SECTION 10

Recommended Projects

Capital improvement projects were identified through implementation of a risk rating system. The resulting recommended projects are listed in this section. In addition to capital improvements, tasks related to operation, maintenance, and management of storm drainage infrastructure and assets are recommended.

10.1 Evaluation of Potential Pipeline Improvements

Capital improvement projects were identified using a risk rating system that was based on eight factors:

- **Existing hydraulic deficiency:** All pipes were assigned a hydraulic deficiency level from 0 to 4 according to the criteria described in Section 7.
- **Surcharge severity:** An additional risk factor was added when the surcharge level was estimated to be near the surface and lead to street flooding.
- **Reports of historic flooding:** A risk factor was added for areas where City staff have observed frequent flooding.
- **Reported maintenance problems:** City staff identified areas where maintenance problems currently exist.
- **Location relative to other deficient pipes**: Pipes that are located adjacent to pipes that are highly deficient will likely need to be upsized to accommodate the increase in flow due to upsizing of adjacent pipes. A series of deficient pipes also leads to a compounding effect, which causes flooding to be more severe. An additional risk factor was added to these pipes.
- **Proximity to high use or important public areas:** Frequent floods in these areas have a greater impact on the community and thus receive an additional risk factor to increase to the priority of these problem areas.
- **Projects that were previously identified as recommended capital improvement projects:** Capital improvement project from the previous master plan that have not yet been constructed were reevaluated during the master plan update and when those projects were confirmed to be continued problems, an additional risk factor was included.
- **Correction factor for pipes that have not been surveyed:** A small portion of the evaluated pipes were not surveyed, therefore, the pipe slope had to be assumed. The assumed slope of the pipe was assumed to be equal to minimum slope, which is a conservative assumption. To account for the uncertainty and conservatism of this assumption a risk factor point was removed from the total risk rating since the hydraulic deficiency of these pipes is less certain.

Each pipe receives a total risk rating based on the cumulative total of risk factors. Areas with pipes that have a risk rating of five or more are recommended capital improvement projects.

Since the hydraulic analysis was limited to areas were survey data were available, these areas were furthered reviewed qualitatively as "systems" to account for the fact that other adjacent and downstream pipes that were not included in the analysis would also need to be replaced. This approach provides a better means for estimating the probable project cost.

10.2 Recommended Capital Projects

Recommended conveyance improvement projects are shown in Figure 10-1 and listed in Table 10-1. The complete list of potential pipeline improvements is provided in Appendix C. Individual project fact sheets identifying the project location and describing the specific pipe sections to be improved are provided in Figures 10-2 through 10-14. The figures show capacity improvement projects only. Operations and maintenance projects discussed in Section 10.3 are not shown.

Also considered in the development of a recommended projects list were the operations and maintenance issues described in Section 8. The resulting recommended projects list is shown in Table 10-1 with total length of pipe, average pipe diameters, and estimated project costs. These costs include administration, design, and construction. They do not, however, include expenses for the purchase of easements or rights-of-way where they may be required nor do they include the cost of financing. Additional cost development information is included in Appendix C in the text titled Cost Estimate Supporting Materials. The locations of the recommended projects are shown in Figure 10-1.

Detailed project descriptions organized by basin are located in Section 7 and described in Section 8, Table 8-1. Due to the level of detail in analysis of drainage systems in this plan update, project areas, including number of pipes and sizing, are approximate. During concept and predesign stages of any capital project, additional study should occur for localized hydraulic conditions and potential solutions that might narrow, or widen, the scope of the project to provide necessary improvements. Information in Table 10-1 is intended to identify key drainage problem areas and plan for adequate funding to carefully investigate and make improvements as required.

TABLE 10-1
Recommended Capital Projects
City of McMinnville Storm Drainage Master Plan

Project Name	Total Length of Pipe (feet)	Range of Replacement Pipe Diameter (inches)	Estimated Project Cost
Hilary St from Clifton Ct to Hilary Ct	581	18-21	$130,000
Linfield Ave from Baker St to Melrose Ave	729	21	$170,000
Brockwood Ave to Edmunston St then east to Drumwood Ave	957	36	$330,000
Cleveland Ave from Davis St to east of Villard St	2,349	21	$550,000
1st St from Adams St to Evans St	1,544	18-24	$350,000
4th St from Birch St to Davis St	1,672	18-30	$410,000
Elm St and 12th St	2,968	21-48	$970,000
Alpine St from 7th Ave to 12th Ave	1,750	15-21	$380,000

TABLE 10-1
Recommended Capital Projects
City of McMinnville Storm Drainage Master Plan

Project Name	Total Length of Pipe (feet)	Range of Replacement Pipe Diameter (inches)	Estimated Project Cost
Kirby and 13th St	790	21	$180,000
Adams St from 20th St to 17th St	928	21	$220,000
Evans St from 15th St to 17th St	466	21	$110,000
Galloway St from 13th to McMinnville High School	690	27-30	$200,000
McDonald Ln from 17th St to 18th St	363	21	$90,000
Outfall stabilization*	4 locations	Not applicable	$200,000
Booth Bend and Davis*	Unknown	Unknown	$200,000
Michelbook Catch Basins*	Unknown	Unknown	$100,000
High School Catch Basins*	Unknown	Unknown	$100,000
3rd Street west to City Park*	Unknown	Unknown	$200,000
TOTAL			**$4,900,000**

* Lump sum cost estimate is provided as a project allowance; no detailed cost estimate was prepared.

