

FEASIBILITY REPORT

2012 STREET AND ALLEY RECONSTRUCTION

INTRODUCTION

The purpose of this report is to determine the feasibility of improving the following described streets by regrading, base reconstruction, necessary curb and gutter reconstruction, and resurfacing:

Sherwood Street - Nobles Street to Franklin Street
Franklin Street - East Avenue to Sherwood Street
Trevor Street - East Avenue to Murray Avenue

The purpose of this report is to also determine the feasibility of improving the following described alleys by regrading, base reconstruction, and resurfacing:

Alley in Block 28, Plat of Worthington (between Ninth Street and Tenth Street) from Sixth Avenue to Seventh Avenue, abutting Lots 2, 3, 10, and 11 (Northeasterly Alley);

Alley in Block 28, Plat of Worthington from Sixth Avenue to Seventh Avenue, abutting Lots 4, 5, 8, and 9 (Southwesterly Alley)

This report has been prepared pursuant to the Council resolution of March 26, 2012. The improvement has not been petitioned for and needs to proceed as a Council initiated improvement project. See Maps A and B for the location of the subject streets and alleys.

The improvement of Franklin Street excludes its intersection with Murray Avenue. Murray Avenue would be reconstructed through the Franklin Street intersection at a later date.

PROJECT NEED

Streets

All of the subject streets are residential streets constructed with flexible pavement (bituminous surface, aggregate base) and are concrete curb and guttered. All abutting land uses are residential. The width and year of construction of the streets are as follows:

Sherwood Street - 36 feet wide, constructed in 1981
Franklin Street - 36 feet wide, constructed in 1976
Trevor Street - 36 feet wide, constructed in 1981

All of the streets have met or exceeded the 20 year design life.

The streets' bituminous pavement no longer has the properties necessary to fulfill its function. The loss of the bituminous pavement qualities needed to sustain durable surfacing is generally due to material fatigue as well as material degradation. Fatigue develops from the accumulation of the minute deflections that occur with each wheel loading and is accelerated over time as natural factors

reduce the pavement's ductility. These factors ultimately limit the usable life of the surfacing regardless of other factors or deficiencies affecting the total pavement structure. Seasonally saturated soil conditions contribute to a weakening of the subgrade and aggregate base. The weakening of the subgrade and base reduces the load bearing capability of the total pavement structure to the point that it will no longer support normal loadings without excessive deflection or perhaps even failure. The effects of this weakening are typically recognized by surface deformation and extensive "map" or "an alligator pattern" cracking. Severe occurrences of this condition resulting from frost melt are commonly referred to as "frost boils". The results of this condition may be found throughout the length of the subject streets. The seasonal saturation aggravates the blending of the subgrade clay soils and aggregate base which permanently reduces the strength and function of the base. The combination of factors has deteriorated the total bituminous pavement structure of the streets to the point they no longer are able to provide an acceptable level of service. It is recommended that the existing pavement structure (base and surfacing) be removed and replaced as part of a street reconstruction in order to restore the total pavement system.

Dislocated concrete curb and gutter should be removed and replaced as necessary to maintain reasonable water flow, with any ponding water to be contained within the concrete gutter area.

Alleys

Both of the alleys are constructed with flexible pavement (bituminous surface, aggregate base) and have exceeded a 20 year design life.

The Northeasterly Alley, which is parallel to and closest to Tenth Street, was improved in 1974 as an assessable project. The properties on the northeast side of this alley abut Tenth Street and are zoned and used for commercial purposes. The properties on the southwest side of the Northeasterly Alley are zoned residential multi-family uses. The lot abutting the southwest side of the alley and Seventh Avenue is used for residential purposes while the lot abutting the southwest side of the alley and Sixth Avenue is used for parking (Avera Clinic).

There is no record of the improvement of the Southwesterly Alley; however, it appears to have been surfaced at the time the most southerly parking lot was developed in or before 1992. The properties on both sides of this alley are zoned for residential multi-family uses. The lots abutting the alley and Seventh Avenue are used for residential purposes while the lots abutting the alley and Sixth Avenue are used for parking (Avera Clinic).

