Road Assessment

City of Lake Ozark

Pavement Analysis Assessment and Recommendations Lake Ozark, Missouri

Cochran Project No. 18-181

February 2019

Presented to:

City of Lake Ozark

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Abbreviations

Ave.	-	*Avenue*
Blvd.	-	*Boulevard*
Cir.	-	*Circle*
Crt.	-	*Court*
Dr.	-	*Drive*
ft	-	*Feet*
HMA	-	*Hot Mix Asphalt*
Hwy	-	*Highway*
ISD	-	*Intersection Sight Distance*
Ln.	-	*Lane*
LOS	-	*Line of Sight*
MoDOT	-	*Missouri Department of Transportation*
mph	-	*Miles per Hour*
PASER	-	*Pavement Surface Evaluation and Rating*
PSI	-	*Pavement Score Index*
RAP	-	*Recycled Asphalt Pavement*
Rd.	-	*Road*
sqft	-	*square feet*
SSD	-	*Stopping Sight Distance*
St.	-	*Street*
TIF	-	*Tax Increment Financing*
vph	-	*vehicles per hour*

Overview

The City of Lake Ozark is located partly in Camden County and Miller County, Missouri near the Bagnell Dam. Incorporated in 1966 the City has a population of 1,586 in the 2010 census and an estimated population of 1,785 in 2016. City of Lake Ozark has an area of approximately 7.95 square miles and shares a boarder with the neighboring City of Osage Beach. Lake of the Ozarks region sees a high amount of tourist traffic during the summer months and City of Lake Ozark is no exception. Due to the high amount of seasonal residents and tourist attractions, traffic volumes fluctuate throughout the year. Figure 1 shows an overview of the City including City Limits and major roads.

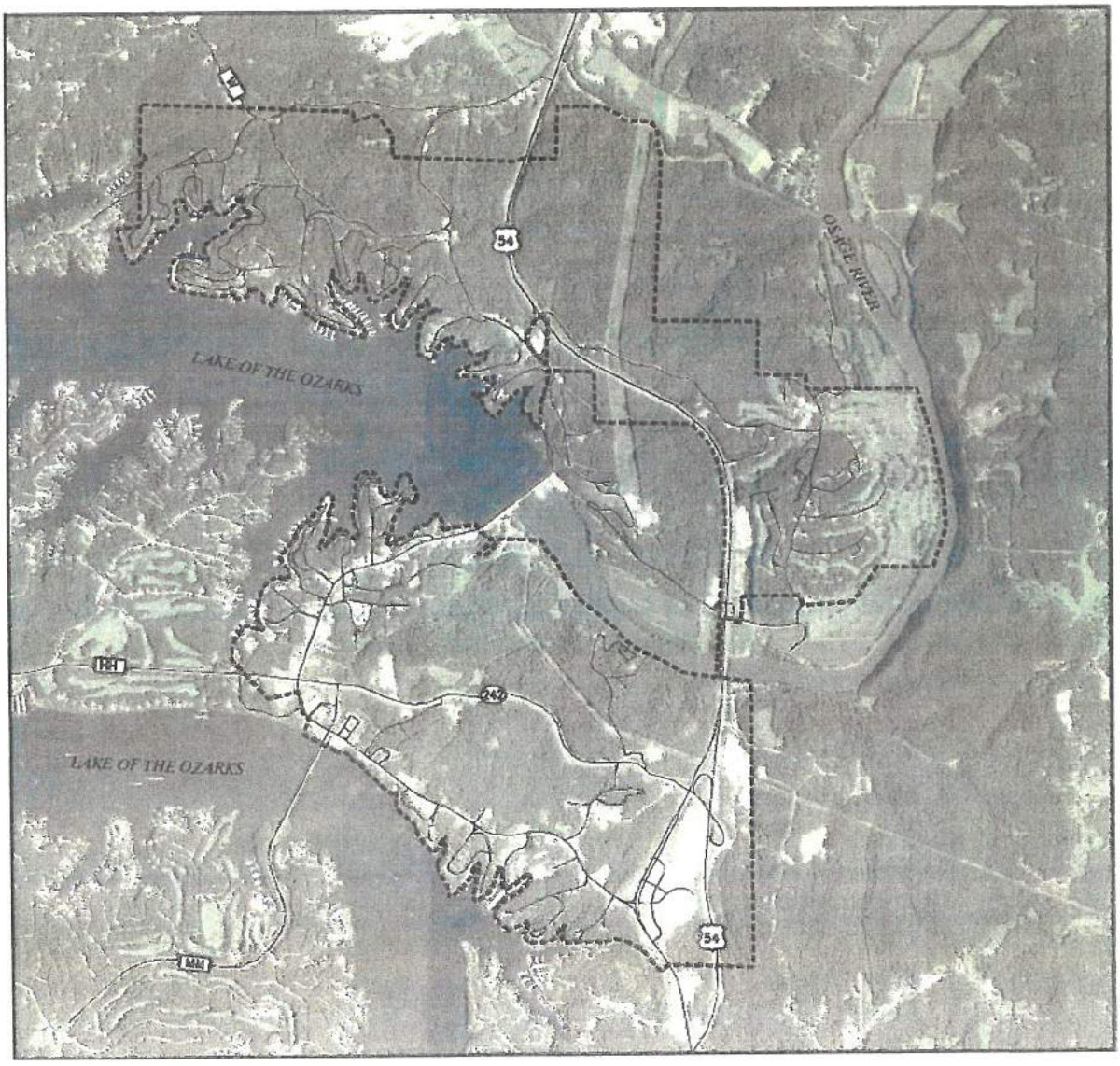


Figure 1: City Roads & Limits Overview

Within roadway systems, a hierarchy of roads exists to relate to traffic flow and amount of access. Standard system of hierarchy includes freeways, arterials, collectors, and local roads. Figure 2 shows approximately the roadway hierarchy within and near the City of Lake Ozark. The City mainly consists of businesses along Bagnell Dam Boulevard and residents on other roads near Lake of the Ozarks. Figure 2 shows most commercial areas are located on collector roads or higher (with a high concertation near the dam) while residential areas are typically located on local roads. However there are a few exceptions due to commercial marinas on the Lake of the Ozarks.

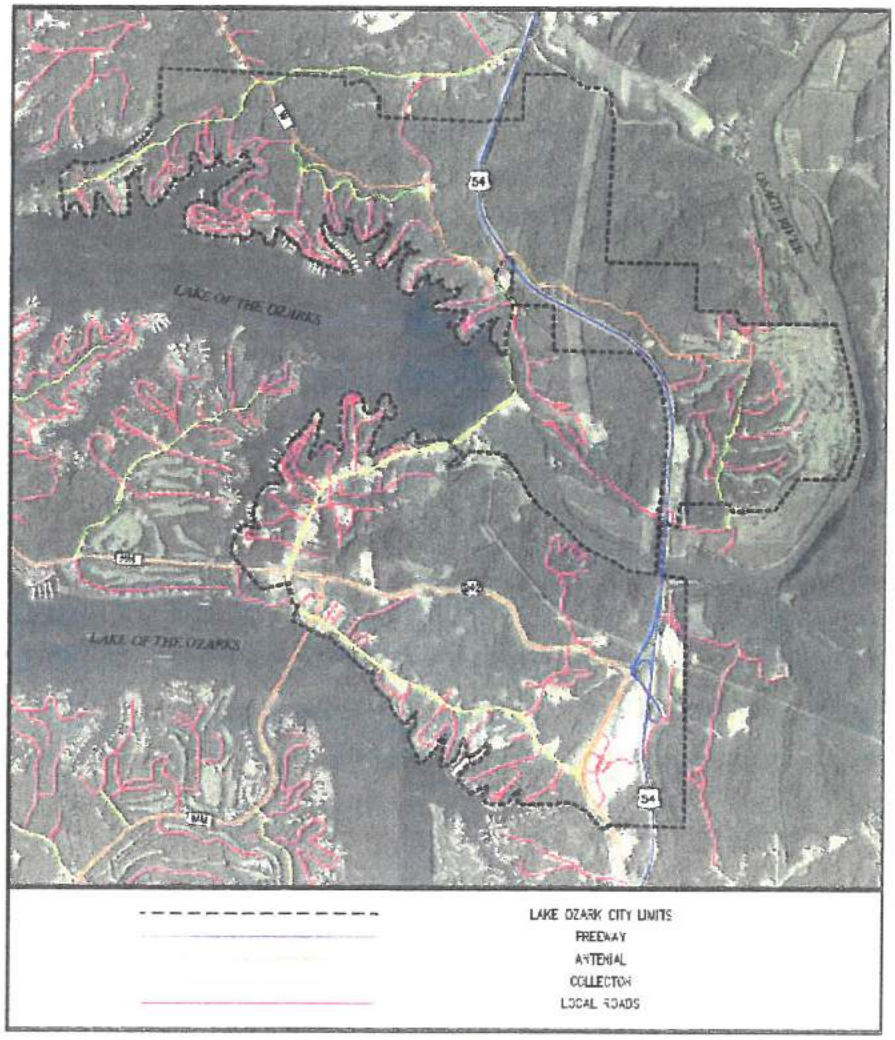


Figure 2: Lake Ozark Road Hierarchy

The goal of this report is to cover the existing condition and value of roadways within the city limits of Lake Ozark and to devise a plan to improve and maintain roadway conditions.

Collected Data

For the report Cochran and the City collected traffic data at locations requested by the City. Traffic data was collected using Radar Counters and Road Tube Counters. Data was collected during holiday weeks for

peak vehicle count. Table 1 shows the traffic data collected throughout the City. Due to the method of how data was collected, it is difficult to determine if the existing roads have sufficient capacity. To better analyze the roadway capacity, intersection study should be performed. Study needs to be performed during a one hour peak time and any one hour non-peak.

Table 1: City of Lake Ozark Traffic Count Data

Road Name	Data Record Time	# of Days	Total # of Vehicles*	# of Vehicles per hour
S. Fish Haven Rd.	Fourth of July Week	7	7,510	44.7
West Bound HH	Fourth of July Week	7	77,061	458.7
Lighthouse Rd.	Fourth of July Week	7	12,976	77.2
Bagnell Dam Blvd.	Magic Dragon Car Show	3	43,000	597.2
Bagnell Dam Blvd.	Memorial Weekend	3	41,000	569.4

*Vehicles/hr based on Full Number of Days

Along with traffic information Cochran assessed pavement and roadway condition of the City streets. City street pavement condition was assessed using PASER evaluation and rating system. PASER system gives pavement a score on a scale of one to ten (1-10). Table 2 shows general information the PASER system uses, including score and condition. A key component to the longevity of pavement is adequate drainage. The PASER system considers drainage along the roadway to be excellent, good, fair, or poor depending on the ability to shed water away from the roadway. Excellent drainage will divert all storm water off the surface and away from the road, generally storm sewers or well-formed ditches. Good rating typically adequately drains storm water but general maintenance would improve the effectiveness. Fair drainage needs major improvements to divert storm water away from the edge of the roadway. Poor drainage is nonexistent and water is allowed to freely puddle on the road surface.

Table 2: PASER System Pavement Rating, Condition, & Construction

Rating	Condition	Pavement Condition Detail	Construction
10	Excellent	No visible distresses	New construction
9	Excellent	No visible distresses	New or recent overlay
8	Very Good	Occasional transverse cracks, widely spaced (40' or greater)	Recent Sealcoat or New Mix
		No longitudinal cracks	
		All cracks sealed or tight (less than ¼")	
7	Good	Very slight or no surface raveling, surface shows some traffic wear	First Signs of Aging
		Transverse cracks (open ¼") spaced 10' or more apart with little to slight crack raveling	
		No patching, or very few patches, in excellent condition	
6	Good	Slight surface raveling (loss of smaller aggregate) and traffic wear	Shows signs of aging with sound structural condition
		Longitudinal cracks (open ¼" to ½"), some spaced less than 10'	
		First sign of block cracking	
		Occasional patching in good condition	
5	Fair	Moderate to severe surface raveling (loss of smaller and larger aggregates)	Moderate Surface aging with sound structural condition
		Longitudinal and transverse cracks (open ½") show first signs of slight raveling and secondary cracks	
		First signs of longitudinal cracks near edge of pavement	
		Block cracking up to 50% of surface	
4	Fair	Severe surface raveling	Significant surface aging and first signs of structural integrity loss
		Multiple longitudinal and transverse cracking with slight raveling	
		Longitudinal cracking in wheel patch	
		Block cracking greater than 50% of surface	
		Slight rutting or distortions (1/2" deep or less)	
3	Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion	Needs patching and repair prior to structural overlay
		Some alligator cracking less than 25% of surface	
		Severe block cracking	
		Moderate rutting or distortion (1" or 2" deep)	
		Occasional potholes	
2	Very Poor	Alligator cracking greater than 25% of surface	Sever deterioration and needs reconstruction with extensive base repair
		Severe distortions (over 2" deep)	
		Extensive patching in poor condition	
		Potholes	
1	Failed	Severe distress with extensive loss of surface integrity	Needs total reconstruction

Along with pavement condition each road was surveyed using a walking wheel to find a general length, width, and noted features along each road. Roadway field survey was conducted between July 25th and August 28th of 2018. Table 3 shows field data collected (Pavement Score, Length, Pavement Area, and Drainage Rating) for major City Roads and data collected for each City road is in Appendix A.

