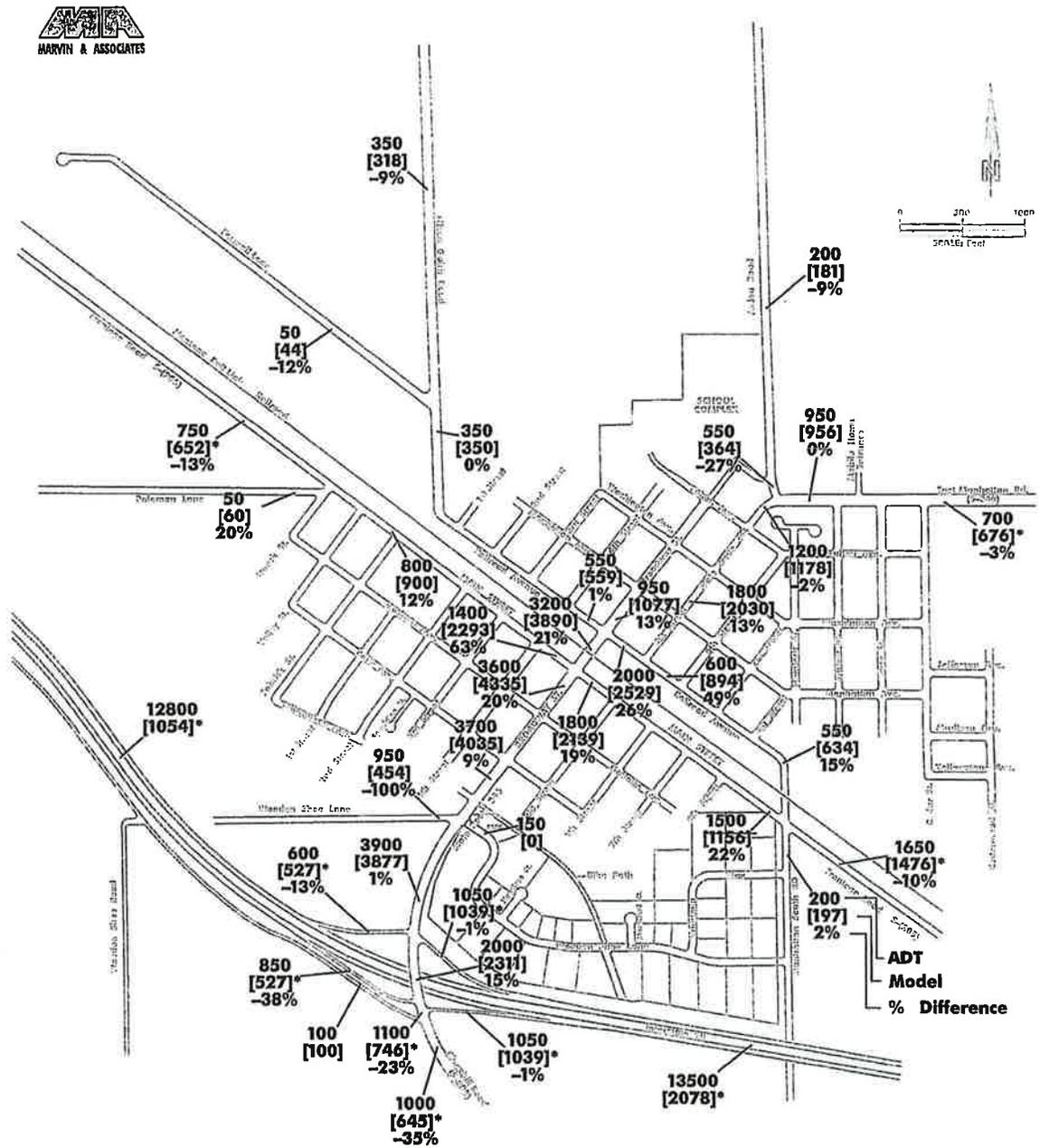
Table 1- Demographic Projections

Demographic	Existing (2000)*	Addition (20 years)	Projected (2020)
Acres	2,429	1,595	4,024
Dwelling Units	629	2,829	3,458
Population	1,628	6,930	8,558
Retail Employment	250	632	882
Non-Retail Employment	250	536	786
*Based on 2000 U.S. Census Data			

Traffic Model Calibration

A traffic model was created based on the TAZs existing demographics, and the existing Town of Manhattan street network. The model was calibrated to ensure it produces results that are reasonably close to existing traffic volumes. Adjustments are made to various modeling criteria to align the model results with actual counts. These calibrated factors are then used on all future model run scenarios. The traffic model calibration results (shown in **Figure 7**) show excellent correlation with existing traffic volumes.