10.3 Other Stormwater Program Recommendations

In addition to capital improvements, the City is responsible for the operation, maintenance, and management of storm drainage infrastructure and assets. Through the course of the master plan update, the following additional, program-related tasks were identified and are recommended for the continued management of City facilities:

- Enhance the City's geographical information system (GIS) mapping and database of drainage facilities by collecting additional field survey data. To more effectively evaluate system capacity and possible improvements, identify maintenance priorities, and track system changes over time, a complete database with pipe invert data, pipe material, manhole rim elevations, catch basin types, water quality facilities, and detention facilities would be valuable. Much of this information will be needed during predesign of capital improvements, and may be collected more efficiently citywide.
- Perform a review of maintenance activities and best practices gap analysis to ensure that the current system is functioning effectively before investing in capital improvements. For example, a pipe that has accumulated sediment may not be able to convey the same flow as one that is cleaned more frequently. Many maintenance practices also have implications for receiving water quality and should also be considered in light of potential regulatory requirements
- Create stormwater ordinances and revise design and construction standards to reflect water quality best practices.

- Perform a review of financing, utility, and rate structure to ensure adequate program operating and capital funds.

Table 10-2 summarizes these recommendations and assigns a cost allowance to each.

TABLE 10-2
Program Recommendations
City of McMinnville Storm Drainage Master Plan

Recommendation	Cost Allowance*
Conduct detailed asset survey and GIS analysis	$300,000
Review maintenance practices	$50,000
Update ordinances and standards	$50,000
Review finance and rate structure	$50,000
Total	**$450,000**

* Lump sum cost estimate is provided as a project allowance.

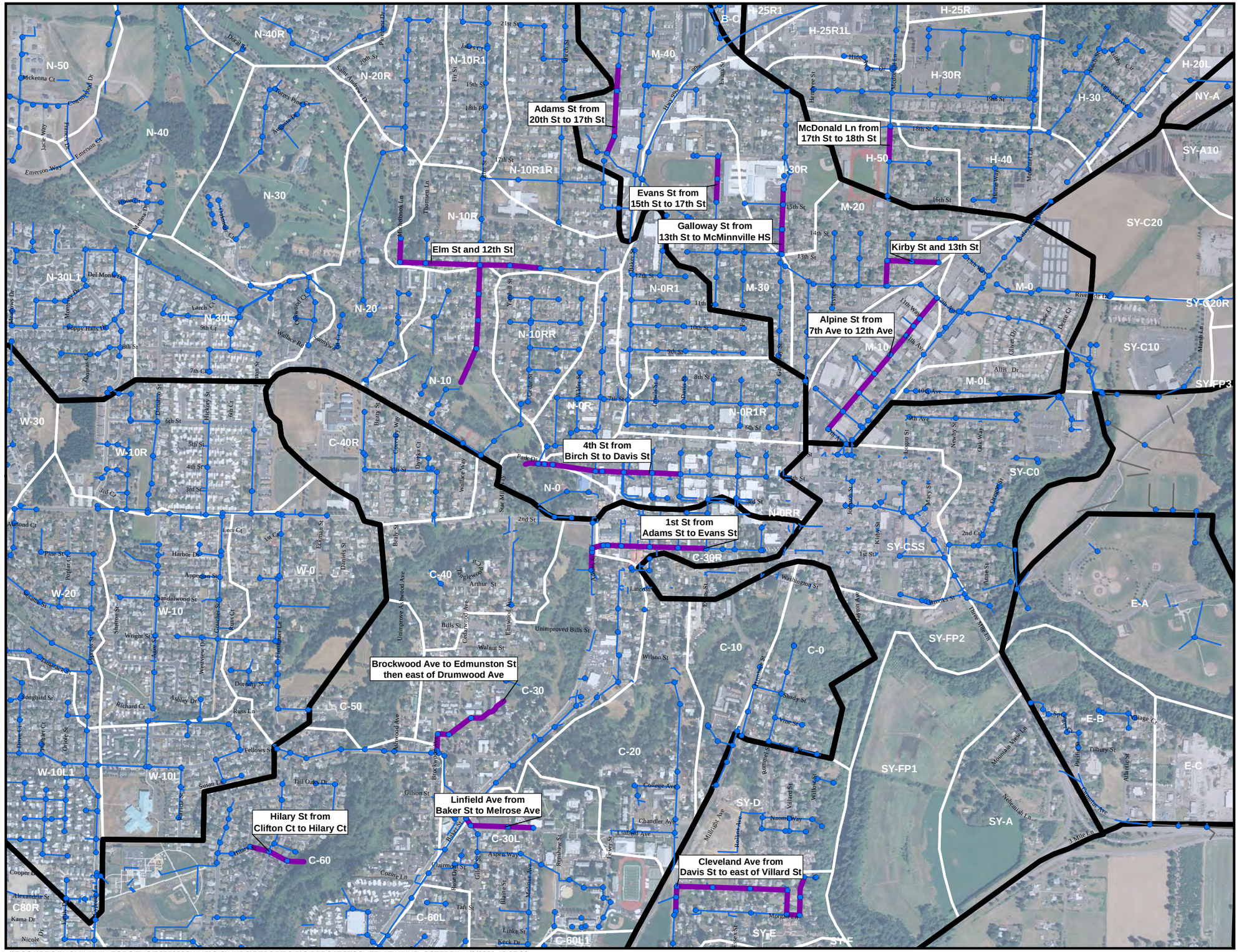

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FIGURE 10-1

Recommended Capital Improvement Projects

City of McMinnville Stormwater Drainage Master Plan

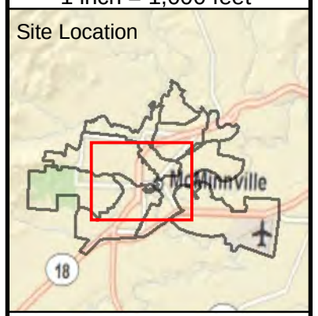
Legend

- Capital Improvement Project (CIP) Area
- Manhole
- Existing Storm Pipe
- Major Basin
- Sub-Basin