Table 3: Pavement Score & Road Data for Major City Roads

	Asphalt Pavement			
Road Name	Pavement Score	Length (ft)	Pavement Area (sqft)	Drainage Rating
Arrowhead Beach Club Rd.	5.82	2,079	35,978	Fair
Arrowhead Beach Rd.	5.00	2,946	49,122	Fair
Ballenger Rd.	6.00	1,968	39,360	Poor
Beacon Point Cir.	6.00	4,267	85,340	Fair
Bob White Ln.	5.00	2,028	40,560	Fair
Bagnell Dam Blvd.	6.15	20,423	995,818	Excellent
N. Fish Haven Rd.	5.93	1,857	44,568	Good
S. Fish Haven Rd.	6.00	2,154	52,730	Fair
Horseshoe Bend Parkway	6.72	1,996	116,380	Good
Lighthouse Rd.	4.71	3,493	62,534	Fair
Old Hwy 54	8.00	1,407	102,711	Excellent
Osage Hills Rd.	6.47	7,188	161,320	Good
Osage River Bridge	6.00	4,551	109,224	Good
Welsh Rd.	7.33	6,762	132,680	Fair

Maintenance Practices

General Information

Asphalt pavement is a blend of asphalt cement and well graded aggregate. It is a flexible material which is compacted and most commonly used for driving surfaces. Asphalt is a durable material, but problems and defects can occur from poor mixing, poor construction, or fatigue. Defects can occur on the driving surface, within the pavement, and within the base. Common problems and defects are listed below:

- Alligator Cracks – interconnected cracks forming a series of small blocks resembling the marking on alligator skin
- Bleeding – forming a thin layer of asphalt that has migrated upward to the surface
- Cracking – separation of pavement caused by loading, temperature extremes, and fatigue
- Disintegration – breakup of pavement into small, loose pieces
- Plastic instability – excessive displacement under traffic loading
- Polishing – aggregate surfaces becoming smooth and rounded (or slippery) under traffic loading
- Pothole – a bowl-shaped hole in the pavement
- Raveling – a steady, progressive loss of surface material caused by the loss of fine and increasingly larger aggregate from the surface, leaving a pock-marked surface
- Reflective Cracking – cracking in asphalt overlays that follow the crack or joint pattern of layers underneath
- Rutting – channelized depressions that occur in the normal paths of wheel travel
- Scaling – the peeling away of an upper layer of asphalt
- Spalling – breaking or chipping of the pavement at joints, cracks, and edges

- Washboarding – plastic deformation characterized by ripples across the pavement

Roadway maintenance can be grouped into two categories, preventative and rehabilitation. Preventative maintenance includes crack seal, cold patch, chip and seal, and drainage modifications. Rehabilitation maintenance includes asphalt overlays and road reconstruction. Table 4 shows PASER rating along with typical treatment measures.

Table 4: Typical Roadway Maintenance for PASER Rating

Rating	Treatment Measure
10	None
9	None
8	Little or no maintenance
7	Routine crack sealing
6	Sealcoat
5	Sealcoat or 2" thick Overlay (non-structural)
4	2" thick Overlay (structural)
3	Mill deteriorated areas and patch
2	Reconstruction w/ extensive base/sub-grade repair
1	Total reconstruction

Preventative Maintenance

Crack Sealing is a preventative maintenance practice to prevent road deterioration. Cracks in asphalt pavement can cause two issues. Cracks allow water or moisture access to the aggregate base, which can erode the aggregate causing potholes to form. The other issue is rigid material filling the cracks. Asphalt pavement is a flexible material, however if a stiffer object is lodged in a crack, such as a rock, it can cause added stresses on the pavement. Crack sealing is a low cost solution to prevent further damage to the pavement. Typical process includes using an air compressor to clear debris from cracks and pouring liquid asphalt (hot or cold) to fill the cracks. Typically crack sealing can provide around three years of preventative service life. While crack sealing is an effective measure, it can become ineffective if overused or roads deteriorate past crack seals effectiveness.

Cold Patching is a cheap and low intensity form of preventative maintenance. Cold patching is best used on cracks that are too large for crack seal or deep pothole areas but not recommended for a large repair areas. Typically cold patching is a vicious material poured to fill voids in the pavement. To apply cold patching the contact area first needs to be cleaned of all debris. After placing cold patch material, the asphalt is compacted and patching is complete. Cold Patching typically keeps the driving surface in good condition, but does not add much to the roadway value. The life span of a cold patch varies, usually patches are stable for a year or two.

Chip and Seal or chipseal is a process that will add durability to the driving surface. A chipseal is typically used when the top course of the asphalt pavement begins to wear. First step for chipseal is to clean debris off the road surface. After the surface is clean, chipseals typically use a two truck system to apply the

chipseal, but can also be hand tooled applied. The first truck will apply the asphalt binder to the existing road. The second truck lays down a course or fine aggregate on top the asphalt binder. After application excess or loose aggregate should be cleared from the driving surface before opening the road. Chipseal is an effective way to improve the driving surface of the road without major construction. A chipseal's added service life depends on the condition of the existing pavement. If the pavement is in good condition chipseal will add on average approximately seven years, but if the pavement is in poor condition the chipseal will add approximately three years of service life.

Micro-surface provides a thin asphalt coat on top the existing roadway. Typically micro-surfacing does not require major street construction, but does require full lane closure during construction. Micro-surfacing can be performed in two to three phases depending on the desired thickness of the asphalt. First phase applies a tack to the existing pavement to help bond the new asphalt to the existing roadway. Next pass adds an approximately 3/8" thick asphalt wearing course. An additional third pass can add another asphalt surface if needed for increased wearing depth. Advantages to micro-surfacing are typically adjustments to utilities are not required and provides a new top surface for the roadway. Micro-surfacing can provide increased friction for the driving surface, prevent surface water infiltration, and seal surface cracks. Micro-surfacing typically works best for roads in good to fair condition and will generally provide approximately six to eight years of service life.

Sealcoat a roadway surface is a preventive maintenance to keep roads in good condition. Generally sealcoat is applied to lower traffic roads and helps to prevent asphalt from falling apart. Sealcoat provides a protective layer on top of the asphalt course. This layer prevents moister and other liquids from moving through the asphalt pavement and eroding the base. Sealcoat can be applied by truck or hand applications. Sealcoating pavement generally extends the service life of pavement by approximately three years.

Patching pavement is typically used to replace failing sections of asphalt pavement without major street construction. Sections that have developed too many cracks for crack sealing or too large for cold patching can be excavated and asphalt repair placed. Process for patching includes saw-cutting the pavement around the work area full depth and remove the existing asphalt pavement. If necessary add additional aggregate base and compact to repair grading and prevent driving surface issues from reforming. Last add new hot mix asphalt pavement and compact to finish grade. Pavement patching can be performed in small segments and does not require a long term construction zone or full street closure. When constructed properly and there are no roadway subgrade or base issues, patched sections typically last eight years.

Rehabilitation Maintenance

Overlay for an asphalt pavement will provide a new driving surface and fix any surface imperfections. Overlays can be an easy option to provide a like new appearance. Overlays can be applied in many forms the most common are overlaying the existing pavement and milling the top course then overlaying. Overlaying a roadway often requires lane or road closures for construction. Overlaying the existing pavement requires minimal equipment compared to mill and overlay. Overlaying the existing asphalt will raise the finish grade of the road by the amount of asphalt overlaid causing extra grading around shoulders

or driveways. While a mill and overlay typically returns the roadway back to existing grade. Milling the existing roadway also has other benefits. The milled asphalt can be used as aggregate in recycled asphalt pavement (RAP) overlay. Pavement distress does not always result in a failure of the asphalt surface. Instead, if the aggregate base fails, the top surface will start to degrade. To fully repair the pavement the top course needs to be milled away and the roadway's aggregate base needs to be repaired. While expected service life of an overlay is dependent on the condition of the existing pavement, it can be expected to get approximately 10 years from an overlay.

Total reconstruction provides the most pristine roadway. Reconstruction consist of closing the existing road and removing improvements within the road corridor. The corridor can then be graded or other improvements added before paving the corridor again. Reconstruction will provide a new roadway in top condition through an existing corridor. Since reconstruction provides a new roadway, the service life expected is the same as a newly constructed road of approximately 20 years. With proper preventative maintenance the service life can be extended to prevent reconstruction. Unlike other maintenance practices reconstruction can take extended periods of time and will cost close to the same amount of original construction.

City Maintenance Practice

Most of the City's maintenance practices are preventative measures. In past years the City has performed crack seal and cold patching. Due to limited amount of budget and equipment the City's maintenance is relativity limited. However, the City has also provided some pavement overlays. Road maintenance is not limited to asphalt pavement and roadway. City maintenance is also responsible for snow removal, mowing along the right-of-way, drainage repair and gravel road maintenance.

Geometric Layout

Geometric layout generally consist of road intersection and interchanges. Intersections can be signalized or non-signalized depending on different factors, such as traffic volume, intersection size, or number of accidents. Typically signalized intersections are in high traffic volume areas or where two major roads meet. Non-signalized intersections are generally low traffic volume or a minor road meeting a major road. During roadway design key factors for curves and intersections are speed and stopping sight distances. Design speed is dependent on curve radius or level of access, while stopping sight distance depends on vehicle speed, human reaction time, and braking distance. At intersections it is important to keep clear sight distances to allow vehicles to see one another and avoid crashes. Common objects that obscure sight distances can be buildings, trees, other cars, or change in grade. Intersections also require sight distances for turning maneuvers. Turning maneuvers require distance for a car to enter the roadway then accelerate to the design speed. Proper intersection design reduces blind turns and improves roadway safety. Table 5 shows stopping sight distance and required sight distance for turning maneuvers for various roadway speeds.

Table 5: Stopping Sight Distance Requirements

Design Speed (mph)	Stopping Sight Distance		Stopping Sight Distance for Turning Maneuvers	
	Calculated (ft)	Design (ft)	Left-Turn Maneuver (ft)	Right-Turn Maneuver (ft)
15	76.7	80	170	149
20	111.9	115	225	195
25	151.9	155	280	240
30	196.7	200	335	290
35	246.2	250	390	335
40	300.6	305	445	385
45	359.8	360	500	430
50	423.8	425	555	480
55	492.4	495	610	530

City Geometric Problems

The City of Lake Ozark expressed a problematic concern that there is limited Right-of-Way along the streets. This limited Right-of-Way can cause sight line issues as well as objects being too close to the roadway causing crash hazards. Ideally, Right-of-Way would be clear of objects allowing for clear sight lines and free of hazards in case a vehicle leaves the roadway. During a meeting with the City, officials expressed concern with a few locations within city limits. City's concerns include the merge on Bagnell Dam Boulevard around Old Highway 54, sight distances for turning on Highway W from Lighthouse Road and Timber Road, and the traffic circle at Highway W and Bagnell Dam Boulevard.

Bagnell Dam Boulevard Merge

The City mentioned the merge for Bagnell Dam Boulevard near the Quality Inn, but there was little concern as the area does not produce many accidents. Figure 4 shows an aerial image of the area. There area has adequate signage regarding the ending right-hand lane. Lane tapers depend on the lane width and speed limit. The lane width for Bagnell Dam Boulevard is 12 feet and the posted speed limit is 40 mph, thus the required taper length for merging is 480 feet. The length of the taper estimated is approximately 340 feet which is 140 feet less than required. Beside the lane taper, another possible incident area is the entrance location to Quality Inn. Due to drivers looking to merge, they may not see vehicles making the right turn causing a rear end accident. Other issues are likely due to driver knowledge of the intersection and unawareness of their surroundings.