Figure 7 - Existing 2005 Model ADT Calibration

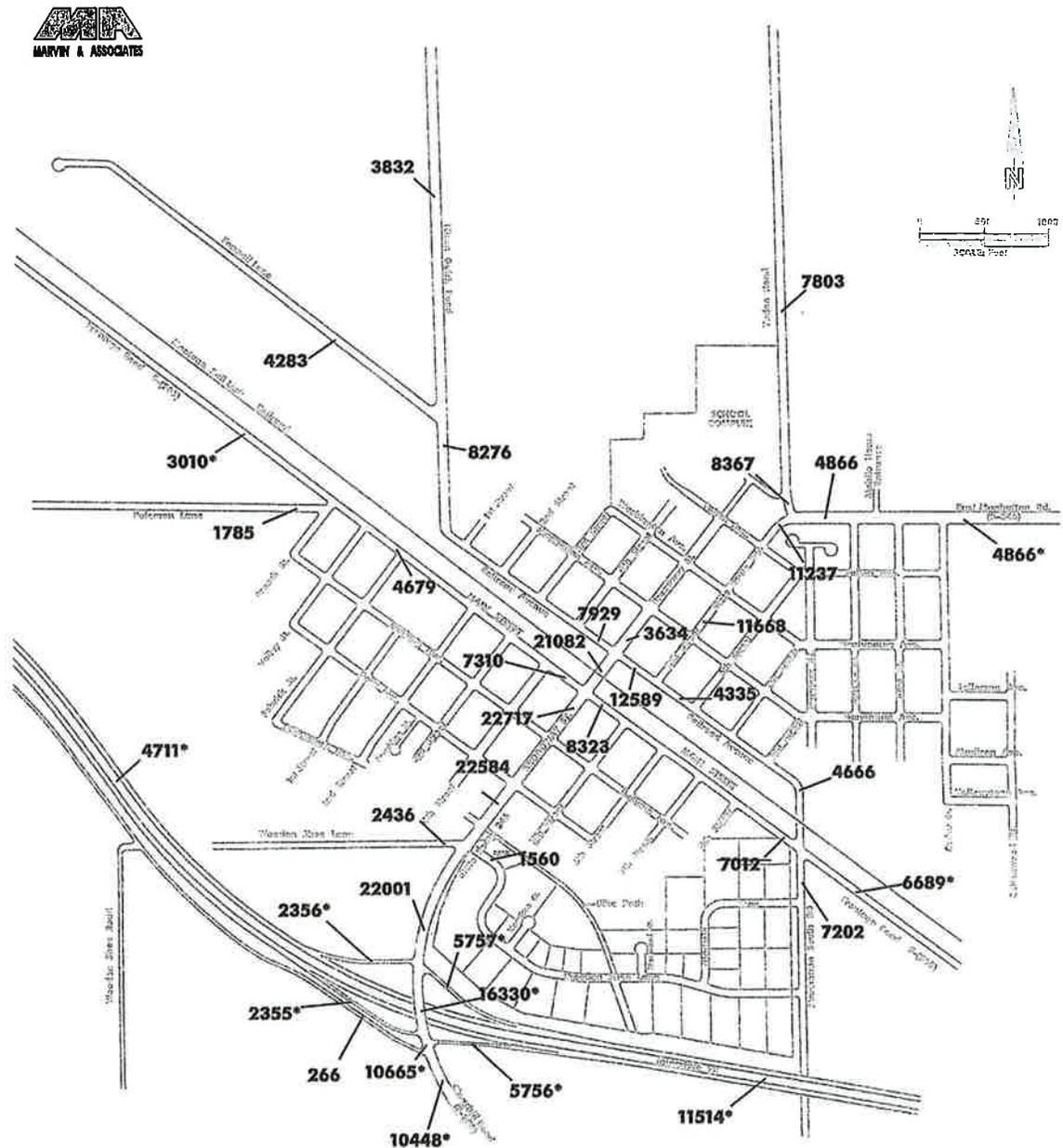


* Does Not Include External-External Traffic

2020 Traffic - Existing Network

Figure 8 shows projected traffic for the year 2020 if no new significant road network is added to the Town of Manhattan. Broadway Street, which is currently two-lanes, is projected to carry 22,000 Average Daily Traffic (ADT), which would require a five-lane roadway. The Interchange overcrossing at I-90 is projected to carry 16,000 ADT, with a significant volume turning left onto the eastbound on-ramp. This traffic demand would require a three-lane bridge. The existing bridge is two lanes. **Appendix C** contains a table showing recommended daily capacities for various types of roadways.

Figure 8 - Year 2020 Traffic Modeling Results Based on the Existing Street System



* Does Not Include External-External Traffic



Projected Traffic Volume

Figure 9 represents the modeling results of traffic demand based on the Growth Policy Land Use Plan, road network, and the projected demographics. Generally, the growth plan network works well with most projected volumes that can be handled on a two- or three-lane (two lanes with a center, left-turn lane) street. The difficulty with this option is that it necessitates two new railroad crossings, which may be difficult to obtain. However, these new crossings would work well in distributing the traffic, allowing a variety of options for traveling to the I-90 interchange.

Modeling results also show Manhattan Road South, where it crosses under I-90, carrying approximately 7,453 vehicles per day in 2020. Though it is likely that much of this traffic is headed for the I-90 interchange to avoid the potential congestion at the existing overcrossing. The 12,459 ADT counts on Broadway Street, where it crosses over I-90, indicates the need for a three-lane bridge at this location to provide an offset, left-turn lane for the on-ramps.

Projected Traffic Volume

Figure 9 shows the Year 2020 Planned System Model.