N

1 inch = 1,000 feet

Site Location



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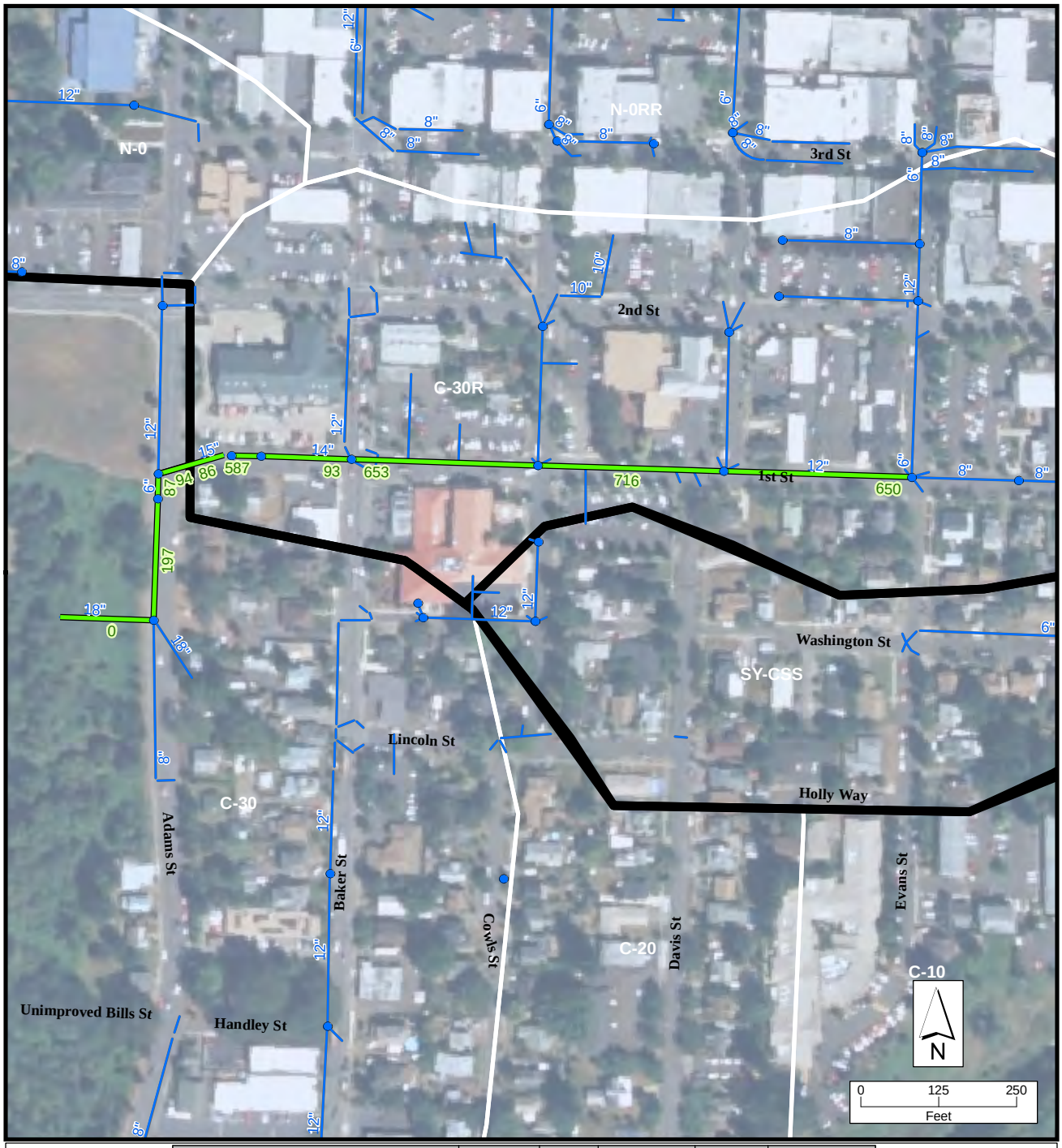
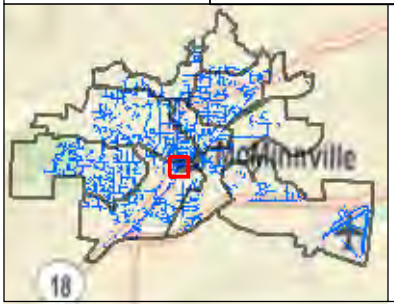


CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
1st St from Adams St to Evans St	650*	300	18	214	$ 64,300
	716	291	18	214	$ 62,400
	653*	300	18	214	$ 64,300
	93	137	21	233	$ 32,000
	587	39	21	233	$ 9,100
	94	49	21	233	$ 11,500
	86*	50	21	233	$ 11,700
	87*	41	24	246	$ 10,100
	197	187	24	246	$ 46,000
	0*	150	24	246	$ 36,900
				Sub-Total =	$ 348,300

* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-2
1st Street from Adams Street to Evans Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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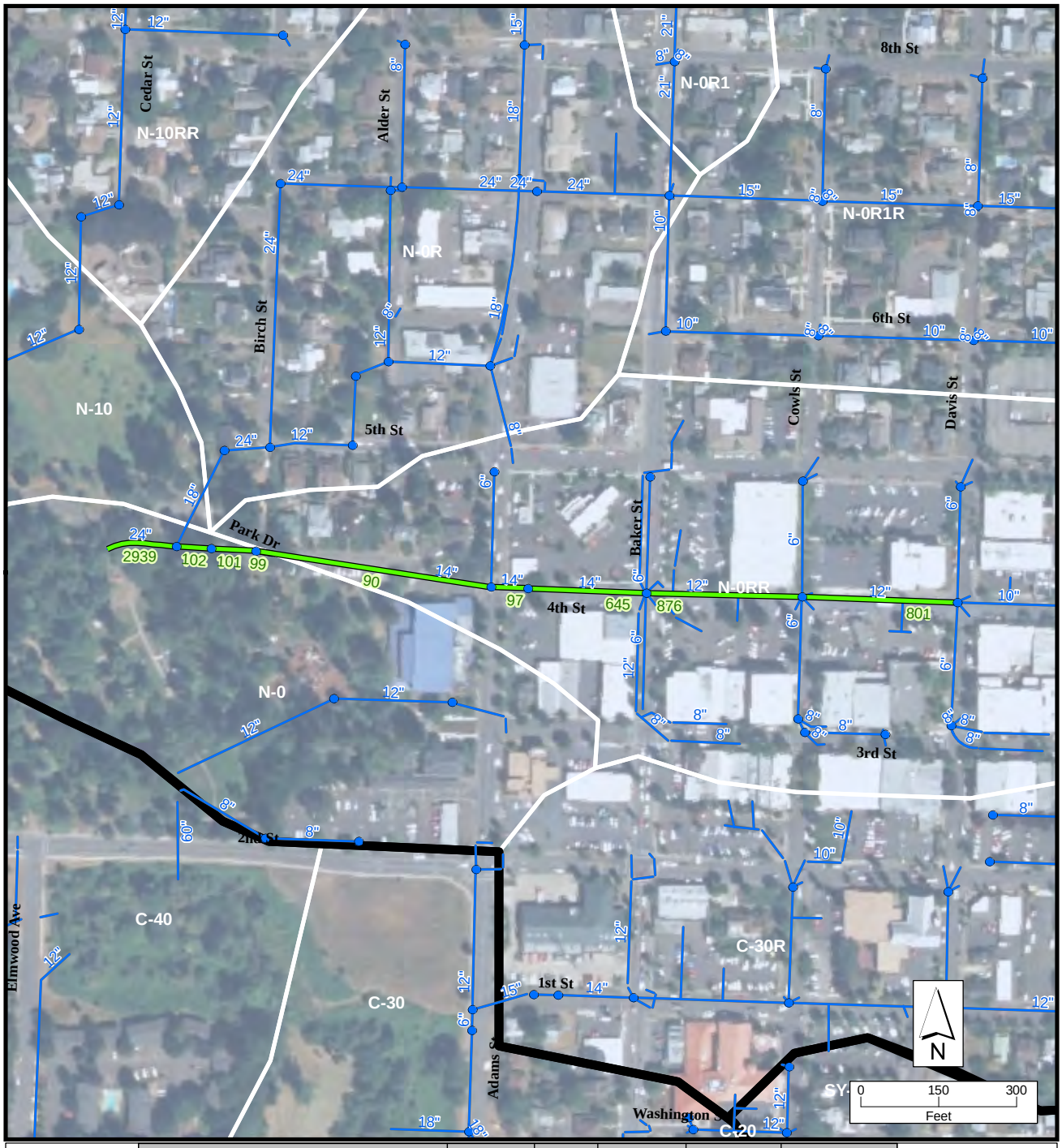
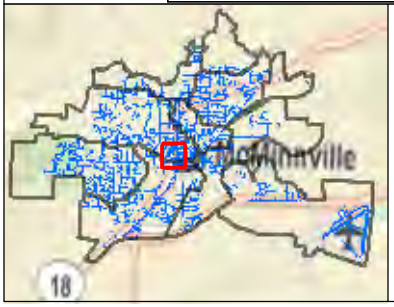


CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
4th St from Birch St to Davis St	801*	300	18	214	$ 64,300
	876	292	21	233	$ 68,200
	645	228	24	246	$ 56,100
	97	63	24	246	$ 15,500
	90*	462	24	246	$ 113,600
	99	29	30	290	$ 8,400
	101	82	30	290	$ 23,800
	102	63	30	290	$ 18,300
	2939*	153	30	290	$ 44,400
				Sub-Total =	$ 412,600

* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-3
4th Street from Birch Street to Davis Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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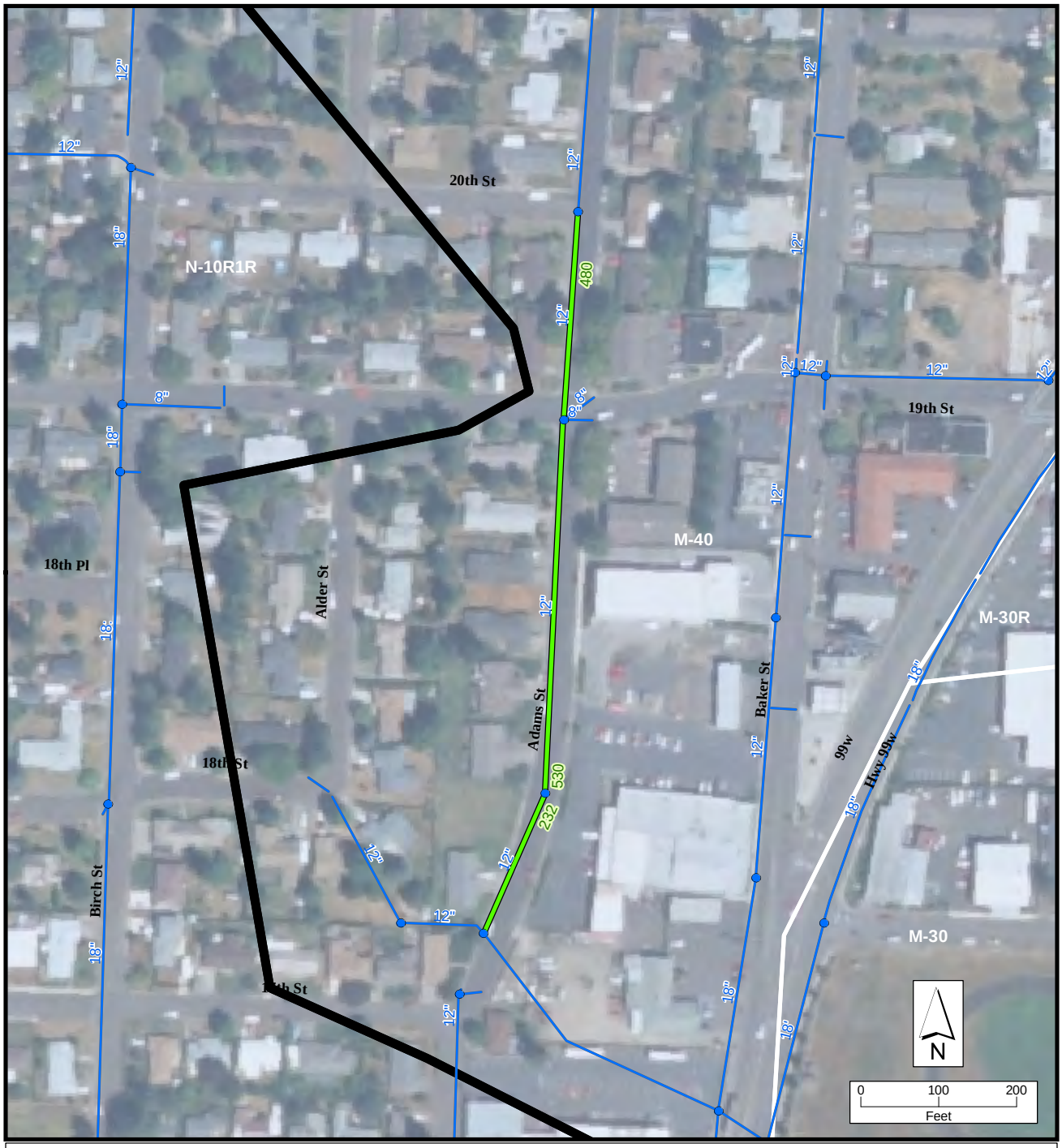
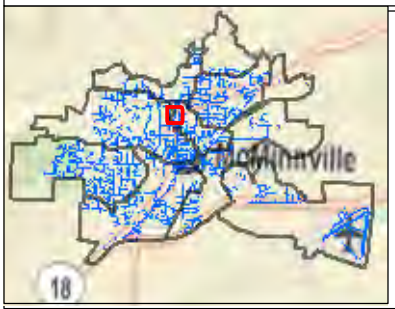


CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Adams St from 20th St to 17th St	480*	268	21	233	$ 62,500
	530	472	21	233	$ 110,100
* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.	232	189	21	233	$ 44,000
				Sub-Total =	$ 216,600



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-4
Adams Street from 20th Street to 17th Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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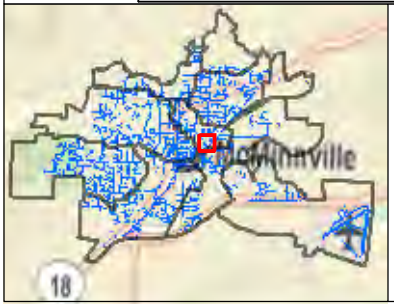
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Alpine St from 7th Ave to 12th Ave	862	234	15	202	$ 47,200
	630	252	15	202	$ 50,900
	929*	261	15	202	$ 52,700
	1004	253	18	214	$ 54,300
	981	262	21	233	$ 61,100
	577	116	21	233	$ 27,100
	624	95	21	233	$ 22,300
	576	276	21	233	$ 64,500
				Sub-Total =	$ 380,100

* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-5
Alpine Street from 7th Avenue to 12th Avenue
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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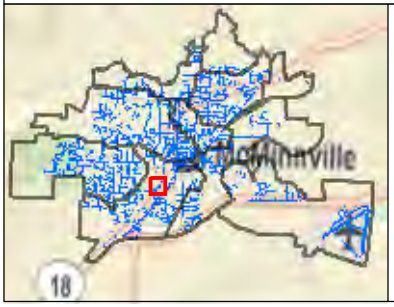
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Brockwood Ave to Edmunston St then east to Drumwood Ave	611	159	36	347	$ 55,200
	90	113	36	347	$ 39,200
	91	285	36	347	$ 98,900
	3524*	400	36	347	$ 138,800
				Sub-Total =	$ 332,100

* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-6
Brockwood Avenue to Edmunston Street then east to Drumwood Avenue
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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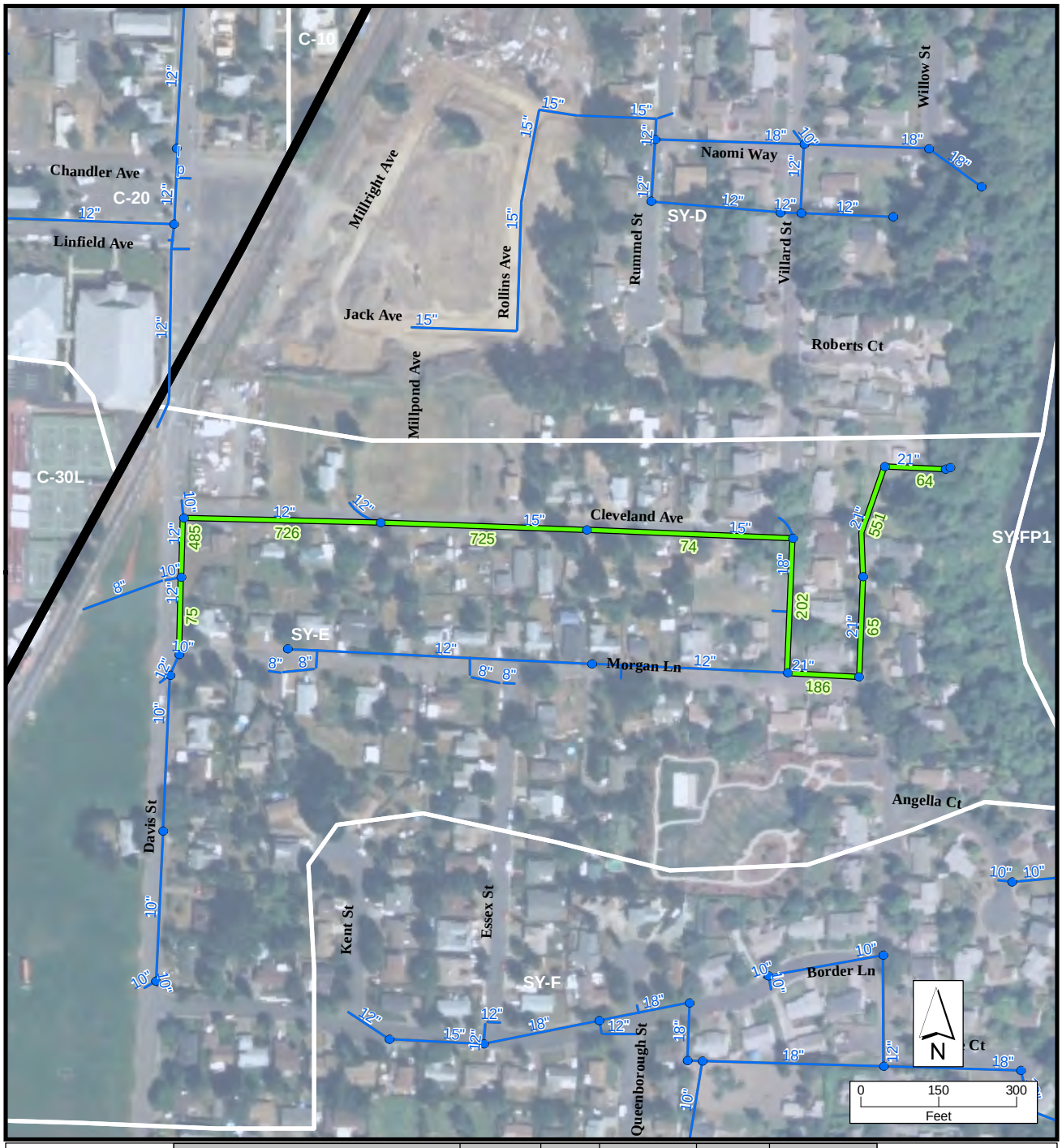
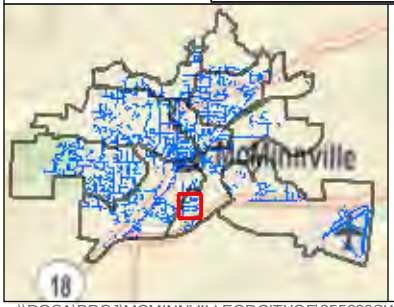


CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Cleveland Ave from Davis St to east of Villard St	75	141	21	233	$ 32,900
	485*	114	21	233	$ 26,600
	726	379	21	233	$ 88,500
	725	389	21	233	$ 90,800
	74	389	21	233	$ 90,800
	202	252	21	233	$ 58,800
	186*	138	21	233	$ 32,200
	65*	193	21	233	$ 45,000
	551*	219	21	233	$ 51,100
	64	135	21	233	$ 31,400
				Sub-Total =	$ 548,100

* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-7
Cleveland Avenue from Davis Street to east of Villard Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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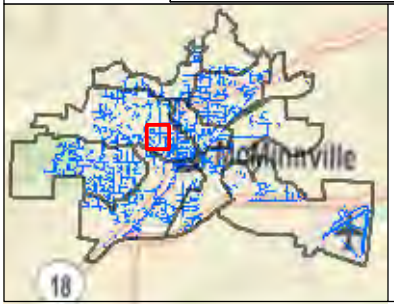
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Elm St and 12th St	591	243	21	233	$ 56,700
	704*	274	24	246	$ 67,400
	115	565	30	290	$ 164,000
	766	317	21	233	$ 74,100
	111	309	21	233	$ 72,100
	114	293	48	423	$ 123,800
	546	272	48	423	$ 115,000
	102*	300	48	423	$ 126,800
	1102*	395	48	423	$ 167,000
				Sub-Total =	$ 966,900

* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-8
Elm Street and 12th Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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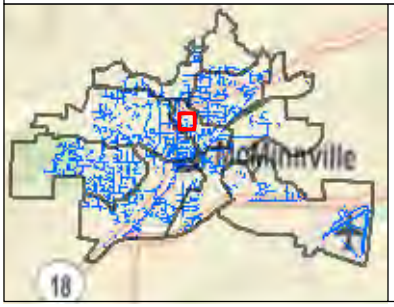
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Evans St from 15th St to 17th St	653	227	21	233	$ 53,100
	652	238	21	233	$ 55,700
				Sub-Total =	$ 108,800