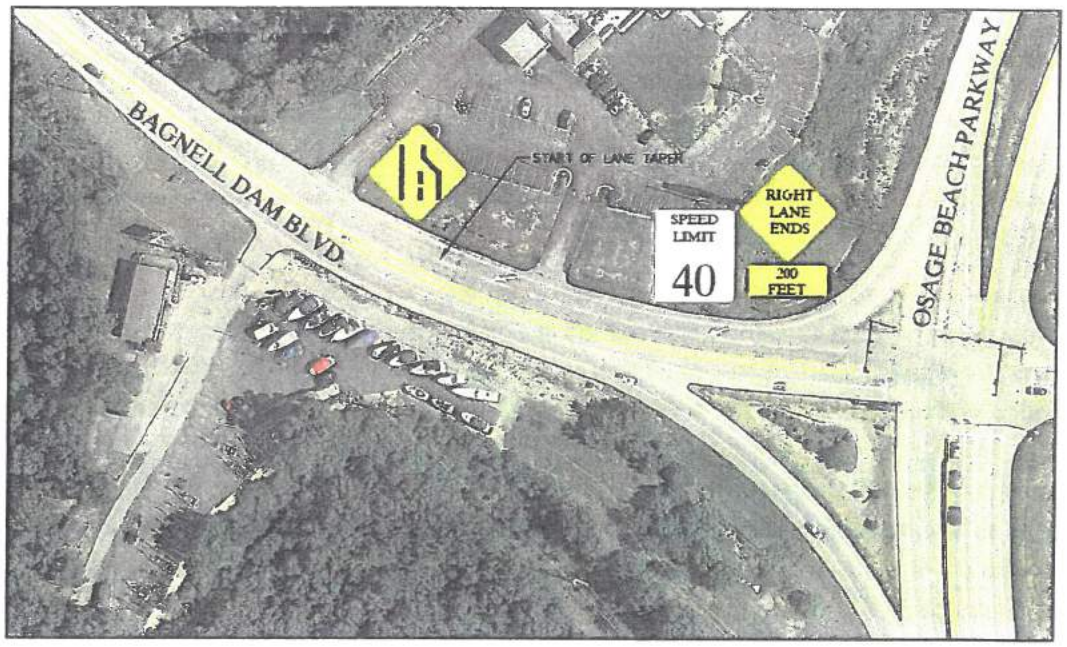


Figure 3: Bagnell Dam Boulevard Merge Near Quality Inn

Lighthouse Road and Highway W

Lighthouse Road is a collector road off of Highway W. The City expressed concerns with sight distance when turning from Lighthouse Road onto Highway W. The Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD) were checked for intersection safety. Field survey was preformed to identify if there is adequate sight distance at the intersection. Survey was performed with two different setups to find the ISD and SSD. For ISD the instrument was set at a height of 3.5 feet and approximately 15 feet from the edge of the road surface, this is approximately where a car at the intersection would stop before turning. Line of sight distance was then recorded for an object 3.5 feet tall in each direction. Stopping sight distances are measured along the centerline of the travel lane, thus field line of sight distance was used to approximate the stopping sight distance for each turn maneuver. The field data shows adequate stopping distance for each movement except left turns from Lighthouse Road onto Highway W. The sight distance is approximately 95 feet short and line of sight is blocked by a wooded area. While most other sight distances are met for the intersection, it was noted during a site visit vehicles appeared to be exceeding 45 mph. With vehicles exceeding the speed limit the slim amount of stopping sight distance is further reduced and can create a dangerous intersection.

Timber Drive and Highway W

Timber Drive is an access road located off of Highway W. The sight distances were tested for the entrance in the same manner as Lighthouse Road. Due to change in roadway grade and the embankment on the side of the road, sight distances are difficult to meet. Table 6 shows the Intersection Sight Distance and Stopping Sight Distance required as well as the field survey distances. Also noted is the obstruction blocking the line of sight.

Table 6: Sight Distance Data for Timber Drive

Sight Direction from Intersection	**Intersection Sight Distance**			**Stopping Sight Distance**		
	Distance Required	*Field Survey Distance*	*Line of Sight Obstruction*	*Distance Required*	*Field Survey Distance*	*Line of Sight Obstruction*
Right	500	361	Roadside Grade	360	391	-
Left	430	362	Road Grade	360	257	Road Grade

The data shows sight distances are restricted by the roadway and adjacent grades. Reduced sight distances can create a dangerous intersection as drivers will be unable to safely stop if needed. Due to the roadway grade being an obstruction it is expensive and difficult to change. To reduce the sight distances needed without major construction, vehicle speed can be reduced to meet the stopping distances. In order to meet all sight distances for Timber Road, vehicles need to be reduced to 30 mph. For the intersection the left turn from Timber Drive onto Highway W (ISD Sight Direction Right) is the controlling factor as the movement requires the most sight distance. If the roadside grade could be changed to increase the sight distance the next limiting factor would be Stopping Sight Distance which would allow a maximum speed of 35 mph.

Highway W and Bagnell Dam Boulevard Traffic Circle

The traffic circle was installed by MoDOT in 2014 to replace an existing three way intersection. While the traffic circle is within city limits, the right-of-way is owned by MoDOT thus the traffic circle layout is not the City's responsibility. The existing intersection had one stop sign and experienced a small amount of crashes. The reason for upgrading the intersection was to improve traffic flow and reduce the number of accidents. Although the improvements were effective the traffic circle is not traditional due to the limited amount of space. Instead of having a raised center circle and truck apron, the traffic circle is flat allowing vehicles to drive through the center. The primary issue with the traffic circle is driver error or improper movements through the intersection. When done correctly round-a-bouts and traffic circles can improve traffic flow and eliminate severe accident types. Figure 5 shows the existing traffic circle. Currently the Missouri Department of Transportation has proposed a new interchange to eliminate the stop light at US Highway 54 and Bagnell Dam Boulevard. Construction for the project is expected to begin in fall of 2019 and will realign the roadway eliminating the existing traffic circle and current issues.

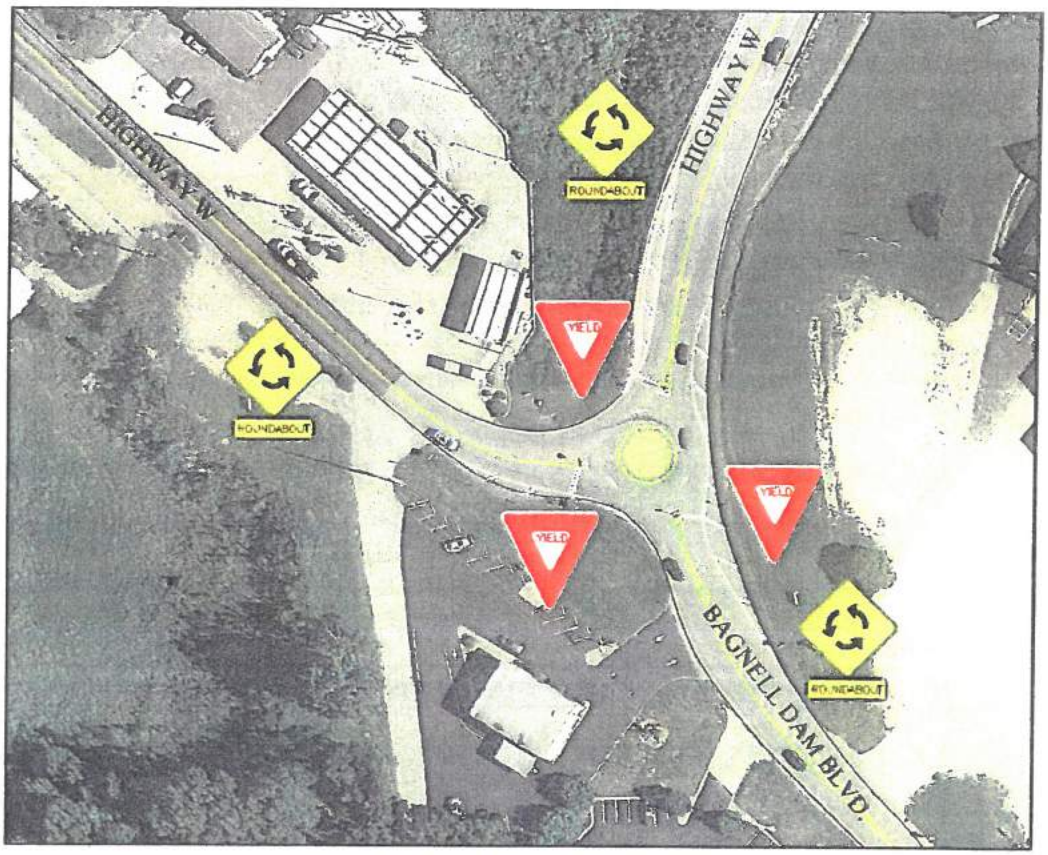


Figure 4: Highway W Round-a-bout Overview

Finance Review

Transportation Fund (2016 & 2017)

The City provided transportation financial data for 2016 and 2017. In 2017 the total transportation budget for Lake Ozark was $631,894 which was a 0.56% increase from the 2016 budget of $628,386. The main source of income for the City's transportation budget is Transportation Sales Tax. The sales tax accounts for approximately 82% of the City's budget in 2017. The City also uses tax funding from fuel and motor vehicle sales, as well as minor funding from fees and miscellaneous sources. Appendix B shows detail transportation funds for 2016 and 2017. The City's transportation budget funds the entire department and covers many fixed costs. These fixed costs leave little room in the budget for capital improvements for streets. Included in these fixed costs is the cost of the City's TIF project which consumes approximately 50% of the City's revenue.

Improvement Alternatives

In general having a plan to maintain asphalt pavement can greatly increase the performance and life cycle of the pavement. While the most common complaint about pavement are streets in poor condition, it can be detrimental to the overall system to focus on the poorest roadways. Focusing on roads in the worst condition and ignoring others will create a condition where more and more roads, which were previously in good condition, will be in poor condition. Another strategy is reacting to roads in fair condition to

prevent additional roads from reaching poor condition. This strategy will keep most roads in fair condition, but few to none will be in good condition. Attacking fair roads will also ignore roads in poor condition as the investment is too great to bring poor roads to fair. Last strategy is to keep good roads in good condition while preforming minor work on fair roads and some major projects on poor roads. Keeping roads in good condition will reduce the amount of major construction a road needs. Preventative maintenance is easier on a budget and extra cash can be used to target other streets for major construction. Table 7 shows in general the different strategies for the asphalt pavement within the City's limits. Option 1 maintains the roads in good condition while targeting poor road for reconstruction. Option 2 maintains fair roads to prevent more roads in poor condition. Option 3 rebuilds roads when they reach poor condition. The table shows the total cost and number of projects for the time period and the average pavement score after projects are completed.

Table 7: General Lake Ozark Pavement Maintenance Plan

	Year 0	Year 1	Year 5	Year 10	Year 15	Year 20
Option 1	-	$176,156.01 (32)	$575,351.32 (62)	$523,891.81 (47)	$2,489,398.05 (34)	$1,498,861.48 (68)
	6.47	6.61	6.71	6.44	7.35	7.62
Option 2	-	$1,073,824.10 (35)	$1,170,207.95 (46)	$1,191,699.40 (21)	$1,391,762.25 (46)	$1,311,646.40 (67)
	6.47	7.64	7.58	7.16	6.96	7.60
Option 3	-	$85,381.40 (5)	$83,256.80 (4)	$2,328,650.20 (12)	$2,567,411.60 (29)	$2,223,801.40 (21)
	6.47	6.23	5.19	5.95	6.71	7.02

Table 8 shows the overall cost at the end of a 20 year period for each option as well as the final pavement score compared to million dollars spent. The results show Option 1 is the most cost effective due to least overall cost while having the highest average pavement score rating.

Table 8: Pavement Maintenance 20-Year Total Cost & Pavement Score per Million Dollars Spent

	20 Year Total	PSI/Million Dollars Spent
Option 1	$ 5,263,658.67	1.45
Option 2	$ 6,139,140.10	1.24
Option 3	$ 7,288,501.40	0.96

Road Maintenance Plan

The City should develop a plan to ensure streets are maintained in the best condition possible. A good maintenance plan should include maintaining all aspects of the roadway. While asphalt pavement maintenance and rehabilitation will improve driving surfaces, it is also important to consider the root issue causing pavement to deteriorate. Sources which cause pavement to deteriorate quicker than expected are overloading and poor drainage. While asphalt pavement is flexible, the important elements to structural strengths are pavement thickness and aggregate base. Typically larger vehicles, such as semi-trucks and heavy maintenance vehicles, cause an increased load on the pavement. If a pavement section is not designed for larger loads there is a higher chance for permanent damage to the pavement and base

rock. Poor roadside drainage allows water to pool on the driving surface or in side ditches. If water begins to penetrate the base rock, through cracks in the driving surface or infiltration from roadside ditches, it will start to wash out base material causing damage to the driving surface. Along with a yearly maintenance plan, the City should ensure new construction and rehabilitation projects are designed with appropriate pavement sections and roadway drainage. Detailed project schedules and maintenance plan is described below.

Project Schedule

A plan was developed to help insure the City's roads are maintained in the best shape possible. Due to past spending and budgets, it was established the City has approximately $70,000 per year to spend on capital street improvements. A plan was established to keep the City's largest roads in good condition while using the current budget to the fullest extents. Detailed project information is listed below. In an effort to provide the best maintenance plan for the City's budget, Bagnell Dam Boulevard will be discussed in a separate section as it will require a considerable higher cost than the City's current budget. Detailed project scheduling and cost information is shown in Appendix E.

Year 1

For year one the target is to maintain the City's best road to prevent deteriorating to the point where more expensive maintenance practices are necessary. The plan is to crack seal Welsh Road and Eagle Crest Road and to sealcoat Osage Hills Road and Osage River Bridge. At the end of year one the City will have 45 roads in good condition, 39 roads in fair condition, and six in poor condition. Table 9 shows the summary for year one and the average pavement score.