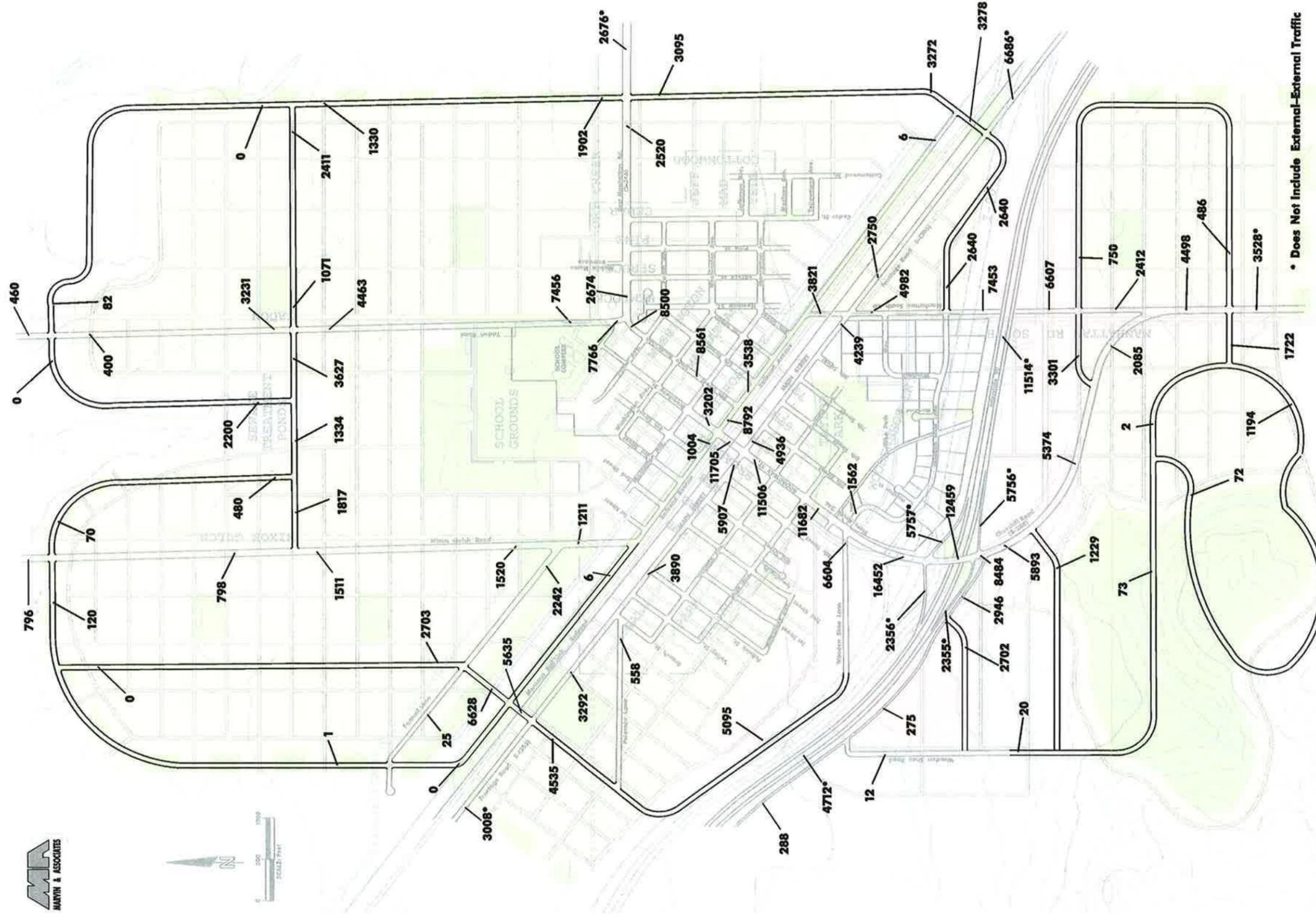


Figure 9





Recommendations

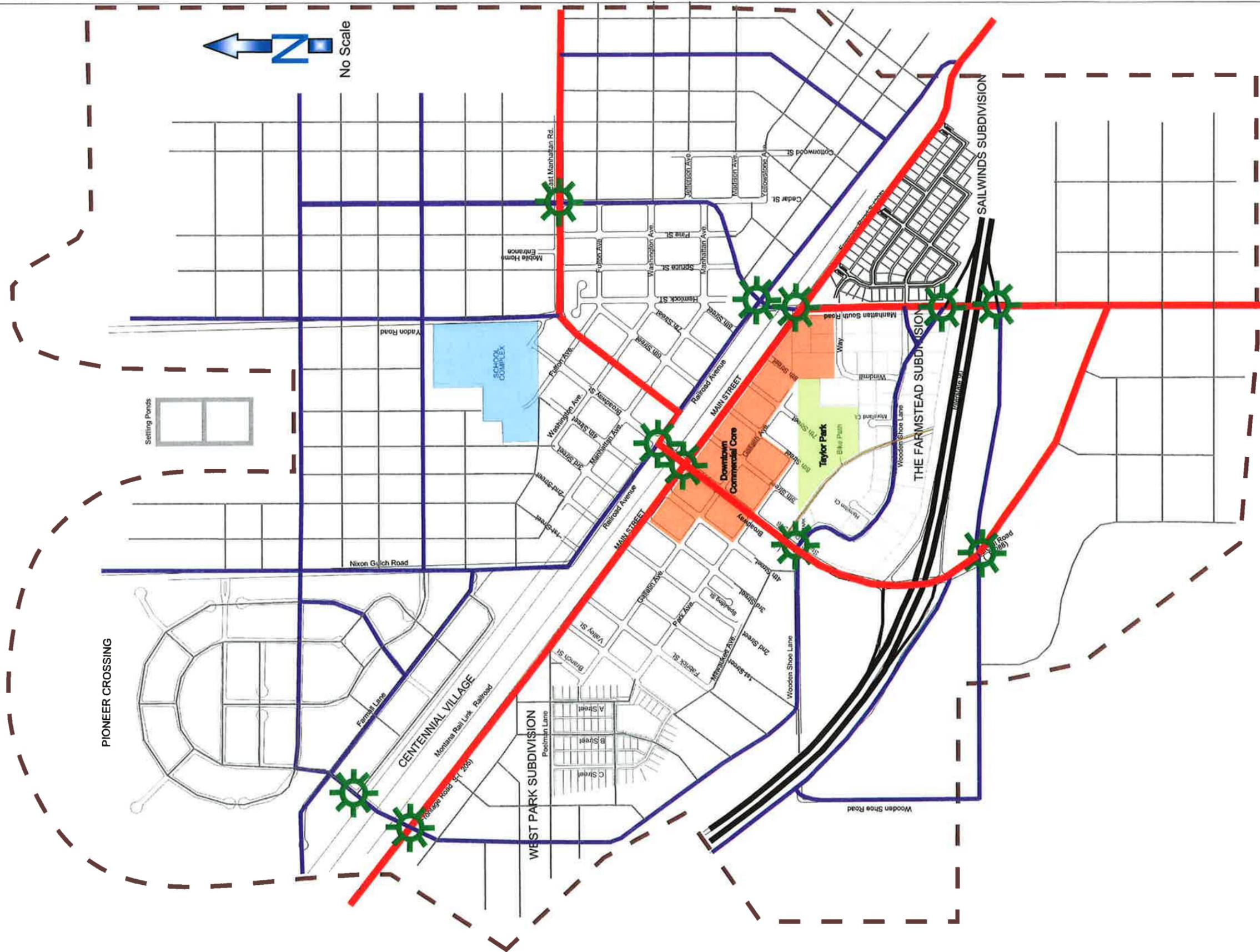
The developers of this Transportation Plan, through the use of the traffic model and coordination with the Town of Manhattan, have identified two potential street network options for consideration. These are discussed in detail below.

Option A - Recommended Road Grid

Figure 10 depicts the existing roadway network with the addition of key elements which attempt to mitigate potential traffic issues on Broadway Street and at the I-90 interchange. Option A proposes a split-diamond interchange with Manhattan Road South and a new frontage road south of I-90 to connect the two halves of the interchange. Wooden Shoe Lane would serve as the frontage road on the north side of the interchange. This option would maintain the existing railroad crossing connecting to Pioneer Crossing/Centennial Village. The road would then follow an alignment west of the West Park Subdivision. Railroad Avenue is extended to the east to connect with SR 205 after it crosses the railroad. This would provide a grade-separated route across the tracks, which is highly recommended. Option A works well with many of the subdivision proposals that have been submitted to the Town of Manhattan.

Recommendations

Option A - Recommended Road Grid



LEGEND

-  Proposed Local Street, Extension or Connection
-  Proposed Collector
-  Proposed Arterial
-  Growth Policy Study / Land Use Area
-  Potential Traffic Signal

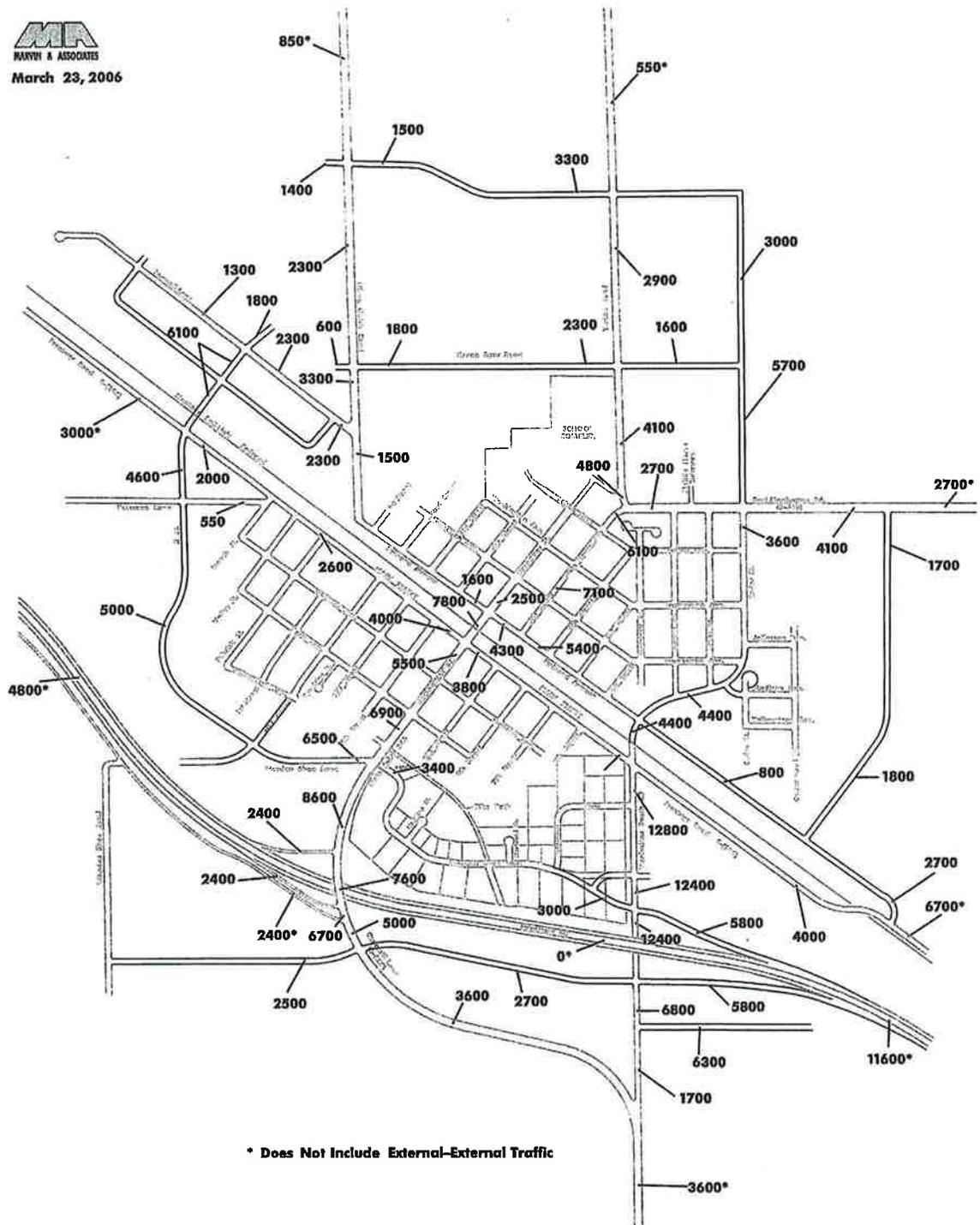
Figure 10



Recommendations

Figure 11 illustrates the results of traffic demand modeling using the Option A street network. This option works very well, redistributing much of the traffic from the new growth to the east to Manhattan Road South and the east half of the split-diamond interchange.