In the same manner as the pavement of streets addressed in this report, the bituminous surfacing of the alleys no longer has the properties necessary to fulfill its function due to weathering and use. Likewise, seasonally saturated soil conditions are causing failure of the subgrade, aggregate base, and bituminous surfacing. Saturated subgrade failure is typically recognized by a "map" or "alligator" cracking pattern along with surface deformation and "pot holes" such as that found on the bituminous surface of the alleys. Saturation of the aggregate base and subgrade reduces the load bearing capability of the aggregate base to the point that it no longer can adequately support normal loadings nor provide an adequate base for structural overlay. The subgrade failure combined with weathering and use has deteriorated the bituminous surfacing to the point of no longer being able to provide an acceptable level of service.

It is recommended that, in regard to both alleys, the existing alley pavement structure (base and surfacing) be removed and replaced.

DESIGN

Streets

The City's Assessment Ordinance provides that residential streets shall be of "5 ton" design and that collector streets (including commercial and industrial access streets) shall be of "9 ton" design. Although the terminology "5 ton" or "9 ton" design reflects what might be considered outdated pavement design methodology, the intent of the standard is clear in defining that the pavement of residential streets should reflect the adjacent residential land use rather than being designed to potentially serve a collector or arterial function. A residential street design would therefore typically account for traffic consisting of predominately automobiles and light trucks together with minor quantities of trucks and buses to reflect normal residential services such as garbage hauling, school busing, and deliveries. All of the subject streets are subject to only such traffic and can be designed accordingly.

It is proposed that the streets be reconstructed utilizing a residential street section consisting of 3" of bituminous surfacing and 9" of aggregate base. It is recommended that the aggregate base include a layer of an open graded aggregate (drainable) base material. Use of the drainable base material as the bottom layer of the base together with proper edge drain tiles will allow for free drainage of that base material, intercept free water rising from below that layer, and allow for more rapid drainage of any excess moisture in the material above the drainable base. The drainable base material also provides a base layer that is less susceptible to loss of strength due to the presence of excess moisture. The depth of the drainable layer is recommended to be 4". Geotextile reinforcement fabric would also be installed in conjunction with the aggregate base. The geotextile fabric will reduce the migration of the subgrade clay into the drainable base material and reinforce the subgrade material (clay) during the spring transitional period when frost is melting out of the soil and the subgrade's bearing strength is the weakest.

Concrete curb and gutter should be removed and replaced where it has settled or has, in other ways, been dislocated on all streets. A majority of the curb and gutter on the streets can remain in place and should be in an acceptable condition throughout the life of the reconstructed pavement.

Alleys

Although the Northeasterly Alley does abut commercial properties, it is anticipated that the traffic will be similar to that of residential streets inclusive of the occasional truck and bus traffic. The Southwesterly Alley does not abut properties that are zoned commercial, however, it should be expected that the alley will be subject to periodic use by heavier vehicles for local deliveries, service, and maintenance. It is recommended that both alleys be improved with a typical minimum residential pavement section with an inverted crown. This pavement section should consist of a 3" bituminous surface and 9" aggregate base.

It is recommended that the aggregate base in both alleys include a layer of an open graded aggregate (drainable) base material and a centerline drain tile for the same reasons it is recommended in the street section as previously presented. The tile in each alley will need to drain to Seventh Avenue and be routed behind the street curb to the storm sewer at Ninth Street and Seventh Avenue. Although this extended tile installation will be a cost not typically incurred in alley improvements, the evidence of the need for base drainage in the alleys warrants the tile installation. Installation of geotextile fabric under the base layer is recommended to reduce the migration of the subgrade clay into the drainable base material and to reinforce the subgrade material (clay) during the spring transitional period when frost is melting out of the soil and the subgrade's bearing strength is the weakest.

The approaches of both alleys onto Sixth Avenue and the Northeasterly Alley approach onto Seventh Avenue are in poor condition and should be replaced. The Southwesterly Alley approach onto Seventh Avenue is in good condition, however, installation of the drain tile outlet will require that it be removed and replaced.

RELATED IMPROVEMENTS

Trevor Street and Franklin Street

The storm sewers within Trevor Street and Franklin Street were reconstructed in 2008 in anticipation of the street reconstruction. The 2012 Storm Sewer Utility fund includes a budget for pavement restoration relating to but not within the scope of necessary street improvements. This restoration includes the replacement of sidewalks, and curb and gutter removed as part of the storm sewer work. Restoration also includes the placement of an overlay on the trench crossing of Murray Avenue and replacement of concrete pavement in East Avenue at Trevor Street. Certain pavement adjacent to that being restored in East Avenue is in poor condition and should be replaced as part of the overall project. The additional work is not related to the 2008 storm sewer project and should not be funded from storm water utility revenues. The estimated costs for the Trevor Street and Franklin Street pavement restoration work, including the additional pavement replacement, engineering and contingencies, are \$39,600 and \$10,800, respectively. Due to the additional pavement replacement in East Avenue, these costs are \$13,350 above the combined pavement restoration budget of \$37,050. It is proposed that the costs above that budget in the storm water utility fund be financed from the general revenue budgeted for contract street maintenance.