Table 9: Project Total Summary and Total Cost for Year One

Project Type	*Number of Projects*	*Total Cost*
Crack Seal	2	$ 20,938.50
Sealcoat	2	$ 54,108.80
Total	*4*	*$ 75,047.30*

Year 2-5

Years two to five covers four total years for roadway maintenance. During the timeframe the goal is to continue to maintain roads in good condition, but also complete some rehabilitation projects to improve roads in poorer condition. Crack seal would be used on six roads in good condition and sealcoat on four to prevent deterioration. Two roads were targeted for rehabilitation construction, an overlay for Falcon Drive and a mill and overlay for Valley Road. At the end of year five the City will have 15 roads in good condition, 66 in fair condition, and nine in poor condition. Table 10 shows the summary of projects for year's two to five.

Table 10: Project Total Summary and Total Cost for Year Two - Five

Project Type	*Number of Projects*	*Total Cost*
Crack Seal	6	$ 38,686.59
Sealcoat	4	$ 41,320.80

Overlay	1	$ 12,320.00
Mill & Overlay	1	$ 185,372.00
Total	*12*	*$ 277,699.39*

Year 6-10

Years six to ten covers five total years. The goal during this timeframe is to keep the remaining good roads in their current condition, but begin to target fair and poor roads for major construction. Crack seal and sealcoat are recommended for four roads each to maintain road conditions. To improve several roads in fair condition a micro-surface is recommended for Osage River Bridge, Mockingbird Road, School Road, and Beacon Point Circle. To improve the roads in poor condition, it is recommended to chip and seal Arrowhead Beach Road and Lighthouse Road, and to overlay Thornsberry Road and Castaway Cove. At the end of year ten the City will have 16 roads in good condition, 57 roads in fair condition, and 17 roads in poor condition. Table 11 shows the summary for year six to ten.

Table 11: Project Total Summary and Total Cost for Year Six - Ten

Project Type	*Number of Projects*	*Total Cost*
Crack Seal	4	$ 16,069.50
Sealcoat	4	$ 90,348.20
Micro-Surface	4	$ 100,589.40
Chip & Seal	2	$ 94,907.60
Overlay	2	$ 56,648.00
Total	*16*	*$ 358,562.70*

Year 11-15

For years 11 to 15 the total number of good roads begins to vanish. In order to improve the City's system it is necessary for more major construction. Preventative maintenance should be performed on several roads. Crack seal should be applied to three roads and cold patch applied to four. To upkeep recently improved roads, it is recommended to seal coat Arrowhead Beach Road and Lighthouse Road and asphalt pavement patch School Road, Mockingbird Road, Old Hwy 54, and Eagle Crest Road. Major construction includes micro-surface for three roads, Castaway Cove, Oakmont Avenue, and Osage Hills Road. To improve minor roads in fair to poor condition a chip and seal would provide improvements to the driving surface. Chip and seal is recommended for five roads. With remaining funds small roads which have reached their life termination are targeted for rehabilitation. This includes overlay for Hidden Acres Road and reconstruction for Cardinal Circle. After year 15 the City will have 21 good roads, 26 fair roads, and 43 poor roads. Table 12 shows a summary for projects for year 11 to 15.

Table 12: Project Total Summary and Total Cost for Year 11 - 15

Project Type	*Number of Projects*	*Total Cost*
Crack Seal	3	$ 3,103.56
Cold Patch	4	$ 53,495.52
Sealcoat	2	$ 23,052.80
Patch	4	$ 85,853.75
Micro-Surface	3	$ 98,336.40

Chip & Seal	5	$ 92,143.40
Overlay	1	$ 1,056.00
Reconstruct	1	$ 1,260.00
Total	*23*	*$ 358,301.43*

Year 16-20

Final years of the maintenance plan focuses on keeping roads in good condition and few major construction projects on minor roads. To keep good roads in their current condition, crack seal and cold patching is recommended for eight and three roads respectively. Other preventative maintenance includes sealcoat for eight roads. With remaining funds the City should attempt to improve roads in fair or poor conditions. Micro-surface and chip and seal will improve roads in fair condition to good condition. These improvements are recommended for three and one roads respectively. Major road construction will improve poor roads. Major construction includes overlays, mill and overlay, and reconstruction. Major construction is recommended for six roads to improve to good condition. After year 20 the City will have 32 good roads, three fair roads, and 55 poor roads. Table 13 shows a summary for year 16-20. After year 20 the City should remain focused on upkeep maintenance of roads in good condition while using the remaining budget to improve road in poor or fair condition.

Table 13: Project Total Summary and Total Cost for Year 16 - 20

Project Type	***Number of Projects***	***Total Cost***
Crack Seal	8	$ 44,204.94
Cold Patch	3	$ 28,189.46
Sealcoat	8	$ 60,181.20
Micro-Surface	3	$ 30,055.20
Chip & Seal	1	$ 7,786.00
Overlay	2	$ 150,720.00
Mill & Overlay	3	$ 16,390.00
Reconstruct	1	$ 5,976.00
Total	*29*	*$ 343,502.80*

Bagnell Dam Boulevard

Bagnell Dam Boulevard is the main stretch of road within City limits. The road is composed of old US Highway 54 corridor and original construction was completed by MoDOT. After the realignment of Highway 54 the City took over the old stretch. While Bagnell Dam Boulevard is currently in fair shape, the road is deteriorating and the City needs a maintenance plan. Maintenance for the roadway include mill and overlay, aggregate base repair, and micro-surface. Due to the current state of Bagnell Dam Boulevard it is recommended to mill and overlay the road to provide the best driving surface and ability to repair the aggregate base if necessary. Due to the section of road near Eagles Landing being newer a micro-surface would provide sufficient maintenance and extend the life of the pavement. Other minor improvements along the corridor include drainage modifications, parking asphalt overlay, and intersection repair. Table 14 shows project phases, location description, maintenance work, and approximate cost for Bagnell Dam Boulevard.

Table 14: Bagnell Dam Boulevard Improvements

Project	Description	Type of Work	Cost
Phase I	Bagnell Dam to School Road	Mill & Overlay, Aggregate Base Repair, Overlay Parking	$ 610,949.83
Phase II	School Road to HH Traffic Signal	Mill & Overlay, Drainage Modifications	$ 232,316.44
Phase III	HH Intersection	Mill & Overlay, Aggregate Base Repair, Intersection Striping & Repair	$ 40,892.54
Phase IV	HH Intersection to Arrowhead Estates Road	Mill & Overlay	$ 387,600.53
Phase V	Arrowhead Estates Road to Old Hwy 54 Traffic Signal	Mill & Overlay, Drainage Modifications	$ 481,447.14
Phase VI	Old Hwy 54 Traffic Signal to 242 Traffic Signal	Micro-surface	$ 77,863.50

Funding Plan

The City has limited funds available and a limited ability to raise additional funding for street maintenance and improvement projects. As a result this report indicates that roadway conditions will continue to deteriorate without an infusion of additional funding. However, the majority of the City's streets are also in a special road district that collects taxes from residents for street maintenance. Based on the amount of revenue that these road districts receive and the maintenance they provide outside the City limits, there are not additional funds available for increased maintenance within the City limits without an increase in revenue for the road districts. In other jurisdictions, maintenance projects are often shared between the City and the road district, however, additional funding would be needed to promote this partnership.

Other possible funding sources and grants were investigated by Cochran. No grant funding is currently available to the City for street improvement projects. Since Proposition D was not approved in the recent election, increased fuel taxes the City of Lake Ozark would have received are also not available.

Therefore, the last remaining option available to the City of Lake Ozark should would be a dedicated tax issue for street improvements. Any such tax will require voter approval and should be capable of providing funding to either fund a bond issue for some major road projects or provide funds annually for smaller projects on a pay as you basis. An additional $120,000 per year would provide funds to repay a $1,000,000 loan in 10 years allowing the City to construct all of the Bagnell Dam Boulevard improvements over a 20 year period. Should the City decide to provide a pay as you go program, we would recommend the new source of revenue provide $150,000 per year. This would allow the City to complete Phase II and VI of Bagnell Dam Blvd. and have additional funds to speed other improvements. To complete the larger phases of Bagnell Dam Blvd. the City would either need to break the phases into smaller pieces or skip a year or two to provide sufficient funds to complete the larger phases.

Based on the above discussion, Cochran recommends contacting the City's financial advisor to provide detailed information about any proposed bond issue or tax increase. Should the City decide that providing a bond issue to complete the larger projects needed within the City, they should also investigate the

possibility of gaining sufficient bond approvals for the entire program of approximately $3,000,000 to $4,000,000. This provides the ability to design and construct the most urgent projects immediately, while the better sections of the roadway would continue to receive maintenance and additional bonds sales at future dates could be used to construct the other projects as the need arises without the need for additional bond elections.

Should the property owners currently located on a gravel road wish to have their road paved, those owners should work with the City to create a Neighborhood Improvement District (NID) to complete those paving projects. The City could borrow the required funds which would be repaid through a NID payment by each property owner with their tax bill.

Appendix

Appendix A

(City Roadway Field Survey Data)

	Asphalt			Concrete			Gravel			
Road Name	Pavement Score	Length (ft)	Pavement Area (sqft)	Pavement Score	Length (ft)	Pavement Area (sqft)	Pavement Score	Length (ft)	Pavement Area (sqft)	Drainage Rating
Arnold Plamer	9.00	1,000	25,000		-	-		-	-	Good
Arrowhead Beach Club Rd.	5.82	2,079	35,978		-	-		-	-	Fair
Arrowhead Beach Rd.	5.00	2,946	49,122		-	-		-	-	Fair
Arrowhead Dr.	8.00	1,695	40,680		-	-		-	-	Good
Bagnell Dam Blvd.	6.15	20,423	995,818		-	-		-	-	Excellent
Ballenger Rd.	6.00	1,968	39,360		-	-		-	-	Poor
Bay Hill Ave.	8.00	1,030	20,971	8.00	52	3,120		-	-	Fair
Bay Hill Crt.	7.00	966	23,184		-	-		-	-	Fair
Beacon Hill Dr.	7.00	1,681	33,620		-	-		-	-	Good
Beacon Point Cir.	6.00	4,267	85,340		-	-		-	-	Fair
Bluebird	6.00	27	540		-	-	8.00	2,333	46,660	Good
Bob White Ln.	5.00	2,028	40,560		-	-		-	-	Fair
Bogey Hill Ct.	8.00	635	15,240		-	-		-	-	Good
Borders Dr.	2.81	351	7,020		-	-		-	-	Poor
Cardinal Cir.	2.00	21	420		-	-	5.51	2,194	35,104	Fair
Carls Dr.	5.00	613	9,808		-	-		-	-	Poor
Castaway Cove	3.85	478	8,604		-	-		-	-	Fair
Castaway Dr.	3.47	533	7,462	2.00	165	1,650		-	-	Fair
Cherry Hill Ave.	8.00	2,505	60,120		-	-		-	-	Good
Cherry Hill Ct	4.00	237	6,540		-	-		-	-	Good
Cherry Hill Dr.	8.00	1,792	43,008		-	-		-	-	Poor
Cherry Hill Ln.	8.00	837	20,088		-	-		-	-	Good
Cherry Hill Park	6.00	400	10,000		-	-		-	-	Fair
Cherry Hill Way	7.00	80	1,600		-	-		-	-	Fair
Cotton Rd		-	-		-	-	5.00	750	20,000	Fair
Crossing East	7.00	750	15,000		-	-		-	-	Good
Crossing West	6.00	620	15,500		-	-		-	-	Good
Dakota Dunes	6.00	330	6,600		-	-		-	-	Good
Eagle Crest Rd.	7.00	5,733	99,970		-	-		-	-	Fair
Eagles Rock Ave.	8.00	1,155	23,100		-	-		-	-	Good
Falcon Dr.	4.00	308	6,160		-	-	8.00	849	16,980	Fair
N. Fish Haven Rd.	5.93	1,857	44,568		-	-		-	-	Good
S. Fish Haven Rd.	9.00	2,154	52,730		-	-		-	-	Fair
Forest Hills Dr.	5.50	1,217	14,924		-	-		-	-	Poor
Frudeger Rd.	5.90	1,968	28,308		-	-		-	-	Fair
Glen Rd.	5.00	815	13,040		-	-		-	-	Poor
Golden Rule Rd.	6.69	491	7,914		-	-		-	-	Fair
Gull Rd.	4.55	1,324	14,115		-	-	6.00	1,388	14,092	Fair
Henderson Ln	5.00	580	12,760		-	-		-	-	Good
Hickory Dr.	5.85	972	18,070		-	-		-	-	Fair
Hidden Acres Ct.	6.00	700	14,000		-	-		-	-	Fair
Hidden Acres Rd.	10.00	1,770	35,400		-	-		-	-	Good
Hobson dr		-	-		-	-	6.00	650	7,800	Fair
Horseshoe Bend Parkway	6.72	1,996	116,380		-	-		-	-	Good
Isleworth Ave.	8.00	1,607	45,486		-	-		-	-	Excellent
Isleworth CT	7.00	170	4,760		-	-		-	-	Fair
Kane Cir. (Shorewood Estates C	7.00	2,120	25,440		-	-		-	-	Good
Knox Point Cir.	6.00	1,944	30,648		-	-		-	-	Fair
Lakeland Rd.	4.85	2,236	49,192		-	-		-	-	Fair
Lakeview Rd.	7.00	1,520	19,760		-	-		-	-	Good
Lee Travino Ct	8.00	590	9,540		-	-		-	-	Good
Lenox Ln.	4.00	280	3,360		-	-		-	-	Poor
Lighthouse Rd.	4.71	3,493	62,534		-	-		-	-	Fair
Longview Cir.	6.00	33	528		-	-	8.00	1,507	18,712	Fair
Marsh Ln.	0.00	166	1,992		-	-	4.00	166	1,992	Poor
Meyers Ct.	8.00	458	9,160		-	-		-	-	Poor
Mockingbird Rd.	7.00	4,583	82,494		-	-		-	-	Fair
Oak Ridge Dr.	4.64	2,433	49,390		-	-		-	-	Fair