Figure 11 - Year 2020 Option A Traffic Model Results





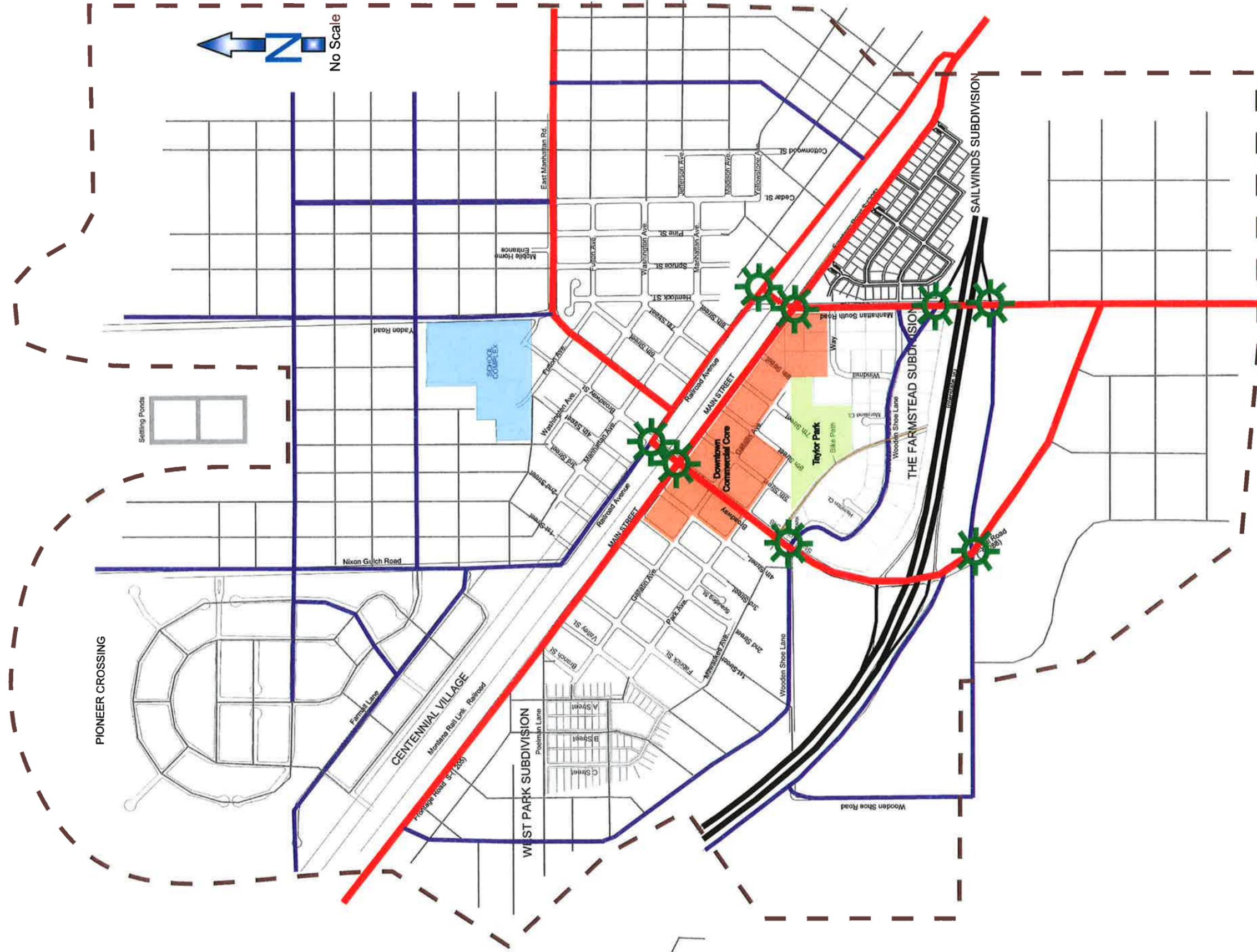
Recommendations

Option B - Modified Road Grid

Option B was developed to evaluate potential traffic operations utilizing the two existing at-grade railroad crossings. With this option, there would be no railroad crossing on the west side of town. The split-diamond interstate access configuration is also included in this Option. Option B is illustrated in **Figure 12**.

Recommendations

Option B - Modified Road Grid



LEGEND

- Proposed Local Street, Extension or Connection
- Proposed Collector
- Proposed Arterial
- Growth Policy Study / Land Use Area
- Potential Traffic Signal

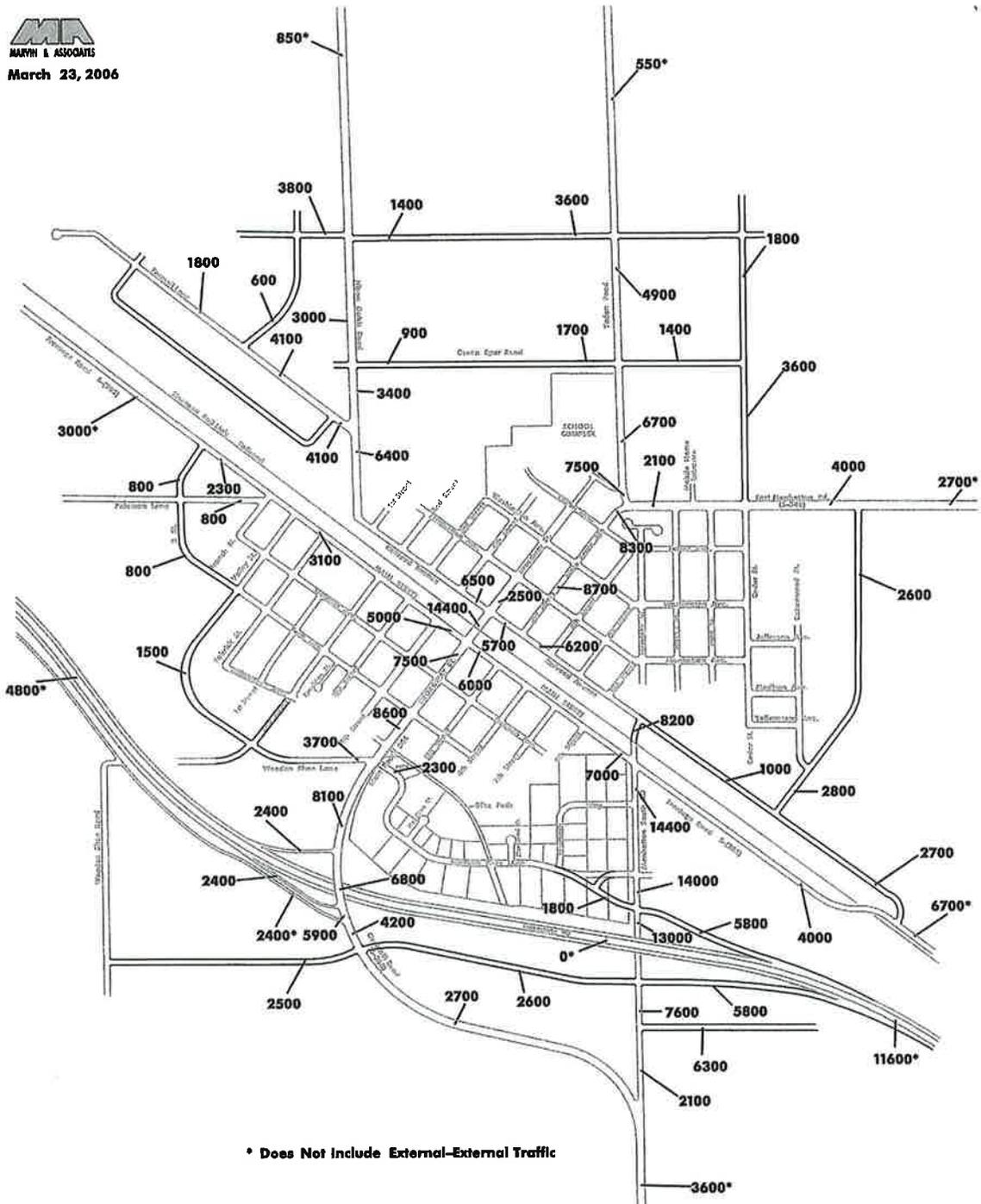
Figure 12



Recommendations

Figure 13 illustrates the results of traffic demand modeling under the Option B configuration. Option B works satisfactorily for the I-90 interchanges and the railroad crossings. Where Broadway Street crosses over the railroad, a traffic volume of 14,400 ADT is nearing the capacity of this two-lane link with closely spaced signalized intersections.