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-9
Evans Street from 15th Street to 17th Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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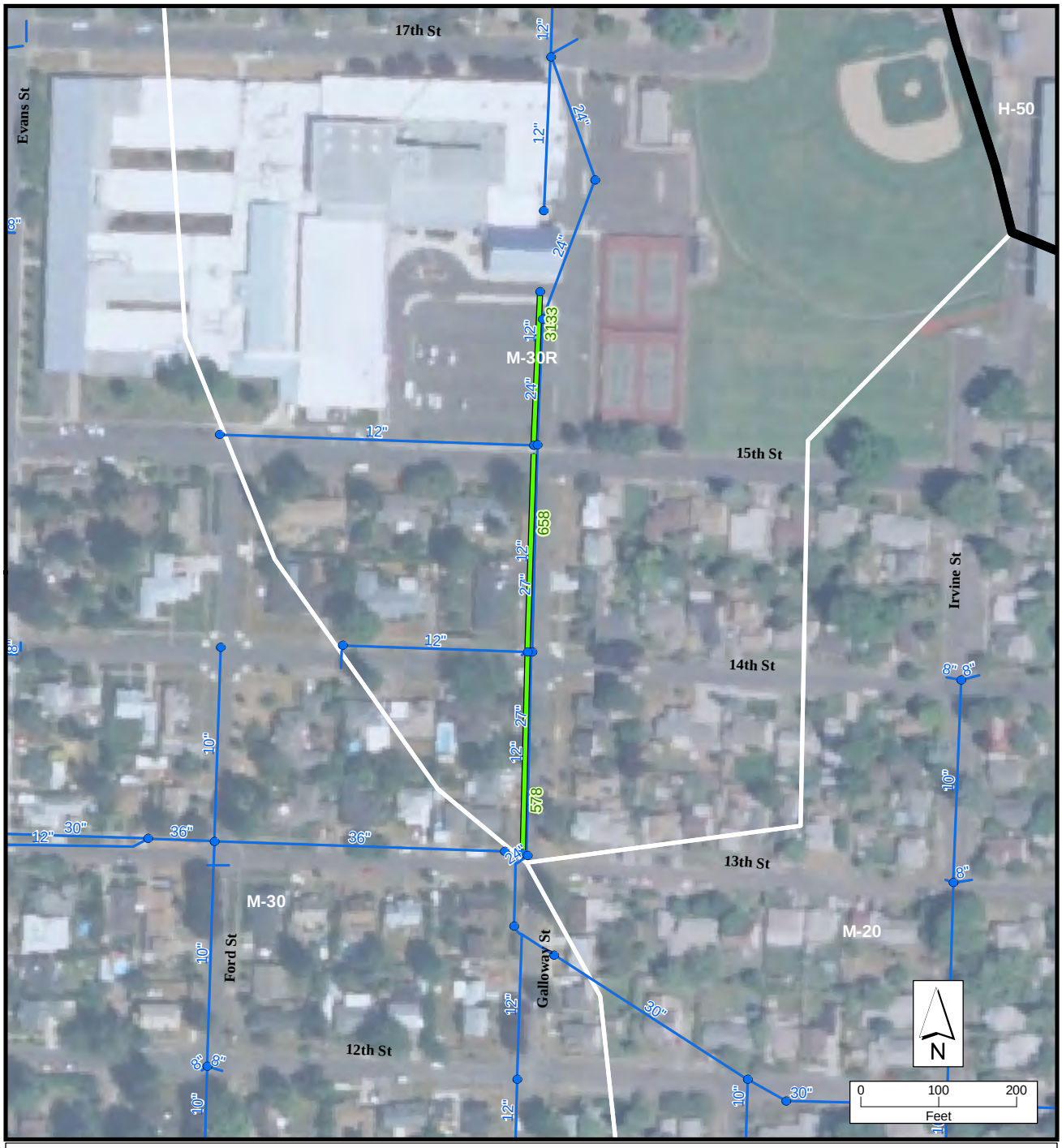
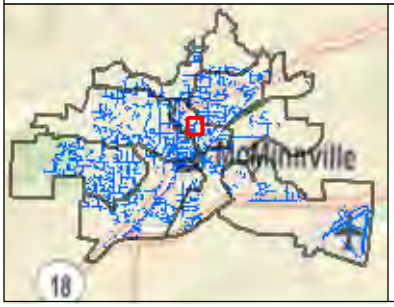


CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Galloway St from 13th St to McMinnville High School	3133	189	27	274	$ 51,900
	658	250	30	290	$ 72,500
	578	251	30	290	$ 72,900
				Sub-Total =	$ 197,300



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-10
Galloway Street from 13th Street to McMinnville High School
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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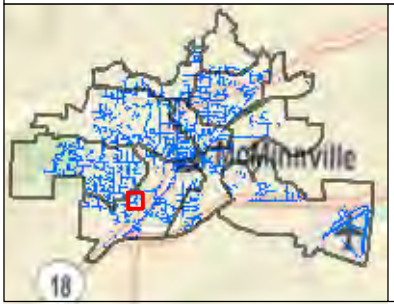
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Hilary St from Clifton Ct to Hilary Ct	622	197	18	214	$ 42,300
	621	211	21	233	$ 49,400
* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.	1023*	172	21	233	$ 40,100
				Sub-Total =	$ 131,800



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-11
Hilary Street from Clifton Court to Hilary Court
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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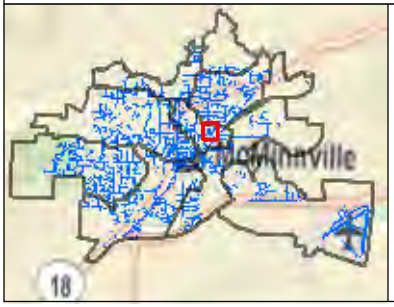
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Kirby and 13th St	994	279	21	233	$ 65,100
	995	251	21	233	$ 58,600
	998	259	21	233	$ 60,500
				Sub-Total =	$ 184,200