	Asphalt			Concrete			Gravel			
Road Name	Pavement Score	Length (ft)	Pavement Area (sqft)	Pavement Score	Length (ft)	Pavement Area (sqft)	Pavement Score	Length (ft)	Pavement Area (sqft)	Drainage Rating
Oak Wood Ln.	4.58	220	3,550		-	-		-	-	Poor
Oakmont Ave.	8.00	2,087	50,088		-	-		-	-	Fair
Oakmont Ct	7.00	350	7,700		-	-		-	-	Fair
Old Hwy 54	8.00	1,407	102,711		-	-		-	-	Excellent
Osage Hills Rd.	6.47	7,188	161,320	4.00	724	17,376		-	-	Good
Osage River Bridge	6.00	4,551	109,224	6.00	41	984		-	-	Good
Overlook Rd.	7.00	2,080	41,600		-	-		-	-	Fair
Palm Ridge Dr	8.00	582	11,640		-	-		-	-	Good
Payne Stewart Ct	6.00	400	8,000		-	-		-	-	Good
Pintail Ln.	9.00	400	6,360		-	-		-	-	Fair
Placid	4.00	740	11,100		-	-		3,600	5,400	Fair
Pleasure Point Cir.	3.21	1,350	21,717		-	-		-	-	Fair
Quail Cir.	6.00	1,487	23,792		-	-		-	-	Fair
Quail Hollow Ave	7.00	1,760	35,200		-	-		-	-	Fair
Rockwood Cir.	7.66	151	2,718		-	-	6.14	1,024	10,568	Fair
Rosco Rd	6.00	2,100	31,500		-	-		-	-	Excellent
Rudder Rd.	7.37	2,021	36,036		-	-		-	-	Poor
S. Beacon Ridge Dr.	8.00	2,247	44,940		-	-		-	-	Fair
Sander Rd.	8.00	2,043	42,280		-	-		-	-	Good
School Rd.	6.94	2,598	58,240	4.00	22	440		-	-	Fair
Scottish Landing		-	-		-	-	4.00	1,500	30,000	Poor
Smiley Ln.	6.00	345	4,140		-	-		-	-	Fair
Stonehill Rd.	8.00	31	744		-	-	8.00	191	2,292	Fair
Sugar Ln.	7.00	332	5,312		-	-		-	-	Good
Thornsberry Rd.	4.00	986	19,720		-	-		-	-	Poor
Tom Watson Ct	7.00	600	15,600		-	-		-	-	Good
Twin Oaks Dr.	5.85	1,257	17,598		-	-		-	-	Fair
Valley Rd.	2.58	4,213	84,260	3.00	225	4,500		-	-	Fair
Welsh Ln.	6.00	234	4,680	2.00	260	3,715	8.00	243	2,430	Poor
Welsh Rd.	7.39	6,762	132,680		-	-		-	-	Fair
Whey Fourth Place	8.00	280	5,600		-	-	4.00	580	8,700	Poor
Wilmore	8.00	1,600	35,200		-	-		-	-	Good
Winged Foot Ave.	8.00	571	12,562		-	-		-	-	Fair
Wood River Dr.	8.00	1,562	31,240		-	-		-	-	Good
Wren Dr.	7.00	852	13,632		-	-		-	-	Good

Appendix B

(Detail Transportation Fund for 2016 & 2017)

REVENUE & EXPENSE REPORT (UNAUDITED)

AS OF: DECEMBER 31ST, 2016

02 -TRANSPORTATION FUND

FINANCIAL SUMMARY

% OF YEAR COMPLETED: 100.00

	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
REVENUE SUMMARY						
TRANSPORTATION	632,654	90,330.02	634,827.39	0.00	(2,173.39)	100.34
TOTAL REVENUES	632,654	90,330.02	634,827.39	0.00	(2,173.39)	100.34
EXPENDITURE SUMMARY						
TRANSPORTATION						
PERSONNEL	173,750	14,449.15	173,063.38	0.00	686.22	99.61
PROFESSIONAL SERVICES	7,974	0.00	7,973.75	0.00	0.25	100.00
INSURANCE	10,369	0.00	10,269.40	0.00	99.60	99.04
OPERATING	436,293	41,978.88	425,349.49	0.00	10,943.94	97.49
TOTAL TRANSPORTATION	628,386	56,428.03	616,656.02	0.00	11,730.01	98.13
TOTAL EXPENDITURES	628,386	56,428.03	616,656.02	0.00	11,730.01	98.13
REVENUE OVER/(UNDER) EXPENDITURES	4,268	33,901.99	18,171.37	0.00	(13,903.40)	425.76

REVENUE & EXPENSE REPORT (UNAUDITED)

AS OF: DECEMBER 31ST, 2016

02 -TRANSPORTATION FUND

% OF YEAR COMPLETED: 100.00

REVENUES	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
TRANSPORTATION						
TAXES						
02-5200-5106 Transportation Sales Tax	547,754	71,711.71	547,754.40	0.00	(0.40)	100.00
02-5200-5192 Gas Tax	41,500	3,681.04	42,236.44	0.00	(736.44)	101.77
02-5200-5194 Motor Vehicle Sales Tax	12,500	1,005.78	13,575.47	0.00	(1,075.47)	108.60
TOTAL TAXES	601,754	76,398.53	603,566.31	0.00	(1,812.31)	100.30
FEES						
02-5200-5410 Motor Vehicle Fees	6,800	525.76	6,919.79	0.00	(119.79)	101.76
02-5200-5415 Road Dist Reimbursement	2,800	2,850.79	2,850.79	0.00	(50.79)	101.81
02-5200-5416 Excavation Permit Fee	350	150.00	500.00	0.00	(150.00)	142.86
02-5200-5417 Right of Way Lease Payment	6,530	350.00	6,530.00	0.00	0.00	100.00
TOTAL FEES	16,480	3,876.55	16,800.58	0.00	(320.58)	101.95
RESERVES						
02-5200-5890 Carry Over	0	0.00	0.00	0.00	0.00	0.00
TOTAL RESERVES	0	0.00	0.00	0.00	0.00	0.00
MISCELLANEOUS						
02-5200-5900 Transfers From	0	0.00	0.00	0.00	0.00	0.00
02-5200-5901 FEMA Reimbursement	0	0.00	0.00	0.00	0.00	0.00
02-5200-5910 Interest Income	151	14.94	150.69	0.00	0.31	99.79
02-5200-5913 Trash Pick Up	10,000	10,000.00	10,000.00	0.00	0.00	100.00
02-5200-5920 Miscellaneous Income	352	0.00	352.02	0.00	(0.02)	100.01
02-5200-5921 Bldg Replacement-Ins Proce	0	0.00	0.00	0.00	0.00	0.00
02-5200-5922 Surplus Property	2,991	0.00	2,991.50	0.00	(0.50)	100.02
02-5200-5923 Insurance Premium Refund	926	40.00	966.29	0.00	(40.29)	104.35
02-5200-5924 Recycling	0	0.00	0.00	0.00	0.00	0.00
TOTAL MISCELLANEOUS	14,420	10,054.94	14,460.50	0.00	(40.50)	100.28
TOTAL TRANSPORTATION	632,654	90,330.02	634,827.39	0.00	(2,173.39)	100.34
TOTAL REVENUE	632,654	90,330.02	634,827.39	0.00	(2,173.39)	100.34

REVENUE & EXPENSE REPORT (UNAUDITED)

AS OF: DECEMBER 31ST, 2016

02 -TRANSPORTATION FUND

DEPARTMENT - TRANSPORTATION

% OF YEAR COMPLETED: 100.00

DEPARTMENTAL EXPENDITURES	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
PERSONNEL						
02-6200-6110 Salaries Full Time	116,774	8,451.12	116,720.56	0.00	53.44	99.95
02-6200-6112 Salaries Part Time	7,834	0.00	7,834.06	0.00	(0.06)	100.00
02-6200-6114 Salaries Overtime/Holiday	5,200	1,140.54	5,564.25	0.00	(364.25)	107.00
02-6200-6118 Social Security	10,644	727.76	9,719.15	0.00	924.85	91.31
02-6200-6120 Unemployment Insurance	814	0.00	814.36	0.00	(0.36)	100.04
02-6200-6122 Health Insurance	21,649	3,072.40	21,529.55	0.00	119.45	99.45
02-6200-6160 Retirement	8,782	715.23	8,828.85	0.00	(46.85)	100.53
02-6200-6161 Health Insurance Subsidy P	2,053	342.10	2,052.60	0.00	0.00	100.00
TOTAL PERSONNEL	173,750	14,449.15	173,063.38	0.00	686.22	99.61
PROFESSIONAL SERVICES						
02-6200-6262 City Attorney/Legal	0	0.00	0.00	0.00	0.00	0.00
02-6200-6265 Audit	0	0.00	0.00	0.00	0.00	0.00
02-6200-6270 Engineering Services	7,974	0.00	7,973.75	0.00	0.25	100.00
TOTAL PROFESSIONAL SERVICES	7,974	0.00	7,973.75	0.00	0.25	100.00
INSURANCE						
02-6200-6330 Work Comp Insurance	5,145	0.00	5,145.00	0.00	0.00	100.00
02-6200-6334 Liability & Property Insur	5,224	0.00	5,124.40	0.00	99.60	98.09
TOTAL INSURANCE	10,369	0.00	10,269.40	0.00	99.60	99.04
OPERATING						
02-6200-6410 Building Supplies	750	0.00	418.51	0.00	331.49	55.80
02-6200-6411 Building Replacement	0	0.00	0.00	0.00	0.00	0.00
02-6200-6412 Office Supplies	150	12.95	133.96	0.00	16.04	89.31
02-6200-6414 Building Maintenance	900	0.00	795.26	0.00	104.74	88.36
02-6200-6415 Codification	0	0.00	0.00	0.00	0.00	0.00
02-6200-6416 Miscellaneous	0	0.00	0.00	0.00	0.00	0.00
02-6200-6418 Uniforms	2,250	262.01	2,325.41	0.00	(75.41)	103.35
02-6200-6420 Safety Equipment	1,000	154.14	1,089.90	0.00	(89.90)	108.99
02-6200-6422 ADS & Notices	241	0.00	317.80	0.00	(76.80)	131.87
02-6200-6426 Tools	900	551.82	1,262.04	0.00	(362.04)	140.23
02-6200-6429 IT Services	0	0.00	0.00	0.00	0.00	0.00
02-6200-6431 Computer System-Hardware/S	0	0.00	0.00	0.00	0.00	0.00
02-6200-6437 Employee Drug Screening	100	0.00	52.00	0.00	48.00	52.00
02-6200-6438 Insurance	216	0.00	216.00	0.00	0.00	100.00
02-6200-6439 Rental Equipment	9,500	0.00	8,874.00	0.00	626.00	93.41
02-6200-6440 Leased Equipment	20,664	0.00	20,663.54	0.00	0.00	100.00
02-6200-6444 Medical	250	0.00	355.00	0.00	(105.00)	142.00
02-6200-6449 Recruitment	0	0.00	0.00	0.00	0.00	0.00
02-6200-6451 Training	140	175.00	315.00	0.00	(175.00)	225.00
02-6200-6453 Beautification Snowflakes	4,000	0.00	3,231.00	0.00	769.00	80.78
02-6200-6454 Routine Streets	45,000	2,346.28	38,325.03	0.00	6,674.97	85.17
02-6200-6455 Street Signs	1,500	1,040.88	2,156.59	0.00	(656.59)	143.77
02-6200-6456 Propane	2,500	0.00	1,855.66	0.00	644.34	74.23
02-6200-6457 Street Improvements	15,900	0.00	15,836.09	0.00	63.91	99.60
02-6200-6458 Osage Nat'l TIF Sales Tax	0	0.00	0.00	0.00	0.00	0.00