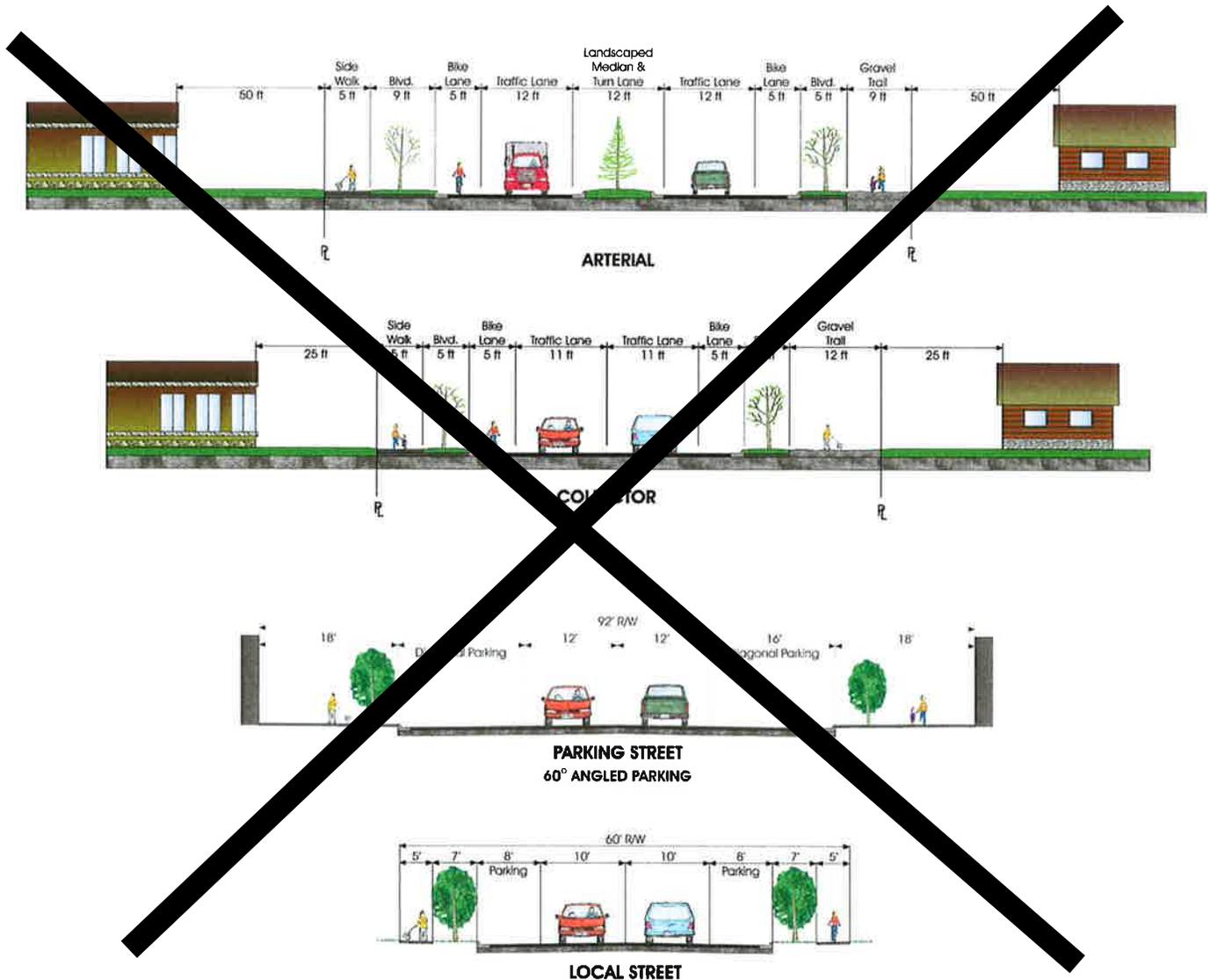
Figure 13 - Year 2020 Option B System Model



Infrastructure Needs

Based on anticipated growth, the Town of Manhattan's existing transportation system level of service will be degraded in the near future. To accommodate increasing traffic volumes, major upgrades to the Town's street system are required, particularly for traffic patterns anticipated through the downtown core, and in the vicinities of the I-90 interchanges. **Figure 14** illustrates the recommended infrastructure upgrades to the Town of Manhattan street system.

Figure 14 - Infrastructure Upgrades to the Town of Manhattan Street System



Obsolete, see typical street sections attached



Implementation Program

The following transportation improvement program includes options for transportation funding, a list of planned transportation projects, and additional recommended transportation projects.

Transportation Improvements Funding

Montana State Law allows few options for the financing of transportation infrastructure. Although the Montana Department of Transportation (MDT) finances roadway improvements, the rapid growth in Montana has created roadway need far beyond available funding. The Town of Manhattan should look for funding of these transportation improvements without assistance from the MDT. The following are options the Town of Manhattan should utilize in funding these improvements. A combination of all three of these sources will likely be required.

Developer Provided Improvements - Each development will be responsible for providing improvements that directly benefit the development. These improvements include developing roadways within and adjacent to the development to locally adopted standards. Specific improvements are identified on a case by case basis, and are conditioned with preliminary plat approval.

Transportation Impact Fee - The 2004 State legislature passed enabling legislation for local governments to enact a transportation impact fee. This fee would be assessed to each individual lot at the time of development. The Town of Manhattan will create a separate fund to track the revenue from this fee and program improvements as they become necessary. Improvements that are eligible for funding by impact fee include facilities that provide a community-wide benefit. Examples include traffic signals, interchange improvements, and improvements to arterial streets. With an estimated 3,500 additional lots proposed for development, assessed at \$3,100 per lot, the total revenue generated would be \$10,800,000.

Assessment Districts - Special Improvement Districts (SIDs) can be used to provide improvements in existing areas, but require the general support of the property owners being assessed. Improvements must directly benefit each property assessed. Frontage improvements and street lighting are examples of improvements that can be funded with SIDs.

Transportation Project List

Street Signing & Stripping - Manhattan should consider improved signing of streets as the traffic grows. Stop signs at collector/arterial intersections and arterial/arterial intersections will be required. Stripping of some collectors and all arterials will also be required. New development benefits from the improved safety that signing and stripping provides.

Traffic Signals - It is anticipated that traffic signals will be required at several locations within the Town of Manhattan. This planning level assessment of the need for these signals is based on projected daily traffic volumes on these roadways. A detailed traffic signal warrant study, based on existing traffic volumes, is required to warrant and construct a traffic signal. However, the Town should start collecting revenue for these future potential needs. The funding will then be in place if the signal is warranted. New development clearly benefits from traffic signals. Traffic signals provide the required level of safety and service to allow the land to be developed to its highest and best use.



