FEASIBILITY REPORT
FOR
SHADY LANE STREET IMPROVEMENT

INTRODUCTION

The purpose of this report is to determine the feasibility of improving the following described street by necessary regrading, base construction, surfacing, and curb and gutter construction:

SHADY LANE - from Orchard Road to Ash Road.

Such improvement was petitioned for by an adequate number of benefitted property owners for the project to be considered as petition initiated. This report has been prepared pursuant to Council resolution of July 28, 2014. See map A for project location.

PROJECT NEED

Shady Lane is a residential street located south of and parallel with Nobles Street from Orchard Road to Ash Road. Except the most easterly and westerly segments of the street, the street currently has no curb and is aggregate (gravel) surfaced. The deficiencies commonly associated with such a graveled street include dust generation in dry weather, muddy and /or soft conditions in wet weather, and the lack of a well delineated or defined roadway edge. The petition is for an improvement which will result in the street being hard surfaced and having curb and gutter.

A hard surfaced and curbed street is typical of that found in the community. Prior to about 1980, the City had a specific policy or capital improvement program objective intended to eliminate, through improvement, graveled streets within the community. Under this policy, several graveled streets were improved within the more developed or "inner" portions of the city such as many of those in Cherry Point Park and in the "Southeast Neighborhood". Those streets that remained gravel surfaced after a majority of them had been improved were generally located close to the perimeter of the city or in relatively isolated locations. Improvement of these remaining streets became a lower priority since their deficiencies tended to not significantly impact nearby improved streets, or the homes or businesses on those improved streets. It has become the City's practice to not initiate improvement of these streets unless they would become unmaintainable or pose a significant adverse impact on new or existing developments. For the most part, this practice equates to allowing the priority for the improvement of these streets to be set by the affected owners through the petitioning process as has been done for the improvement of Shady Lane.

DESIGN

That part of the City's Special Assessment Ordinance pertaining to standards for improvements provides that residential streets be 36 feet in width and be of a "5 ton design", and that concrete curb and gutter be installed at the same time as surfacing is completed unless a permanent rural street

design is approved by Council. There are no special topography or land use considerations, or other unique circumstances in the improvement of subject street which would justify utilization of a permanent rural design, which necessarily includes road ditches. The standard residential street design is appropriate and suitable for the improvement of Shady Lane. Although the "5 ton street" definition is not directly applicable to the City's current methods for street design, the intent of such a definition can be adhered to. The intent was to provide a street designed for only a residential mixture of traffic rather than for that traffic which would exist in commercial areas or on through routes.

Bituminous Option

Based on current design methods and low volume residential type traffic the recommended street section for the standard improvement would consist of a 3" thick bituminous surface placed on a 9" aggregate base. It is also recommended that the aggregate base include a 4" layer of an open graded aggregate (drainable) base material and installation of suitable edge drain tiles. Use of the drainable base material as the bottom layer of the base together with the 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. 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 Option

In lieu of utilizing the standard bituminous pavement as presented in the preceding section, the use of concrete pavement may be considered. Based on the same criteria previously stated, the recommended street section would consist of 6" non-reinforced concrete pavement on 8" of aggregate base. It is also recommended that the aggregate base include a 4" 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. While use of the drainable layer and edge tile in the bituminous pavement section is primarily intended to preserve the strength of the aggregate base during wet weather and ground conditions, use of the drainage technics in the concrete pavement is recommended to also minimize the migration of the fine particles in a saturated gravel base from migrating or being forced (under traffic) into, and potentially through, the pavement joints. Geotextile reinforcement fabric would also be installed in conjunction with the aggregate base. As in the bituminous pavement, 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.

Selection of Pavement Type

The following points may be considered in selecting a pavement type in addition to any factors that may be provided by affected owners at the improvement hearing:

Design Life: The selection of pavement type for relatively low volume roads could be argued to be subjective given the irregular local performance history of certain pavement types. Life cycle cost analyses which include consideration of initial and maintenance costs can be formulated to provide a reasonable recommendation on roadways that deteriorate in a manner having somewhat of a relationship to traffic loadings. Life expectancies of 20 years for bituminous and 35 years for concrete pavements prior to the need for a minimal structural improvement are commonly used in such analyses. Lower volume streets in Worthington have historically shown a much wider range of usable lives. Residential bituminous streets have functionally performed from as little as 10 years to over 50 years. Specific changes in design have been initiated to address those deficiencies that have been identified with poor performance of bituminous pavements. Residential concrete streets other than those subject to certain internal failures have performed well in the community and are commonly found to be over 50 years old. It is important to note that the provisions of the City's Assessment Ordinance relating to street reconstruction establishes a 20 year design life for bituminous pavements and a 35 year design life for concrete pavements. Assessments for reconstruction are prorated to the design life should the street fail to achieve the design life.