REVENUE & EXPENSE REPORT (UNAUDITED)

AS OF: DECEMBER 31ST, 2016

02 -TRANSPORTATION FUND

DEPARTMENT - TRANSPORTATION % OF YEAR COMPLETED: 100.00

DEPARTMENTAL EXPENDITURES	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
02-6200-6462 Electric	1,600	88.50	1,423.90	0.00	176.10	88.99
02-6200-6464 Telephone	2,380	249.57	2,363.55	0.00	16.45	99.31
02-6200-6468 Street Lights	53,950	4,207.98	52,624.42	0.00	1,325.58	97.54
02-6200-6469 Administration Fees	0	0.00	0.00	0.00	0.00	0.00
02-6200-6478 Public Restrooms	2,157	266.46	2,226.37	0.00	(69.37)	103.22
02-6200-6514 Vehicle Fuel	5,937	469.63	5,936.50	0.00	0.50	99.99
02-6200-6515 Vehicle Maintenance	3,000	774.00	3,372.37	0.00	(372.37)	112.41
02-6200-6517 Vehicle Repair	2,000	0.00	1,415.68	0.00	584.32	70.78
02-6200-6520 Vehicles	24,638	0.00	24,638.41	0.00	0.00	100.00
02-6200-6612 Equipment Maintenance	6,000	641.92	6,048.20	0.00	(48.20)	100.80
02-6200-6613 Equipment Repair	7,000	285.83	6,162.17	0.00	837.83	88.03
02-6200-6614 Radios	400	0.00	0.00	0.00	400.00	0.00
02-6200-6710 Equipment	4,000	0.00	3,645.17	0.00	354.83	91.13
02-6200-6715 Bank Fees	0	0.00	0.00	0.00	0.00	0.00
02-6200-6716 Leased Parking	0	0.00	0.00	0.00	0.00	0.00
02-6200-6722 Building Improvements	4,288	0.00	4,287.68	0.00	0.32	99.99
02-6200-6723 Reserve CD	0	0.00	0.00	0.00	0.00	0.00
02-6200-6810 Transfer to	0	0.00	0.00	0.00	0.00	0.00
02-6200-6811 TIF Sales Tax	212,982	30,451.91	212,982.28	0.00	0.20	100.00
TOTAL OPERATING	436,293	41,978.88	425,349.49	0.00	10,943.94	97.49
TOTAL TRANSPORTATION	628,386	56,428.03	616,656.02	0.00	11,730.01	98.13
TOTAL EXPENDITURES	628,386	56,428.03	616,656.02	0.00	11,730.01	98.13
REVENUE OVER/(UNDER) EXPENDITURES	4,268	33,901.99	18,171.37	0.00	(13,903.40)	425.76

02 -TRANSPORTATION FUND
FINANCIAL SUMMARY

% OF YEAR COMPLETED: 100.00

	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
REVENUE SUMMARY						
TRANSPORTATION	631,894	92,787.67	651,812.70	0.00	(19,918.37)	103.15
TOTAL REVENUES	631,894	92,787.67	651,812.70	0.00	(19,918.37)	103.15
EXPENDITURE SUMMARY						
TRANSPORTATION						
PERSONNEL	185,116	10,627.14	181,248.15	0.00	3,868.22	97.91
PROFESSIONAL SERVICES	2,000	0.00	2,000.00	0.00	0.00	100.00
INSURANCE	11,086	5,605.89	11,008.30	0.00	77.37	99.30
OPERATING	402,527	72,256.95	364,741.53	0.00	37,785.19	90.61
TOTAL TRANSPORTATION	600,729	88,489.98	558,997.98	0.00	41,730.78	93.05
TOTAL EXPENDITURES	600,729	88,489.98	558,997.98	0.00	41,730.78	93.05
REVENUE OVER/(UNDER) EXPENDITURES	31,166	4,297.69	92,814.72	0.00	(61,649.15)	297.81

02 -TRANSPORTATION FUND

% OF YEAR COMPLETED: 100.00

REVENUES	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
TRANSPORTATION						
TAXES						
02-5200-5106 Transportation Sales Tax	536,357	66,951.48	556,002.36	0.00	(19,645.10)	103.66
02-5200-5192 Gas Tax	42,500	3,621.67	42,806.64	0.00	(306.64)	100.72
02-5200-5194 Motor Vehicle Sales Tax	13,868	1,097.20	14,165.50	0.00	(297.20)	102.14
TOTAL TAXES	592,726	71,670.35	612,974.50	0.00	(20,248.94)	103.42
FEES						
02-5200-5410 Motor Vehicle Fees	6,975	516.97	7,018.48	0.00	(43.48)	100.62
02-5200-5415 Road Dist Reimbursement	2,975	2,794.60	2,794.60	0.00	180.00	93.95
02-5200-5416 Excavation Permit Fee	600	0.00	500.00	0.00	100.00	83.33
02-5200-5417 Right of Way Lease Payment	6,870	350.00	6,870.00	0.00	0.00	100.00
TOTAL FEES	17,420	3,661.57	17,183.08	0.00	236.52	98.64
RESERVES						
02-5200-5890 Carry Over	0	0.00	0.00	0.00	0.00	0.00
TOTAL RESERVES	0	0.00	0.00	0.00	0.00	0.00
MISCELLANEOUS						
02-5200-5900 Transfers From	0	0.00	0.00	0.00	0.00	0.00
02-5200-5901 FEMA/SEMA Reimbursement	2,774	0.00	2,774.42	0.00	0.00	100.00
02-5200-5910 Interest Income	289	30.75	289.60	0.00	(0.75)	100.26
02-5200-5913 Trash Pick Up	10,000	10,000.00	10,000.00	0.00	0.00	100.00
02-5200-5920 Miscellaneous Income	985	0.00	885.20	0.00	99.80	89.87
02-5200-5921 Insurance Proceeds	0	0.00	0.00	0.00	0.00	0.00
02-5200-5922 Surplus Property	7,600	7,425.00	7,605.00	0.00	(5.00)	100.07
02-5200-5923 Insurance Premium Refund	101	0.00	100.90	0.00	0.00	100.00
02-5200-5924 Recycling	0	0.00	0.00	0.00	0.00	0.00
TOTAL MISCELLANEOUS	21,749	17,455.75	21,655.12	0.00	94.05	99.57
TOTAL TRANSPORTATION	631,894	92,787.67	651,812.70	0.00	(19,918.37)	103.15
TOTAL REVENUE	631,894	92,787.67	651,812.70	0.00	(19,918.37)	103.15

REVENUE & EXPENSE REPORT (UNAUDITED)

AS OF: DECEMBER 31ST, 2017

02 -TRANSPORTATION FUND

DEPARTMENT - TRANSPORTATION

% OF YEAR COMPLETED: 100.00

DEPARTMENTAL EXPENDITURES	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
PERSONNEL						
02-6200-6110 Salaries Full Time	122,700	7,819.92	120,838.15	0.00	1,861.85	98.48
02-6200-6112 Salaries Part Time	10,834	0.00	10,833.68	0.00	0.00	100.00
02-6200-6114 Salaries Overtime/Holiday	8,000	116.83	6,434.23	0.00	1,565.77	80.43
02-6200-6118 Social Security	11,323	564.15	10,263.27	0.00	1,059.42	90.64
02-6200-6120 Unemployment Insurance	685	84.50	700.91	0.00	(15.91)	102.32
02-6200-6122 Health Insurance	18,600	1,797.42	19,958.59	0.00	(1,358.59)	107.30
02-6200-6160 Retirement	10,238	244.32	9,482.52	0.00	755.68	92.62
02-6200-6161 Health Insurance Subsidy P	2,737	0.00	2,736.80	0.00	0.00	100.00
TOTAL PERSONNEL	185,116	10,627.14	181,248.15	0.00	3,868.22	97.91
PROFESSIONAL SERVICES						
02-6200-6262 City Attorney/Legal	0	0.00	0.00	0.00	0.00	0.00
02-6200-6265 Audit	0	0.00	0.00	0.00	0.00	0.00
02-6200-6270 Engineering Services	2,000	0.00	2,000.00	0.00	0.00	100.00
TOTAL PROFESSIONAL SERVICES	2,000	0.00	2,000.00	0.00	0.00	100.00
INSURANCE						
02-6200-6330 Work Comp Insurance	5,451	48.96	5,451.37	0.00	0.00	100.00
02-6200-6334 Liability & Property Insur	5,634	5,556.93	5,556.93	0.00	77.37	98.63
TOTAL INSURANCE	11,086	5,605.89	11,008.30	0.00	77.37	99.30
OPERATING						
02-6200-6410 Building Supplies	800	0.00	683.55	0.00	116.45	85.44
02-6200-6411 Building Replacement	0	0.00	0.00	0.00	0.00	0.00
02-6200-6412 Office Supplies	75	0.00	41.02	0.00	33.98	54.69
02-6200-6414 Building Maintenance	500	105.00	323.40	0.00	176.60	64.68
02-6200-6415 Codification	0	0.00	0.00	0.00	0.00	0.00
02-6200-6416 Miscellaneous	0	0.00	0.00	0.00	0.00	0.00
02-6200-6418 Uniforms	2,100	38.59	1,914.29	0.00	185.71	91.16
02-6200-6420 Safety Equipment	1,000	54.58	859.19	0.00	140.81	85.92
02-6200-6422 ADS & Notices	300	0.00	172.80	0.00	127.20	57.60
02-6200-6426 Tools	1,000	0.00	891.41	0.00	108.59	89.14
02-6200-6429 IT Services	0	0.00	0.00	0.00	0.00	0.00
02-6200-6431 Computer System-Hardware/S	500	0.00	500.00	0.00	0.00	100.00
02-6200-6437 Employee Drug Screening	250	0.00	205.00	0.00	45.00	82.00
02-6200-6438 Insurance	0	0.00	0.00	0.00	0.00	0.00
02-6200-6439 Rental Equipment	3,000	0.00	2,187.95	0.00	812.05	72.93
02-6200-6440 Leased Equipment	0	0.00	0.00	0.00	0.00	0.00
02-6200-6444 Medical	250	0.00	155.00	0.00	95.00	62.00
02-6200-6449 Recruitment	0	0.00	0.00	0.00	0.00	0.00
02-6200-6451 Training	290	0.00	290.00	0.00	0.00	100.00
02-6200-6453 Beautification Snowflakes	4,054	0.00	4,054.36	0.00	0.00	100.00
02-6200-6454 Routine Streets	47,500	0.00	33,101.91	0.00	14,398.09	69.69
02-6200-6455 Street Signs	2,750	123.10	2,603.38	0.00	146.62	94.67
02-6200-6456 Propane	2,500	206.99	1,655.93	0.00	844.07	66.24
02-6200-6457 Street Improvements	18,000	461.23	14,613.17	0.00	3,386.83	81.18
02-6200-6458 Osage Nat'l TIF Sales Tax	0	0.00	0.00	0.00	0.00	0.00