Implementation Program

I-90 Interchange Modifications - Modification of the access on the Interstate system is a major undertaking that requires detailed studies, and review by the Montanan Department of Transportation and the Federal Highway Administration. The improvements must be shown to be beneficial to the freeway operations, and cannot degrade service level, safety, or operation in any way. As clearly demonstrated in this report, there is a strong case for making these changes, given the high cost of improvements to the existing interchange, and the potential impacts to safety and operations at that location where there is a warrant analysis of the recommended modifications. The resulting associated benefit to the community and improved highway operation through town weigh heavily for implementation of the proposed split-diamond interchange. A study would also evaluate other options which might also work as well and be cost effective. The Town of Manhattan should begin collecting revenue to begin these studies. Ultimately, improvements to access at I-90 will be required if the Town grows as projected. New development will benefit from I-90 improvements by providing the required level of safety and service required to allow the land to be developed to its highest and best use.

Manhattan Road South Improvements - Improvements to Manhattan Road South would be necessitated by the split-diamond interchange improvements. The split-diamond interchange effectively divides the traffic in town between Broadway Street and Manhattan Road. This is important in managing traffic volumes low enough to maintain each of these facilities as two-lane roads. This also enables the traffic to split evenly between the two existing railroad crossings. The geometry of the existing crossing at Manhattan Road also needs to be improved. This roadway should be developed to full arterial standards. These improvements will be beneficial to the land owners and new development, as the land adjacent to this roadway becomes viable for commercial, freeway oriented development. This roadway will also serve a gateway to the Town, and should be landscaped in a way that announces and invites entrance to the community.

High School Safety Modifications - Traffic flow around the school is currently acceptable, but improvements to this area are recommended as traffic volumes grow. The Town of Manhattan should consider a project to revise the traffic flow and access to and around the high school. These improvements should include traffic calming, street lighting, and sidewalk bulbouts to improve pedestrian safety at this high-use location.

Downtown Streetscaping - The Town of Manhattan has a unique core downtown that is a critical factor to maintaining quality of life and a unique community identity. It is recommended that the Town plan for an investment in improving the infrastructure downtown by streetscaping several of the core streets of a specific commercial or business focus. Elements of streetscaping can include sidewalks with bulbouts at the corners, street lighting, street trees, public art, benches, diagonal parking, and pockets of landscaping. The streetscaping should be done in a way that captures and maintains the Town of Manhattan's unique identity. This type of improvement will often spur investment in new businesses, building, and redevelopment in core downtowns. Having a downtown where people can walk to lunch or dinner at a great Montana steak house, then attend a movie or grab an ice cream cone, creates a very attractive place to live and visit. A vital and attractive downtown clearly benefits new development by increased desirability and property values.

Trail system - The Town of Manhattan has a planned trail system that will contribute significantly to the quality of life in the community, and to the health of the citizens and safety of children traveling to schools. Manhattan should begin collecting revenue for this trail system, and construct new segments every year. New development benefits by the improved desirability and property values associated with these types of facilities.



Implementation Program

The transportation projects listed in **Table 2** are recommended for the Town of Manhattan.

Table 2 - Transportation Project List

Transportation Project List	Projected Costs (2006 \$)
I-90 Interchange Modifications & Frontage Rd	3,500,000
Manhattan Rd South Improvements & Grade Crossing	1,000,000
Eight Traffic Signals	1,300,000
Modifications at School Facility	100,000
Traffic Signing & Striping	600,000
Downtown Streetscaping	1,200,000
Trail System	1,000,000
Total	\$8,700,000

Additional Recommended Projects

The following projects are recommended in addition to the projects listed above.

Local Street Paving - The Town of Manhattan can provide local street paving by formation of an SID. Improvement costs are assessed on those properties directly benefitting from the improvements.

Frontage Improvements - These improvements benefit the adjacent landowners and can be funded with an assessment district, enabling the Town of Manhattan to provide basic curb, gutter and sidewalk improvements in existing areas of town.

Street Lighting - Providing street lighting improves safety and the economic vitality of communities, especially in downtown areas and near schools. Major roadway intersections should be lit to provide for user safety. Street lighting districts can be formed, where maintenance and operational costs of the street lighting are assessed to adjacent landowners.



Appendix B
Summary of Demographic Projections

TAZ	Existing Conditions - 2000							Additional Population & Dwelling Units			Projected Conditions - 2020					
	Approximate Number of Total Acres	Number of Dwelling Units in Planning Area (1)	Population (1)	Occupancy	Dwelling Units per Acre	Retail Employment (2)	Non-Retail Employment (2)	Approximate Number of Residential Acres (3)	Estimated Number of Additional Dwelling Units	Estimated Additional Residents (4)	Total Households	Projected Population (3)	Projected Dwelling Units per Acre	Approximate Commercial/Industrial Acres	Retail Employment (5)	Non-Retail Employment (6)
1	208	1	3	2.60	0.005	0	0	200	499	1223	500	1225	2.5	0	0	0
2	218	8	20	2.50	0.037	0	0	180	442	1083	450	1103	2.5	0	0	0
3	246	8	20	2.50	0.033	0	0	235	580	1420	588	1440	2.5	0	0	0
4	161	4	12	3.05	0.025	0	0	125	309	756	313	768	2.5	20	0	0
5	146	53	138	2.60	0.363	14	20	70	122	299	175	437	2.5	76	70	70
6	137	27	59	2.19	0.197	0	0	100	223	546	250	605	2.5	5	97	97
7	107	202	625	3.09	1.888	13	20	70	0	0	202	625	2.9	35	100	100
8	128	39	112	2.87	0.305	0	0	95	199	486	238	598	2.5	20	96	96
9	210	28	62	2.21	0.133	0	0	120	272	666	300	728	2.5	60	117	117
10	84	188	428	2.28	2.238	110	127	50	0	0	188	428	3.8	25	68	68
11	27	53	102	1.92	0.000	107	83	10	0	0	53	102	0.0	17	16	16
12	163	16	42	2.63	0.098	0	0	80	184	451	200	493	2.5	70	79	79
13	165	2	5	2.50	0.012	6	0	0	0	0	2	5	0.0	165	239	144
14	97	0	0	0.00	0.000	0	0	0	0	0	0	0	0.0	97	141	84
15	108	1	6	6.00	0.009	0	0	80	199	488	200	494	0.0	28	79	79
16	224	0	0	0.00	0.000	0	0	180	450	1103	450	1103	2.5	44	176	176
TOTAL	2429	629	1628	2.53	0.410	250	250	1595	2829	6930	3458	8558	2.65	493	882	786
(1)	Approximation based on 2000 Census data - Blocks 1000,1003-1010,1034-1105,1124-1139,2000-2004,2067,3013-3015 (estimations were made based on area for blocks that extended beyond the plan boundary)															
(2)	Based on totals received from MDT staff of 250 retail and 250 non-retail employees															
(3)	Based on Manhattan Growth Policy land use designation and proposed development at a gross density of 2.5 dwelling units per acre															
(4)	Assumption of a occupancy rate of 2.45 per dwelling unit.															
(5)	Retail Employment was calculated using 16% of the projected population employed locally, or a constant of 1.45 employees per acre of non-residential land use, where no residential land use is designated. For areas with no commercial/industrial land use designation, zero is used.															
(6)	Non-Retail Employment was calculated with 16% of the population employed based on current conditions, or a constant of .87 employees per acre of non-residential land use where no residential land use is designated. For areas with no commercial/industrial land use designation, zero is used.															