Disruption of Traffic: Considerations in selecting a pavement type may also include the length of time required to return the street to full traffic use. Concrete paving will require up to 12 additional days for pavement to cure prior to through traffic being allowed on the street. Since curbing is involved in any option, traffic entering the street from abutting driveways will be restricted for approximately 7 days. With a concrete pavement option, this time may be in addition to or part of the pavement cure time depending on construction technic used.

Cost: As noted in the design life discussion above, the actual useful life of pavements has varied significantly and therefore definitive life cycle costs are elusive. It may, however, be useful to provide a best available projection of pavement costs for a 35 year period, the design life given for concrete pavement. Current values will be used and maintenance will be disregarded. In order to extend the life of the bituminous street it is assumed surface removal and replacement will be required after 20 years. Given these conditions and assumptions the following 35 year costs are calculated:

	Concrete	Bituminous
Initial Cost	$128,800	$85,200
Costs at 20 Years		$35,000
Total 35 Year Cost	$128,800	$120,200

Given the nature of this cost comparison, it might be stated that 35 year costs are equivalent. Due to the additional costs associated with bidding alternates in this situation, it is recommended that the determination of pavement type should be based on input received at the hearing on the proposed improvement and the considerations above.

PROJECT COST AND FINANCE

The total project cost for improving Shady Lane as previously described utilizing the standard pavement section (bituminous surfacing) is estimated to be $85,200.00. The total project cost for improving Shady Lane utilizing concrete pavement is estimated to be $128,800.00. These total project costs include engineering and contingencies. It is proposed that the 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.

In general, distribution of assessable costs is proposed as outlined in the city assessment ordinance. Consistent with this ordinance and because the project involves new street construction rather than reconstruction, all costs for the project will be assessed to abutting property owners with the only City share being for defined allowances, any City owned or right-of-way frontages, and for any other frontages that are determined to be rate determining but not assessable. The easterly 17 feet of the project abuts Ash Road right-of-way (north side) or right-of-way equivalent (south side) and therefore each of these frontages will be included as rate determining non-assessable frontage.

The basic assessment rates per assessable foot for the proposed street project are as follows:

Standard Pavement	Concrete Pavement
$151.12 / ft.	$228.45 / ft.

COST AND FINANCE SUMMARY

	Standard Pavement	Concrete Pavement
City Share for non-assessable costs[1]	$25,161.05	$38,036.90
City Share of assessable costs	$0.00	$0.00
Total City Share	$25,161.05	$38,036.90
Assessments receivable	$60,038.95	$90,763.10
TOTAL PROJECT COST	$85,200.00	$128,800.00

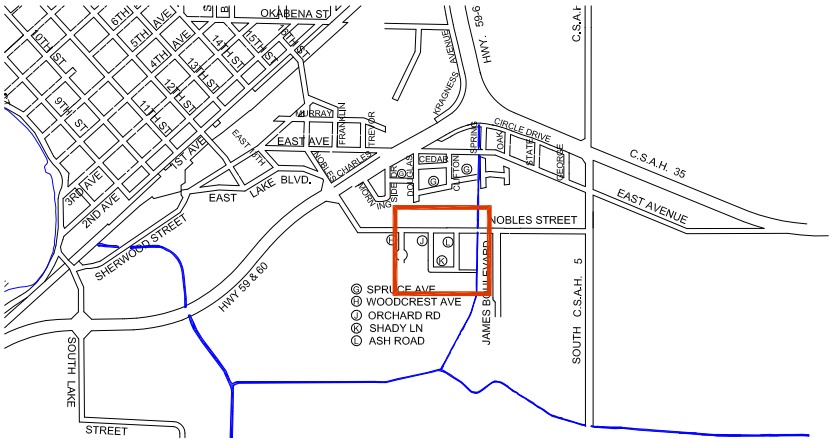
[1] Includes side yard allowances and rate determining non-assessable frontages.

CONTRACT COMBINATION WITH OTHER IMPROVEMENTS

Should the improvement be ordered ahead as a standard pavement project it is recommended that it be combined with all other approved bituminous street surfacing and reconstruction projects for bidding purposes and be completed under a single 2015 Bituminous Street Improvements contract. If the concrete alternate is the approved improvement project the project will need to be bid separate from other projects because there is no compatible projects identified at this time.

CONCLUSION

The proposed project, utilizing either the standard pavement or concrete pavement, is a feasible way to improve Shady Lane.



NOBLES STREET

ORCHARD ROAD

ASH ROAD

31-3155-000

31-3156-000

SHADY LANE

31-3969-700

31-3969-500

PROPOSED IMPROVEMENT

MAP A