COSTS AND FINANCE

In general, the distribution of assessable costs for the project is proposed as outlined in the City's Assessment Ordinance.

Streets

City share will include all costs for reconstruction of the center 24 feet of pavement with the costs for reconstructing the remaining width of pavement and for curb and gutter reconstruction being

assessed to the benefitted properties. Side yard lot allowances and intersecting alley frontages are also a city share of the project.

For the purposes of determining assessments, Franklin Street and Sherwood Street will be combined as a single street segment. The individual street segments would otherwise terminate at the bend located between Murray Avenue and Nobles Street.

The following provides the estimated costs, city share, assessments receivable, and assessment rates for the street improvements:

Franklin Street and Sherwood Street

| | | |
|--|-------------------|---------|
| City share for non-assessable costs ¹ | \$124,206 | |
| City share of assessable costs | <u> \$0</u> | |
| Total city share | \$124,206 | (85.5%) |
| Assessments receivable | <u> \$21,094</u> | (14.5%) |
| TOTAL COST | \$145,300 | |

The estimated assessment rate is **\$24.47/ft**

¹ City share for non-assessable costs includes \$104,800.00 for the center 24 feet, \$1,350.00 for salvaging aggregate base material, \$17,077 for lot allowances, and \$979 for the frontages of public right-of-way.

Trevor Street

| | | |
|--|------------------|---------|
| City share for non-assessable costs ¹ | \$47,019 | |
| City share of assessable costs | <u> \$0</u> | |
| Total city share | 47,019 | (83.5%) |
| Assessments receivable | <u> \$9,281</u> | (16.5%) |
| TOTAL COST | \$56,300 | |

The estimated assessment rate is **\$25.33/ft**

¹ City share for non-assessable costs includes \$40,600.00 for the center 24 feet, \$500 for salvaging aggregate base material, \$5,413 for lot allowances, and \$506 for the frontages of public right-of-way.

Alleys

The City’s Assessment Ordinance does not clearly distinguish a difference between assessing for street and alley surface improvements except in that section which establishes that there is to be no city participation in the costs for the reconstruction of the center 24 feet of an alley. Since adoption

of the Assessment Ordinance, all alleys, except Park Lane, have been 100% assessed against the property represented on a petition for improvement. All other alley improvements undertaken since adoption of the Assessment Ordinance have been accomplished through cooperative agreements with the City and have been directly financed by abutting property owners. Records indicate that costs for alley improvements made before the current Assessment Ordinance were generally 100% assessed to abutting properties. Alleys are considered to exist for the purpose of providing additional access to abutting properties and are not intended to carry through traffic for the community or neighborhoods. A possible exception to this is Park Lane which serves as part of the downtown circulation plan. In consideration of past practices and that alleys exist for direct benefit to only abutting properties, it is recommended that alley improvements be considered a direct benefit to abutting properties and be assessed without the allowances granted on street improvement projects.

Because of the wide variation in assessment rates that would result depending on whether or not the approaches needed replacement, the cost for alley approach work has not been included in the rate determining costs of recent alley improvement projects. Whereas replacing approaches and/or walks due to their condition is typically completed as maintenance work, it would also be inconsistent to assess the costs for similar work as part of an alley improvement. Likewise, it is proposed that the unusual costs associated with establishing the drain tile outlets be classified as non rate determining costs to prevent an assessment rate that is above a typical range for similar improvements.

The following provides the estimated costs, city share, assessments receivable, and assessment rates for the alley improvements:

Northeasterly Block 28 Alley

| | | |
|--|-----------------|---------|
| City share for non-assessable costs ¹ | \$13,450 | |
| City share of assessable costs | <u> \$0</u> | |
| Total city share | \$13,450 | (30.6%) |
| Assessments receivable | \$30,550 | (69.4%) |
| TOTAL COST | \$44,000 | |

The estimated assessment rate is **\$50.92/ft**

¹ City share for non-assessable costs includes \$7,400 for approach replacement and \$6,050 for tile outlet installation. The cost for the tile outlet from the Southwesterly Alley to Ninth Street is included in the cost of that alley. The cost for tile outlet installation for this alley will increase by approximately \$13,000 if the Southwesterly Alley improvement is not ordered ahead.