Appendix C: Recommended Daily Capacities



Memorandum
Alternatives Analysis Reviewers
 December 19, 2002 – Revised April 7, 2003

Table 1
Recommended Link Capacity (Daily)

Functional Classification / Lanes	Daily Capacity LOS "D"	
	CBD	Non-CBD
- Freeway		
4-lane	73,300	73,300
6-lane	110,000	110,000
- Arterial (Urban)		
2-lane	9,600	10,700
2-Lane/Left or Right ¹	13,200	14,500
2-Lane/Left/Right ²	15,200	16,400
4-Lane (Undivided)	20,300	22,600
4-Lane Left or Right ¹	24,500	27,300
4-Lane/Left/Right ²	26,500	29,400
6-Lane/Left/Right ²	39,700	44,100
- Collector (Urban)		
2-Lane	6,600	7,300
2-Lane/Left or Right ¹	8,800	9,600
2-Lane/Left/Right ²	9,800	10,700
4-Lane (Undivided)	13,900	15,400
4-Lane Left or Right ¹	16,500	18,300
4-Lane/Left/Right ²	17,500	19,500
6-Lane/Left/Right ²	26,300	29,200
- Arterial/Collector (Rural)		
2-Lane	NA	6,000
2-Lane/Left or Right ¹	NA	6,600
4-Lane (Undivided)	NA	16,000
4-Lane Left or Right ¹	NA	17,600

Note: 1 - Left and right turn lanes are assigned similar capacity for this macro-scale analysis. Right turns on red are underestimated.
 2 - Divided and undivided segments are not separated.
 Center left turn lanes and left turn lanes impact capacity to similar levels.
 Free rights and right turn lanes impact capacity to similar levels.
 LR - similar capacity as 4-Lane.

TRANSPORTATION PLAN:

Motion-Ryan; Second-Bennett; Vote-Unanimous: To approve the revisions as suggested by the Manhattan City-County Planning Board and the Montana Department of Transportation to the Manhattan Growth Policy Transportation Plan. Johnson referred to his October 6, 2006, staff report. Johnson stated that the Planning Board reviewed the submitted transportation plan by WGM Group and came up with three modifications to the plan. Johnson stated that the first was to modify the collector street cross section and recommended utilizing a sidewalk and bike lane on each side of the collector along with a 11 ft wide traffic lane, plus a 1 ft easement. Johnson stated that the second recommended change was to require that the north-south collector street shown east of Manhattan be at a minimum of 100 ft from the existing municipal boundary. Johnson added that the Planning Board suggests that an additional collector street be added east of the railroad pass to provide a connection to the frontage road. Johnson went through the Montana Department of Transportation recommendations. Johnson stated that the MDOT is urging the Town to discuss with the railroad the addition of another at-grade railroad crossing. Johnson added that MDOT feels a 20ft median width should be considered instead of 12 ft as proposed. Bennett asked if the Town should put the request for a west at-grade railroad crossing in writing to the railroad. King suggested that the far east crossing be abandoned and traded for a west crossing. Ryan suggested that the future traffic statistics be sent with the written request to the railroad. Mersen stated that the request for the west crossing should be done in conjunction with Pioneer Crossing as this is part of the development's preliminary plat conditions. Mersen stated that she will report back to the Council at the January meeting on the availability on working with Pioneer Crossing to form the request for the west railroad crossing. Haag thanked the Planning Board for the work that they did on the modifications to the growth policy transportation plan.

October 6, 2006

TO: Manhattan Town Council

FR: Ralph Johnson, AIA, APA
Planning Consultant, Town of Manhattan

RE: Growth Policy
Proposed Revisions to Transportation Plan

At the September 20, 2006 meeting of the Manhattan City-County Planning Board an appropriately advertised public hearing was conducted with regard to revising the Manhattan Growth Policy Transportation Plan to reflect the recommendations contained in the WGM Group report: "A Transportation Plan for the Town of Manhattan" dated June 22, 2006. The staff report was presented and highlights of the WGM report were explained.

Numerous individuals spoke in opposition to the appropriateness and location of the proposed north-south collector located between East Manhattan Road (Dry Creek Road) and Railroad Avenue as shown in Options A and B. Public comment was unanimously in favor of an additional railroad crossing as indicated in Option A. After taking public comment the public hearing portion of the meeting was closed. The Board lacked a quorum therefore no action was taken.

At the October 5, 2006 the Board reviewed public comment and the staff report. Following this review and discussion **the Board voted unanimously to recommend adoption of the WGM Group Recommendations and Option A with the following conditions:**

- 1. As modified on the attached Growth and Transportation Plan**
- 2. As modified for the attached collector street cross section**
- 3. As modified to require a minimum 100' separation between the eastern boundary of the Clinton Addition and the proposed western right-of-way for the north-south collector between East Manhattan Road (Dry Creek Road) and Railroad Avenue.**

The following is the staff report presented at the Manhattan City-County Planning Board September 20, 2006 meeting.

Background

WGM Group, Inc. has completed "A Transportation Plan for The Town of Manhattan" dated June 22, 2006. The Manhattan Town Council has previously held a public hearing

with regard to the plan and forwarded it to the Planning Board for review, comment and recommendations.

WGM Group proposed two alternatives identified as Option A and Option B. The principle distinctions between the two options are:

1. Option A proposes a railroad crossing to the west of the existing Broadway crossing aligning with the proposed Journey Street.
2. Option B does not propose a railroad crossing west of the existing Broadway crossing.
3. Option B proposes a collector street south of Dry Creek Road (East Manhattan Road) aligning with the existing Cedar Street and connecting to the existing Manhattan Road South railroad crossing.
4. Option A proposes a collector street south of Dry Creek Road (East Manhattan Road) east of the existing Cottonwood Street and its residential development (Clinton Addition).

Both Option A and Option B have two significant elements in common.

1. Railroad Avenue is to be extended east past the Frontage Road railroad overpass to provide access to the overpass from the north side of Manhattan.
2. The existing I-90 interchange is to be split providing access from and to the west at the existing Broadway interchange. A new interchange, providing access from and to the east is proposed at Manhattan Road South.

Staff Comment

Option A is consistent with the existing Growth Policy Transportation Plan in that it anticipates a third railroad crossing west of the existing Broadway crossing. This is critical if a loop traffic system is to utilize Woodenshoe Lane as an alternative means of reaching the existing (and future) I-90 interchange(s).

Option B provides a more realistic location for a future north-south collector linking Nixon Gulch Road (East Manhattan Road) to the eastern extension of Railroad Avenue. Option A requires rebuilding Cedar Street as a collector street through an existing neighborhood. This would devalue the existing neighborhood and direct traffic to the existing Manhattan Road South railroad crossing which is very close to the existing Broadway crossing. Option B moves the north-south collector east which would make the existing overpass a more commonly used option and diminish the dependence on the existing Manhattan Road South railroad crossing.

Page 19 of the WGM Group Plan illustrates the cross section characteristics for arterial, collector, parking and local streets. This is consistent with the existing Growth Policy Transportation Plan. The WGM Group Plan; however, appropriately redesignates some streets that were arterials as collectors. The streets redesignated as collectors will be urban streets and as such would be inappropriate for an adjacent gravel trail. A more appropriate cross section for collector streets would be 11 ft. traffic lanes, 5 ft. bike lanes,

8 ft. planting boulevards, 5 ft. sidewalks and 1 ft. setback from property lines creating a 60 ft. right-of-way.