02 -TRANSPORTATION FUND
DEPARTMENT - TRANSPORTATION

% OF YEAR COMPLETED: 100.00

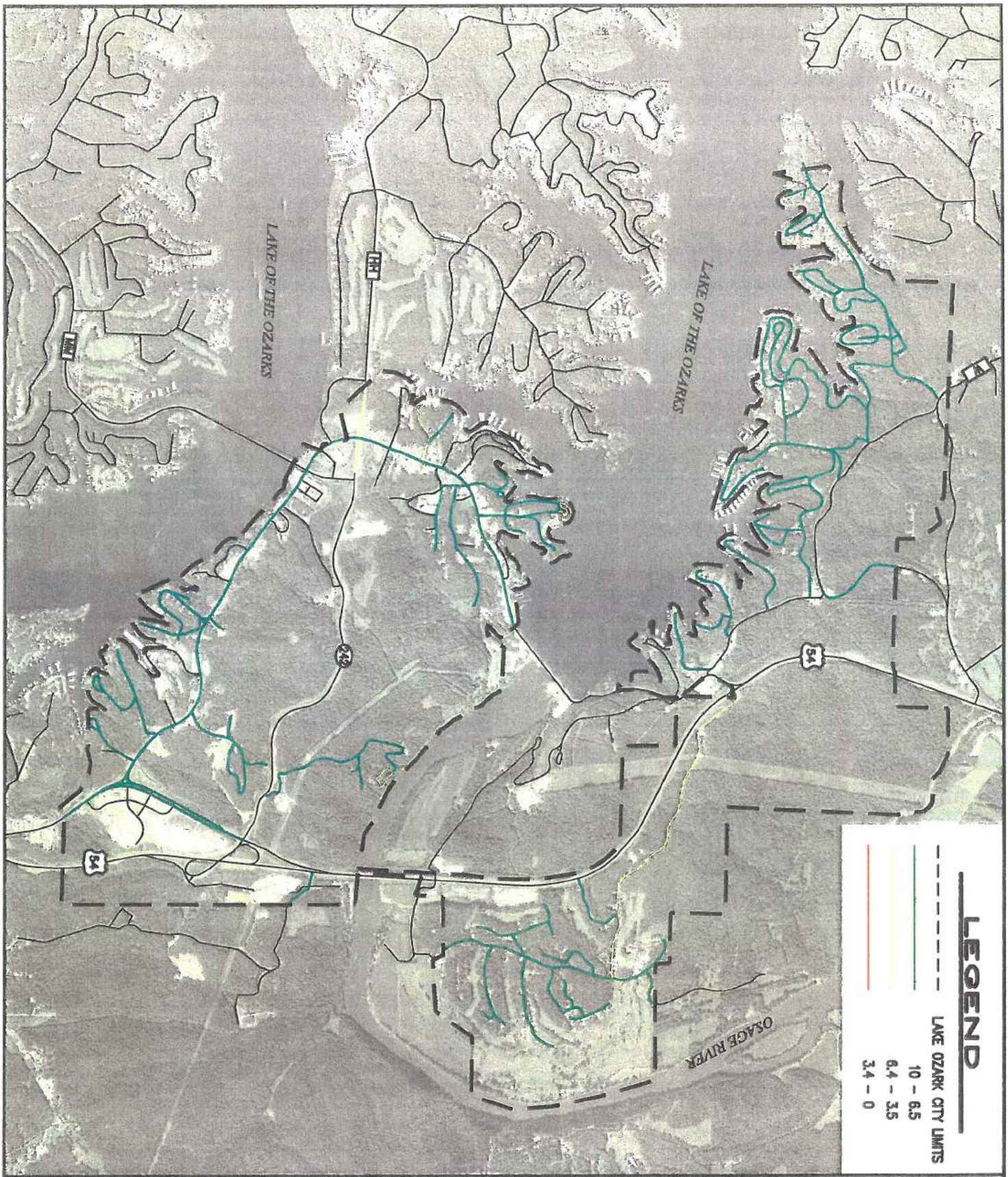
DEPARTMENTAL EXPENDITURES	CURRENT BUDGET	CURRENT PERIOD	YEAR TO DATE ACTUAL	TOTAL ENCUMBERED	BUDGET BALANCE	% YTD BUDGET
02-6200-6462 Electric	1,600	72.97	1,370.26	0.00	229.74	85.64
02-6200-6464 Telephone	2,500	136.03	2,258.42	0.00	241.58	90.34
02-6200-6468 Street Lights	55,000	4,330.65	51,974.04	0.00	3,025.96	94.50
02-6200-6469 Administration Fees	0	0.00	0.00	0.00	0.00	0.00
02-6200-6478 Public Restrooms	0	0.00	0.00	0.00	0.00	0.00
02-6200-6514 Vehicle Fuel	11,024	894.42	11,024.34	0.00	0.00	100.00
02-6200-6515 Vehicle Maintenance	3,000	216.41	2,652.78	0.00	347.22	88.43
02-6200-6517 Vehicle Repair	3,500	0.00	3,078.54	0.00	421.46	87.96
02-6200-6520 Vehicles	0	0.00	0.00	0.00	0.00	0.00
02-6200-6612 Equipment Maintenance	2,750	122.47	2,669.87	0.00	80.13	97.09
02-6200-6613 Equipment Repair	6,250	128.34	6,157.37	0.00	92.63	98.52
02-6200-6614 Radios	0	0.00	0.00	0.00	0.00	0.00
02-6200-6710 Equipment	1,000	0.00	581.64	0.00	418.36	58.16
02-6200-6715 Bank Fees	0	0.00	0.00	0.00	0.00	0.00
02-6200-6716 Leased Parking	12	0.00	8.00	0.00	4.00	66.67
02-6200-6722 Building Improvements	9,991	0.00	8,131.83	0.00	1,859.17	81.39
02-6200-6723 Reserve CD	20,000	0.00	0.00	0.00	20,000.00	0.00
02-6200-6810 Transfer to	0	0.00	0.00	0.00	0.00	0.00
02-6200-6811 TIF Sales Tax	201,030	65,366.17	210,582.08	0.00 (	9,552.06)	104.75
TOTAL OPERATING	402,527	72,256.95	364,741.53	0.00	37,785.19	90.61
TOTAL TRANSPORTATION	600,729	88,489.98	558,997.98	0.00	41,730.78	93.05
TOTAL EXPENDITURES	600,729	88,489.98	558,997.98	0.00	41,730.78	93.05
REVENUE OVER/(UNDER) EXPENDITURES	31,166	4,297.69	92,814.72	0.00 (	61,649.15)	297.81

Appendix C

(Pavement Score Map)

Appendix D

(20-year Maintenance Option Pavement Score Maps)



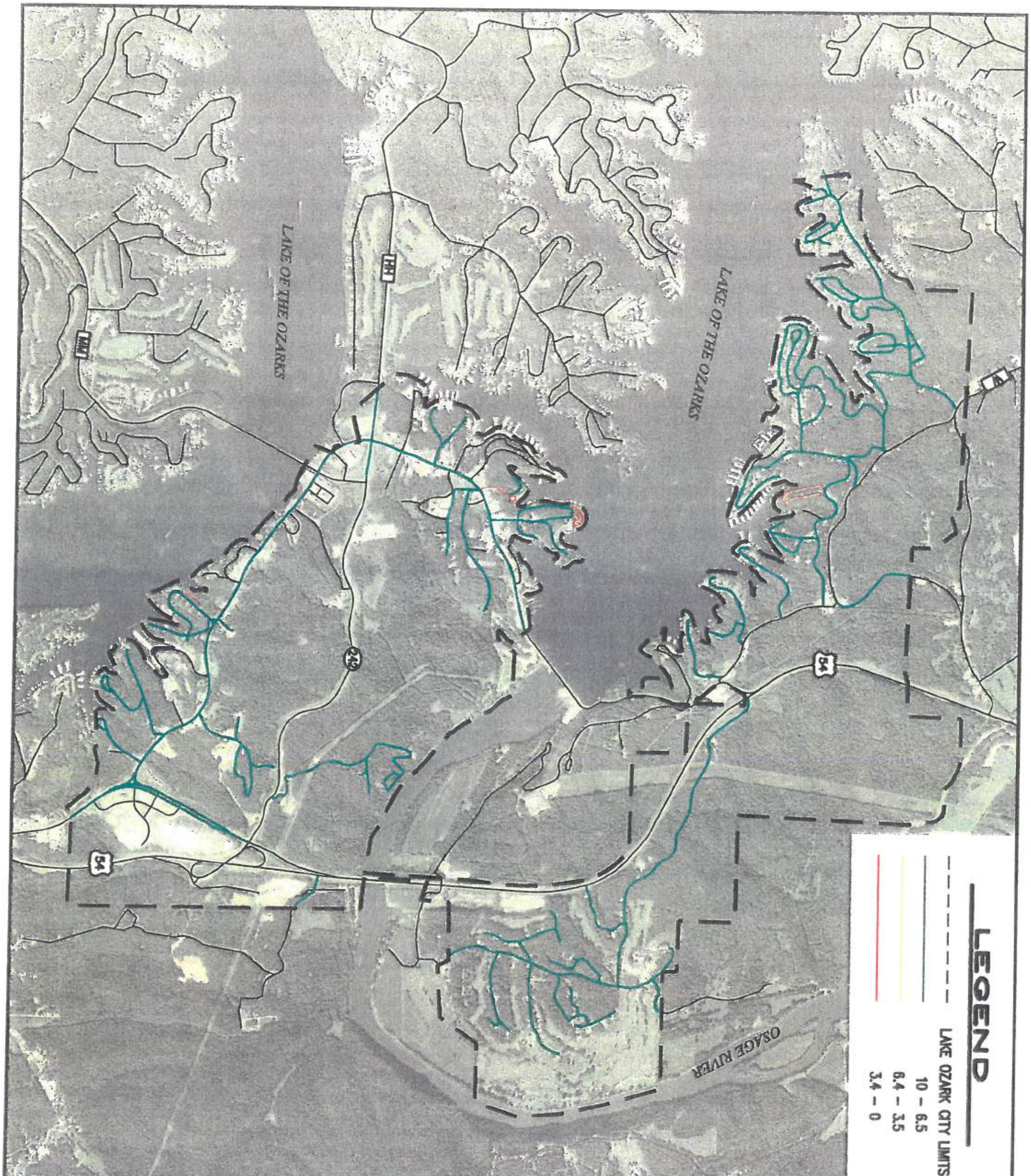
20 - YEAR MAINTENANCE - OPTION 1

D1	DRAWN BY: KDL	DATE: Oct. 12, 2018	PROJECT NO: LOR18-181
	APPROVED BY:	PROJECT: NONE	

DATE	DESCRIPTION	DRAWN BY	APPR. BY

PAVEMENT ANALYSIS ASSMENT AND RECOMMENDATIONS LAKE OZARK, MISSOURI

OCHRAN
• Civil Engineering
• Land Surveying
• Architecture
• Site Development
• General Consulting
• Master Planning



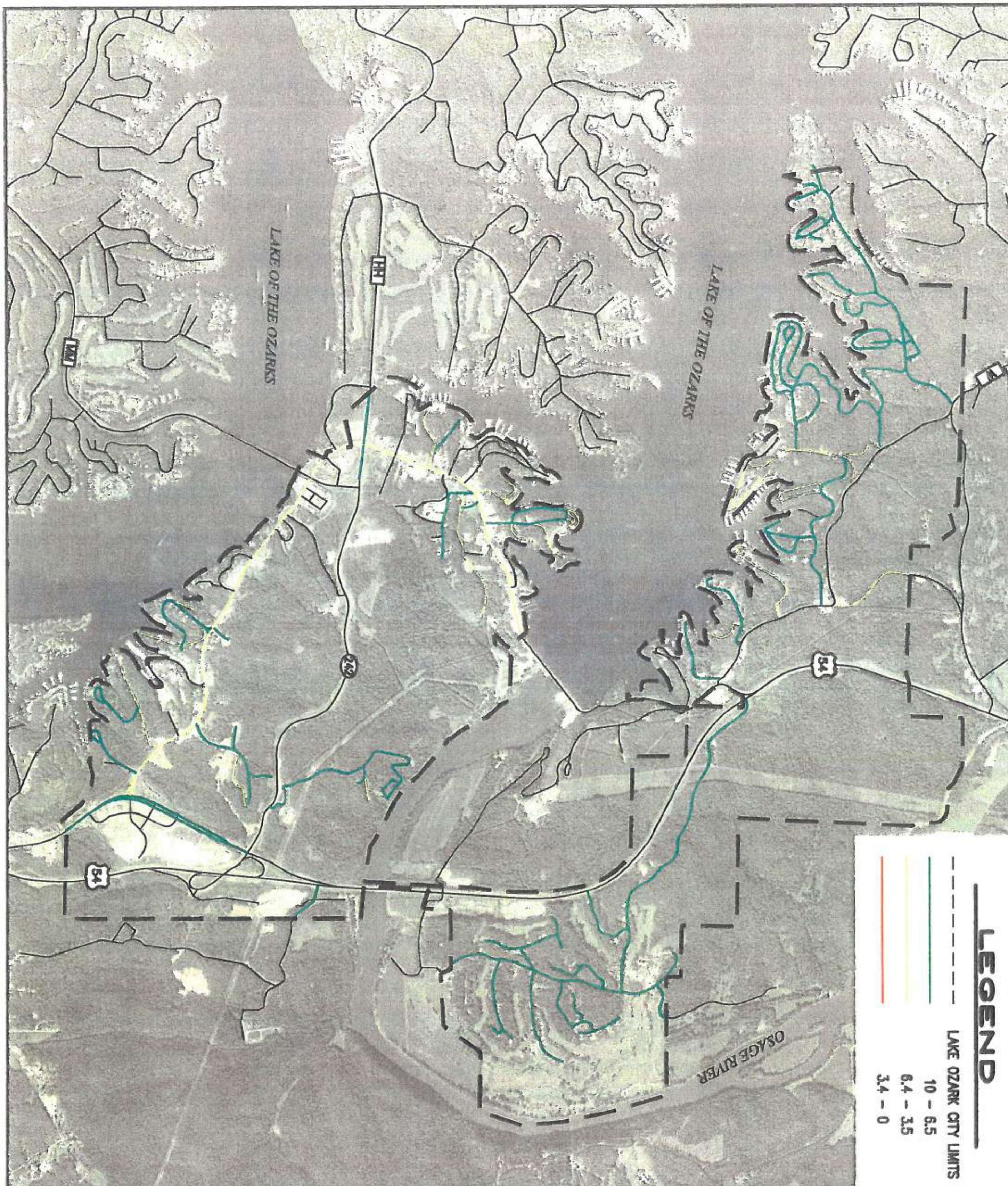
20 - YEAR MAINTENANCE - OPTION 2

DWG NO	D2
PROJ NO	LOR18-181
SCALE	NONE
DATE	Oct. 12, 2018
DRWN BY	KDL

PAVEMENT ANALYSIS ASSMENT
AND RECOMMENDATIONS
LAKE OZARK, MISSOURI

COCHRAN
- Civil Engineering
- Land Surveying
- Architecture
- Site Development
- General Consulting
- Master Planning