Southwesterly Block 28 Alley

| | | |
|--|----------|---------|
| City share for non-assessable costs ¹ | \$18,500 | |
| City share of assessable costs | \$0 | |
| Total city share | \$18,500 | (38.7%) |
| Assessments receivable | \$29,300 | (61.3%) |
| TOTAL COST | \$47,800 | |

The estimated assessment rate is **\$48.83/ft**

¹ City share for non-assessable costs includes \$10,600 for approach replacement and \$7,900 for tile outlet installation.

Total Improvement

The following provides the estimated costs, city share, assessments receivable, and assessment rates for the street and alley improvements:

Streets and Alleys

| | | |
|-------------------------------------|------------------|---------|
| City share for non-assessable costs | \$203,176 | |
| City share of assessable costs | <u>\$0</u> | |
| Total city share | \$203,176 | (69.2%) |
| Assessments receivable | <u>\$ 90,224</u> | (30.8%) |
| TOTAL COST | \$ 293,400 | |

It is proposed that the 2012 street and alley improvement project be initially financed by PIR bonding. Temporary use of 401 Construction Fund reserves may be needed until bond proceeds are received. Revenues from special assessments levied as a result of the project along with the annual special tax levy required to recover the city share of the project would be utilized for bond repayment.

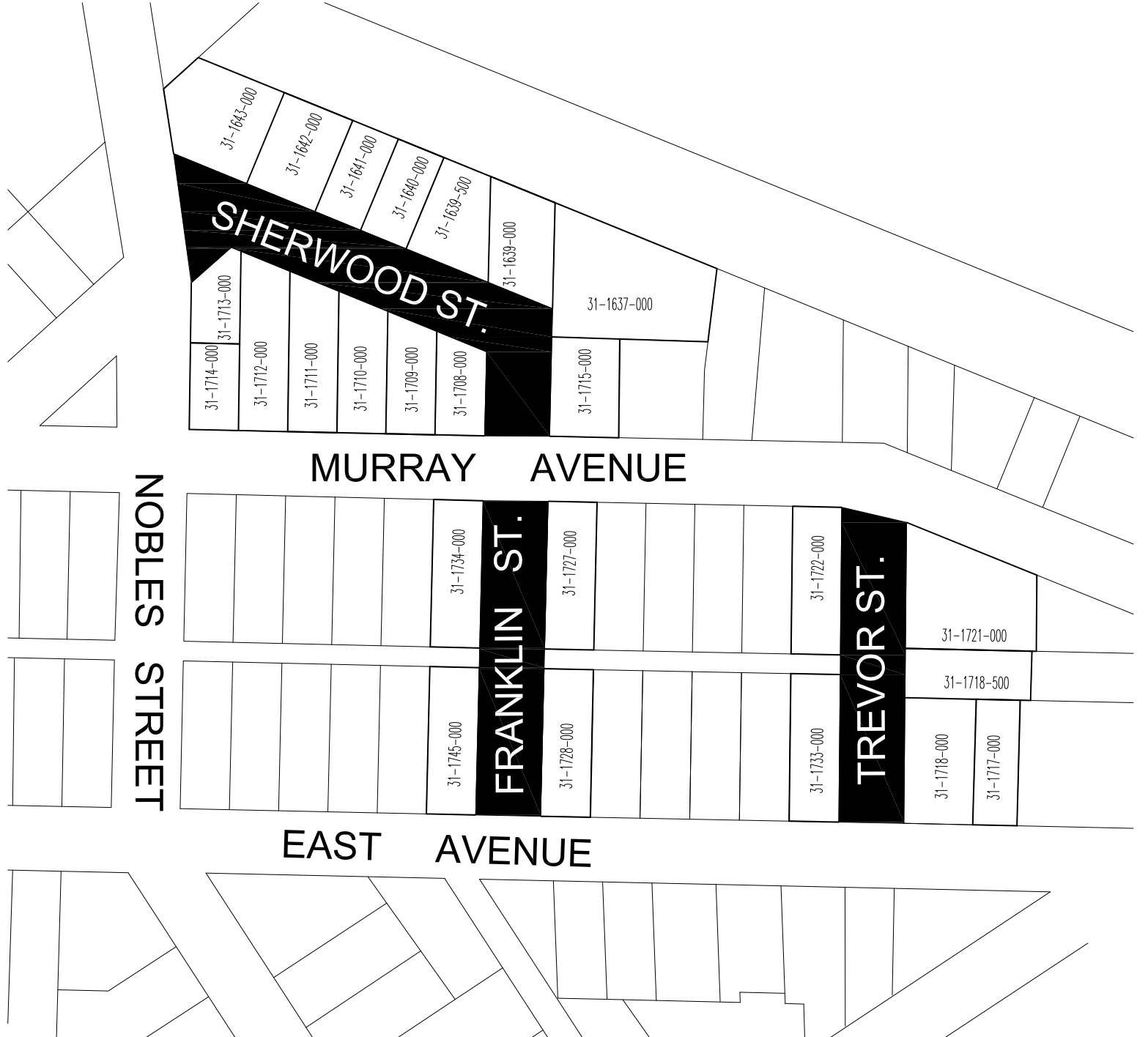
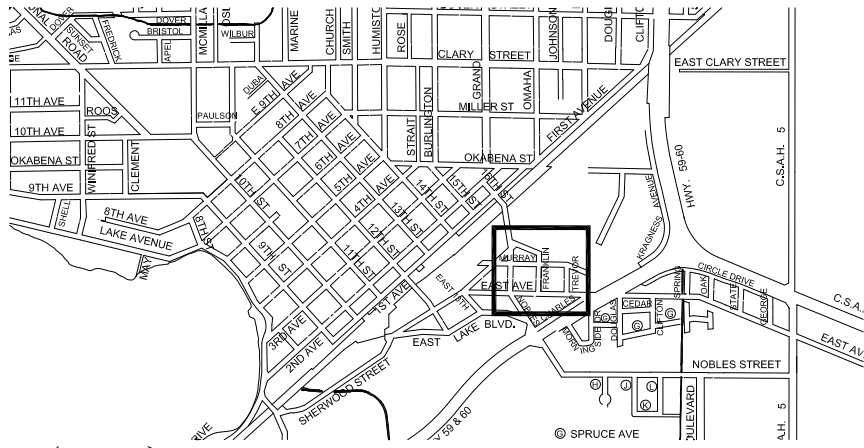
Should the improvement of Sherwood Street and Franklin Street, and/or Trevor Street be ordered and the improvement of neither of the alleys be ordered, the total amount of the assessments projected to be received for the 2012 street improvement project will be estimated to be less than 20% of the total improvement cost. Should this occur, it would be necessary for the city share of the improvement of Sherwood Street and Franklin Street, and/or Trevor Street improvements to be permanently funded from 401 Construction Fund reserves. The assessable improvement costs would be initially financed from the 401 Construction Fund. Revenues from special assessments levied would be returned to the 401 Construction Fund.