Staff Conclusions

Attached is a proposed Growth Policy Transportation Plan that combines attributes of the WGM Group's Options A and B, approved preliminary plats, and the conservation easements that limit the Town of Manhattan's growth to the north, west and east. Its principle features are:

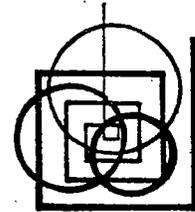
1. A railroad crossing west of Broadway at the proposed Journey Street linking to the proposed western extension of Woodenshoe Road.
2. A north-south road from an eastern extension of the proposed Macoun Road crossing Dry Creek Road and continuing south to an extension of Railroad Avenue. The specific location of this road is not critical except in two regards:
 - a. It must cross Dry Creek Road without requiring a jog on Dry Creek Road.
 - b. It must be located such that it aligns east of the existing Clinton Addition.
3. A north-south road from Dry Creek Road south to a point east of the Frontage Road railroad overpass that permits appropriate access to the Frontage Road overpass.
4. This road system is intended to draw traffic from the north in a distributed manner by creating four approximately equal distant (east to west) north south collectors including the existing Nixon Gulch Road and Yadon Road, plus the proposed collector east of Yadon Road, and the proposed collector intersecting the Frontage Road east of the overpass.

Staff Recommendations

Public comment must be consider, however, assuming no significant comments to the contrary staff recommends revising the Growth Policy Transportation Plan to conform to the WGM Group recommendations:

1. As modified on the attached Growth and Transportation Plan dated August 18, 2006
2. Page 19 modified to indicate that the collector street cross section will consist of 11 ft. traffic lanes, 5 ft. bike lanes, 8 ft. planting boulevards, 5 ft. sidewalks and 1 ft. setbacks from property lines creating a 60 ft. right-of-way.
3. Upon concurrence by the Montana Department of Transportation

cc: Planning & Zoning Board



September 20, 2006

TO: Manhattan City-County Planning Board

FR: Ralph Johnson, AIA, APA
Planning Consultant, ~~Town of Manhattan~~

RE: Growth Policy
Proposed Revisions to Transportation Plan

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Staff Conclusions

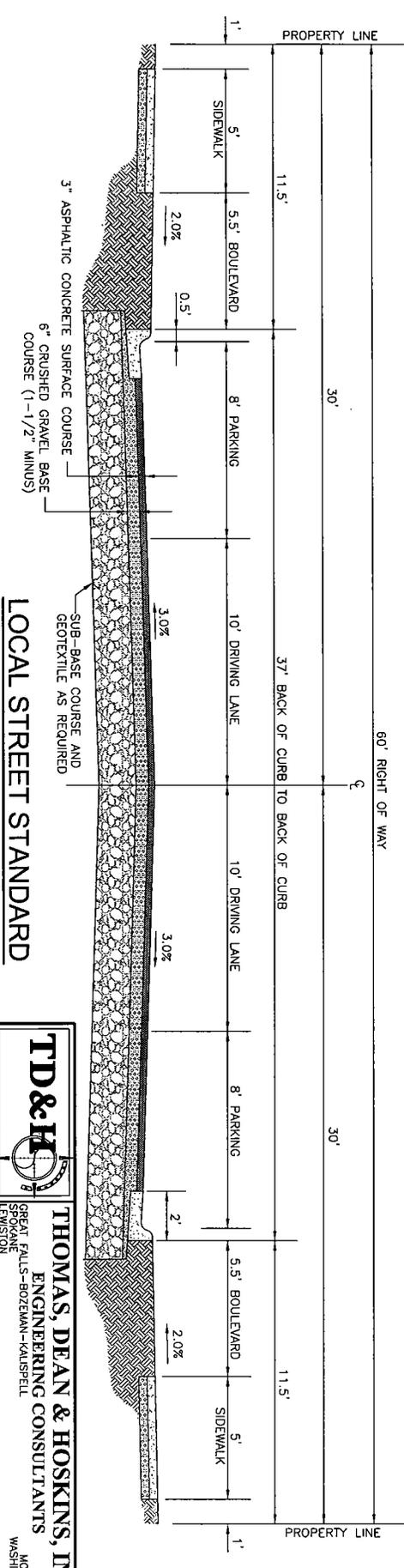
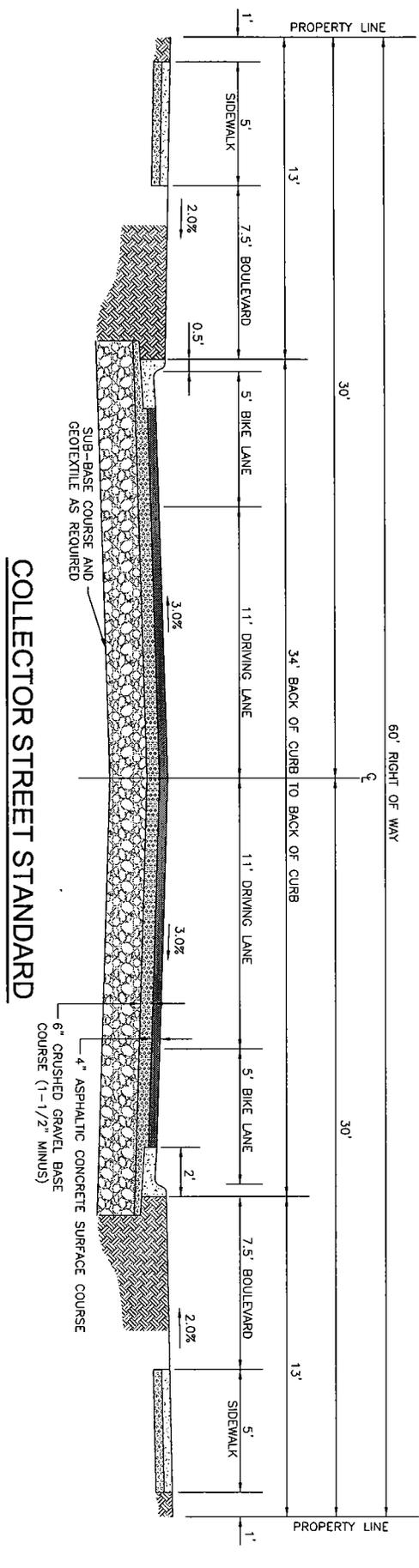
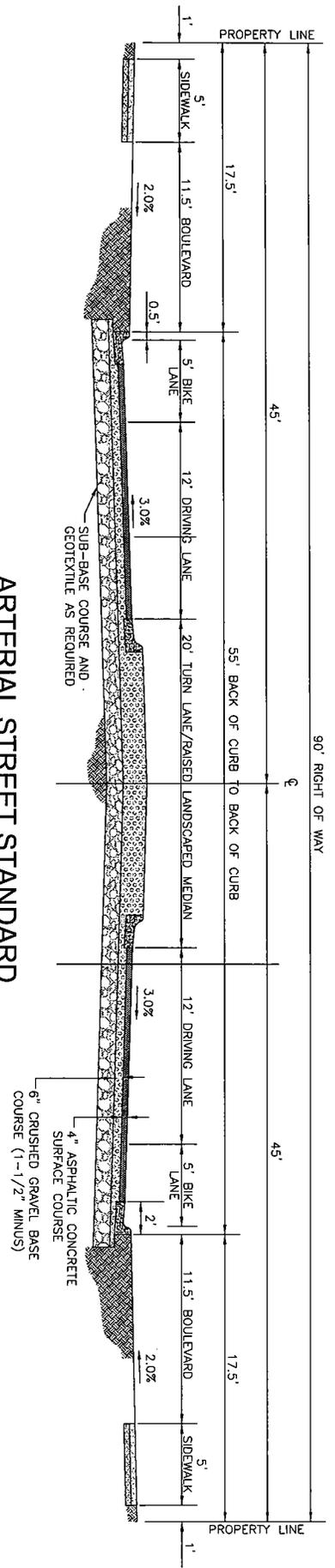
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MONTANA WASHINGTON IDAHO			
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DESIGNED BY:	PLANNING	FIGURE NO.:	A-1
QUALITY CHECK:	DJC	CAD NO.:	412023BASE.DWG
		2006 MANHATTAN TRANSPORTATION PLAN AMENDMENT	