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-12
Kirby Street and 13th Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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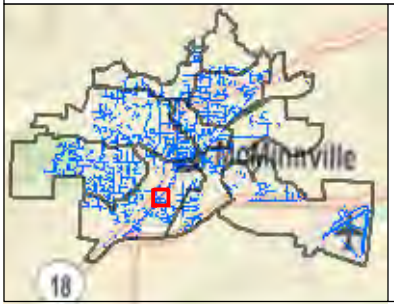
CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
Linfield Ave from Baker St to Melrose Ave	84	261	21	233	$ 61,000
	85	386	21	233	$ 90,100
* Individual pipe was not included in the hydraulic analysis but expected to be replaced as part of the project.	201*	82	21	233	$ 19,100
				Sub-Total =	$ 170,200



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-13
Linfield Avenue from Baker Street to Melrose Avenue
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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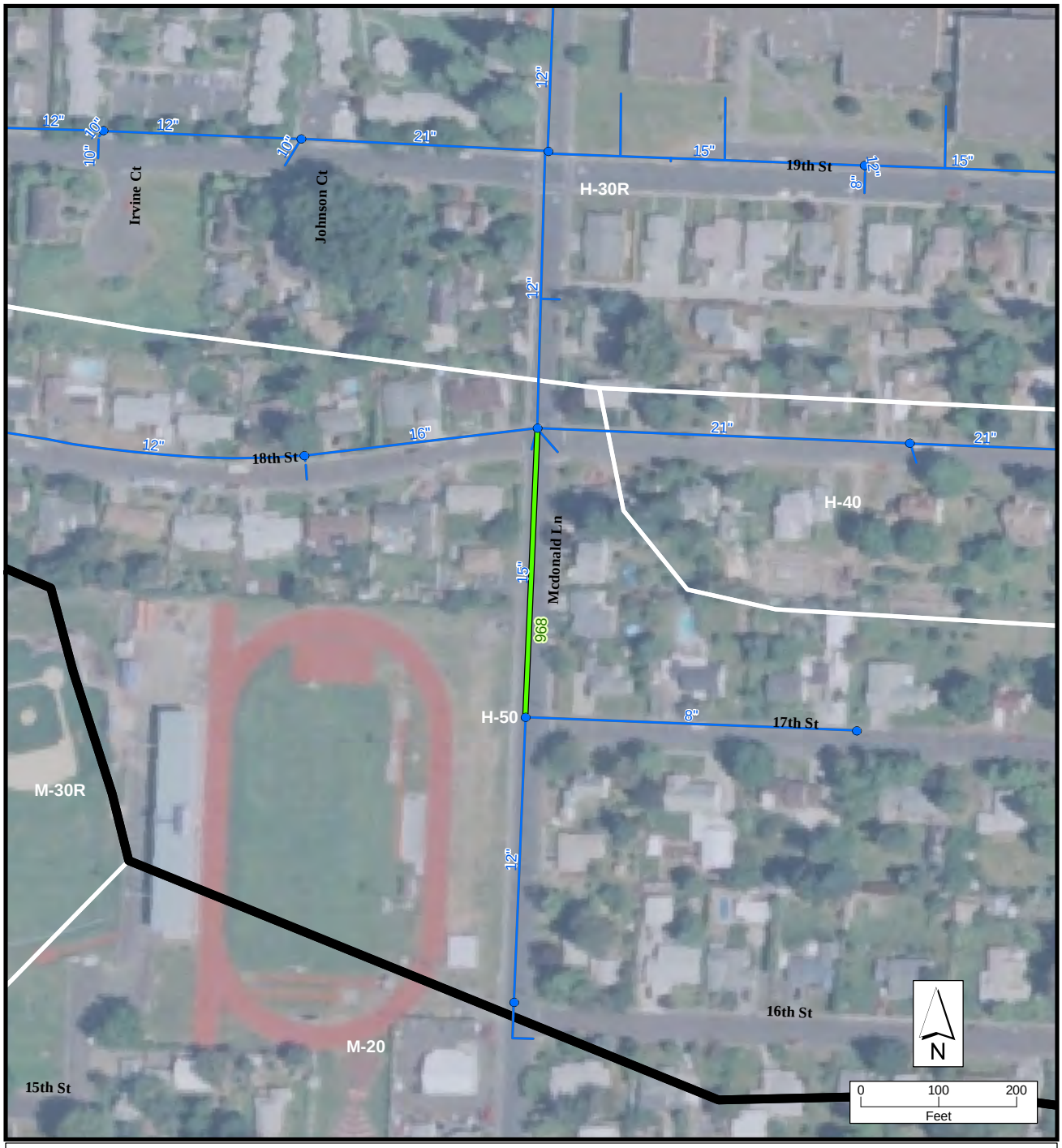
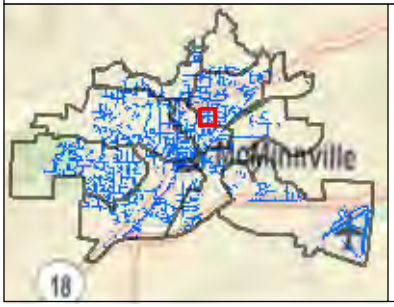


CIP Project Name	Pipe ID	Length (feet)	Replacement Diameter (inches)	Unit Cost ($/ft)	Replacement Cost
McDonald Ln from 17th St to 18th St	968	363	21	233	$ 84,800
				Sub-Total =	$ 84,800



Legend

- Manhole
- Existing Storm Pipe, No Work
- 1023 Existing Pipe w/ Pipe ID, Improvements Recommended
- Major Basin
- Sub-Basin

FIGURE 10-14
McDonald Lane from 17th Street to 18th Street
Recommended Capital Improvements
McMinnville Storm Drainage Master Plan

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