DWG NAME: J:\LOR18-181 Pavement Analysis Assessment & Recommendations\CAD\Exhibits\APENDIX D3.dwg LAYOUT TAB: D3 PLOTTED ON: Oct 12, 2013 – 10:47am PLOTTED BY: Mondrum



20 - YEAR MAINTENANCE - OPTION 3

KDL

Oct. 12, 2018

NONE

LOR18-181

D3

PAVEMENT ANALYSIS ASSMENT

AND RECOMMENDATIONS

LAKE OZARK, MISSOURI

COCHRAN

- Civil Engineering
- Land Surveying
- Architecture
- Site Development
- General Consulting
- Master Planning

Appendix E

(Road Maintenance Plan)

Year One

Project Type	Road Name	Cost	Pavement Score
Crack Seal	Eagle Crest Rd.	$ 8,997.30	7.7
	Welsh Rd.	$ 11,941.20	8
Cold Patch	none	-	-
Sealcoat	Osage Hills Rd.	$ 32,264.00	8.2
	Osage River Bridge	$ 21,844.80	7.7
Asphalt Patch	none	-	-
Micro-surface	none	-	-
Chip & Seal	none	-	-
Overlay	none	-	-
Mill & Overlay	none	-	-
Reconstruction	none	-	-
Total		**$ 75,047.30**	**6.0***

* Average Pavement Score for Road System

^ Asphalt Maintenance at Entrance of Gravel Road

Year Two - Five

Project Type	Road Name	Cost	Pavement Score
Crack Seal	Old Hwy 54	$ 9,243.99	7.3
	Eagle Crest Rd.	$ 8,997.30	7.3
	Welsh Rd.	$ 11,941.20	7.6
	S. Fish Haven Rd.	$ 4,745.70	8.0
	Pintail Ln.	$ 572.40	8.0
	Hidden Acres Rd.	$ 3,186.00	8.8
Cold Patch	none	-	-
Sealcoat	Horseshoe Bend Parkway	$ 23,276.00	7.3
	Kane Cir.	$ 5,088.00	7.5
	Bay Hill Crt.	$ 4,636.80	7.5
	Overlook Rd.	$ 8,320.00	7.5
Asphalt Patch	none	-	-
Micro-surface	none	-	-
Chip & Seal	none	-	-
Overlay	Falcon Dr. ^	$ 12,320.00	9.0
Mill & Overlay	Valley Rd.	$ 185,372.00	9.0
Reconstruction	none	-	-
Total		**$ 277,699.39**	**5.4***

* Average Pavement Score for Road System

^ Asphalt Maintenance at Entrance of Gravel Road

Year Six - Ten

Project Type	Road Name	Cost	Pavement Score
Crack Seal	Valley Rd.	$ 7,583.40	8.0
	S. Fish Haven Rd.	$ 4,745.70	7.3
	Hidden Acres Rd.	$ 3,186.00	7.9
	Falcon Dr. ^	$ 554.40	8.0
Cold Patch	none	-	-
Sealcoat	Welsh Rd.	$ 26,536.00	7.9
	Horseshoe Bend Parkway	$ 23,276.00	7.7
	Old Hwy 54	$ 20,542.20	7.7
	Eagle Crest Rd.	$ 19,994.00	7.7
Asphalt Patch	none	-	-
Micro-surface	Mockingbird Rd.	$ 24,748.20	7.3
	Osage River Bridge	$ 32,767.20	8.0
	Beacon Point Cir.	$ 25,602.00	6.7
	School Rd.	$ 17,472.00	7.3
Chip & Seal	Lighthouse Rd.	$ 53,153.90	6.9
	Arrowhead Beach Rd.	$ 41,753.70	7.1
Overlay	Castaway Cove	$ 17,208.00	9.0
	Thornsberry Rd.	$ 39,440.00	9.0
Mill & Overlay	none	-	-
Reconstruction	none	-	-
Total		**$ 358,562.70**	**5.0***

* Average Pavement Score for Road System

^ Asphalt Maintenance at Entrance of Gravel Road

Year 11 - 15

Project Type	Road Name	Cost	Pavement Score
Crack Seal	Falcon Dr. ^	$ 554.40	7.3
	Castaway Cove	$ 774.36	8.0
	Thornsberry Rd	$ 1,774.80	8.0
Cold Patch	Valley Rd	$ 10,953.80	7.8
	Osage River Bridge	$ 14,199.12	7.8
	Beacon Point Cir.	$ 11,094.20	6.7
	Welsh Rd	$ 17,248.40	7.7
Sealcoat	Lighthouse Rd.	$ 12,506.80	7.4
	S. Fish Haven Rd.	$ 10,546.00	7.7
Asphalt Patch	Mockingbird Rd.	$ 20,623.50	8.2
	School Rd.	$ 14,560.00	8.2
	Old Hwy 54	$ 25,677.75	8.5
	Eagle Crest Rd.	$ 24,992.50	8.6
Micro-surface	Oakmont Ave.	$ 15,026.40	6.9
	Osage Hills Rd.	$ 48,396.00	7.1
	Horseshoe Bend Parkway	$ 34,914.00	9.0
Chip & Seal	Pintail Ln.	$ 5,406.00	8.9
	Oak Ridge Dr.	$ 41,981.50	6.2
	Lakeland Rd.	$ 41,813.20	6.3
	Rockwood Cir. ^	$ 2,310.30	7.7
	Stonehill Rd. ^	$ 632.40	7.9
Overlay	Longview Cir. ^	$ 1,056.00	9.0
Mill & Overlay	none	-	-
Reconstruction	Cardinal Cir. ^	$ 1,260.00	10.0
Total		**$ 358,301.43**	**4.7***

* Average Pavement Score for Road System

^ Asphalt Maintenance at Entrance of Gravel Road

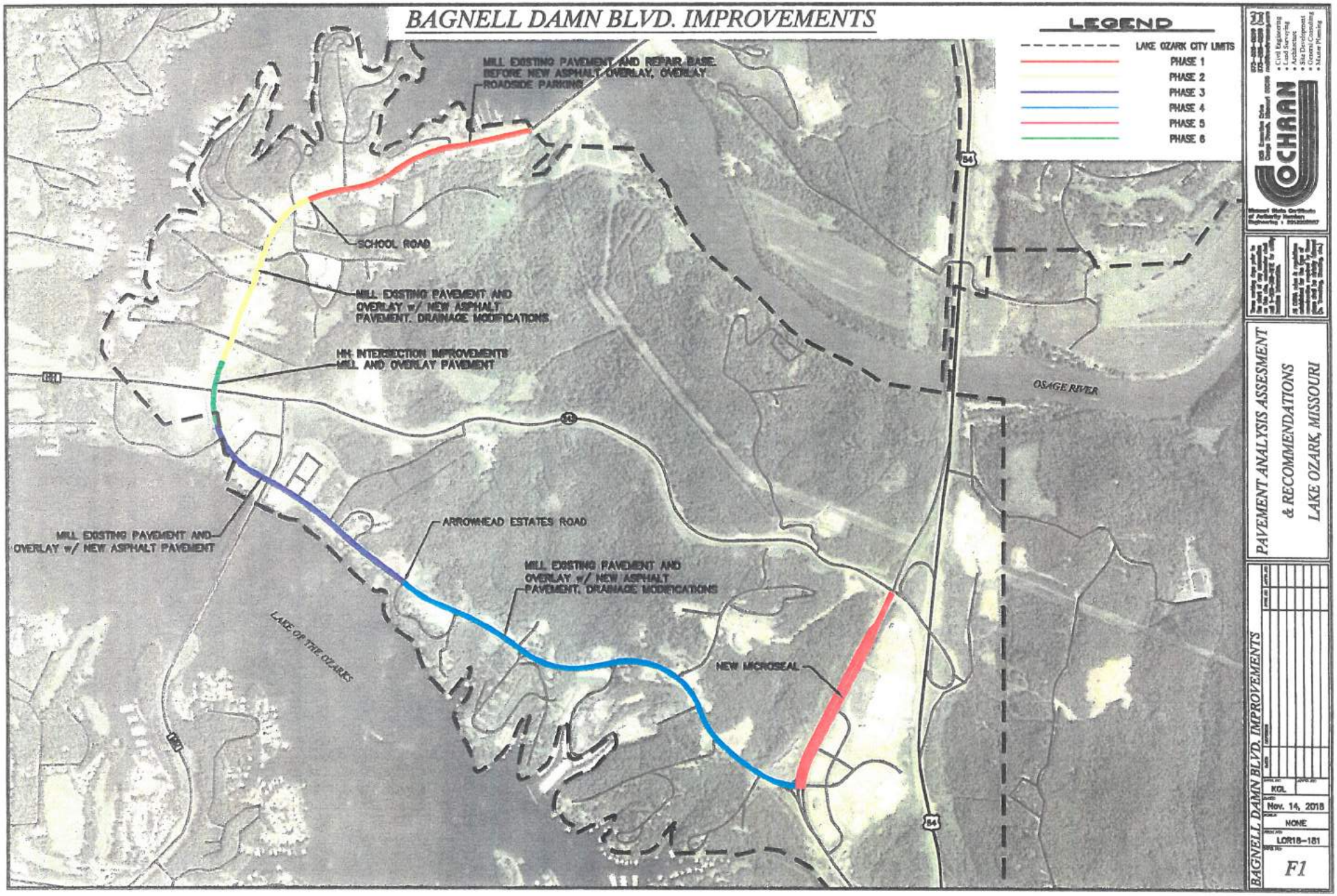
Year 16 - 20

Project Type	Road Name	Cost	Pavement Score
Crack Seal	Pintail Ln.	$ 572.40	8.0
	Osage River Bridge	$ 9,830.16	7.1
	Welsh Rd.	$ 11,941.20	7.0
	Castaway Cove	$ 774.36	7.3
	Thornsberry Rd.	$ 1,774.80	7.3
	Osage Hills Rd.	$ 14,518.80	6.6
	Longview Cir. ^	$ 47.52	8.0
	S. Fish Haven Rd.	$ 4,745.70	7.0
Cold Patch	Valley Rd.	$ 10,953.80	7.6
	Oakmont Ave.	$ 6,511.44	6.9
	Mockingbird Rd.	$ 10,724.22	7.9
Sealcoat	Oak Ridge Dr.	$ 9,878.00	6.9
	Lakeland Rd.	$ 9,838.40	7.0
	Rockwood Cir. ^	$ 543.60	8.0
	Stonehill Rd. ^	$ 148.80	8.1
	Beacon Point Cir.	$ 17,068.00	7.3
	Falcon Dr. ^	$ 1,232.00	7.7
	Arrowhead Beach Rd.	$ 9,824.40	6.3
	School Rd.	$ 11,648.00	8.4
Asphalt Patch	none	-	-
Micro-surface	Hidden Acres Rd.	$ 10,620.00	7.9
	Bay Hill Crt.	$ 6,955.20	6.6
	Overlook Rd.	$ 12,480.00	6.6
Chip & Seal	Meyers Ct.	$ 7,786.00	7.0
Overlay	Bogey Hill Ct.	$ 30,480.00	9.0
	Cherry Hill Ave.	$ 120,240.00	9.0
Mill & Overlay	Lenox Ln.	$ 7,392.00	9.0
	Oak Wood Ln.	$ 7,810.00	9.0
	Bluebird ^	$ 1,188.00	9.0
Reconstruction	Marsh Ln.	$ 5,976.00	10.0
Total		**$ 343,502.80**	**4.3***

* Average Pavement Score for Road System

Appendix F

(Bagnell Dam Boulevard Project Phasing)


BAGNELL DAMN BLVD. IMPROVEMENTS
LEGEND
LAKE OZARK CITY LIMITS
PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
PHASE 6
MILL EXISTING PAVEMENT AND REPAIR BASE BEFORE NEW ASPHALT OVERLAY, OVERLAY ROADSIDE PARKING
SCHOOL ROAD
MILL EXISTING PAVEMENT AND OVERLAY w/ NEW ASPHALT PAVEMENT, DRAINAGE MODIFICATIONS
HH INTERSECTION IMPROVEMENTS MILL AND OVERLAY PAVEMENT
OSAGE RIVER
MILL EXISTING PAVEMENT AND OVERLAY w/ NEW ASPHALT PAVEMENT
ARROWHEAD ESTATES ROAD
MILL EXISTING PAVEMENT AND OVERLAY w/ NEW ASPHALT PAVEMENT, DRAINAGE MODIFICATIONS
LAKE OF THE OZARKS
NEW MICROSEAL
54
KGL
Nov. 14, 2018
NONE
LOR18-181
F1
PAVEMENT ANALYSIS ASSESMENT
& RECOMMENDATIONS
LAKE OZARK, MISSOURI
BAGNELL DAMN BLVD. IMPROVEMENTS