CONTRACT COMBINATION WITH OTHER IMPROVEMENTS

In addition to completion of the related work previously identified, it is recommended that this project be combined with any other similar bituminous work approved to be undertaken in 2012 for bidding purposes only.

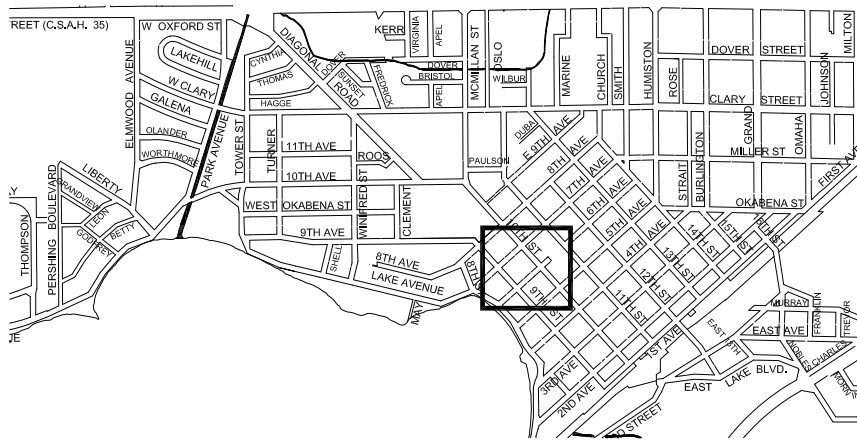
CONCLUSION

The proposed reconstruction of the subject streets and alleys is a feasible way and cost effective means of re-establishing the necessary integrity of the streets and alleys with an all season hard surfaced pavement.



 **PROPOSED IMPROVEMENT**

MAP A



 PROPOSED IMPROVEMENT

MAP B