Turtle Rock III

Pavement Field Assessment

October 2015

ProConsult • P.O. Box 75036, Phoenix, AZ 85087 • 602-541-2403 • ProConsultAZ@outlook.com

Field assessment
Evaluation of existing pavement
Including maintenance and replacement cost projections

Client
Turtle Rock III HOA

Jobsite
Turtle Rock III
1008 E Michigan Ave
Phoenix, AZ 85022

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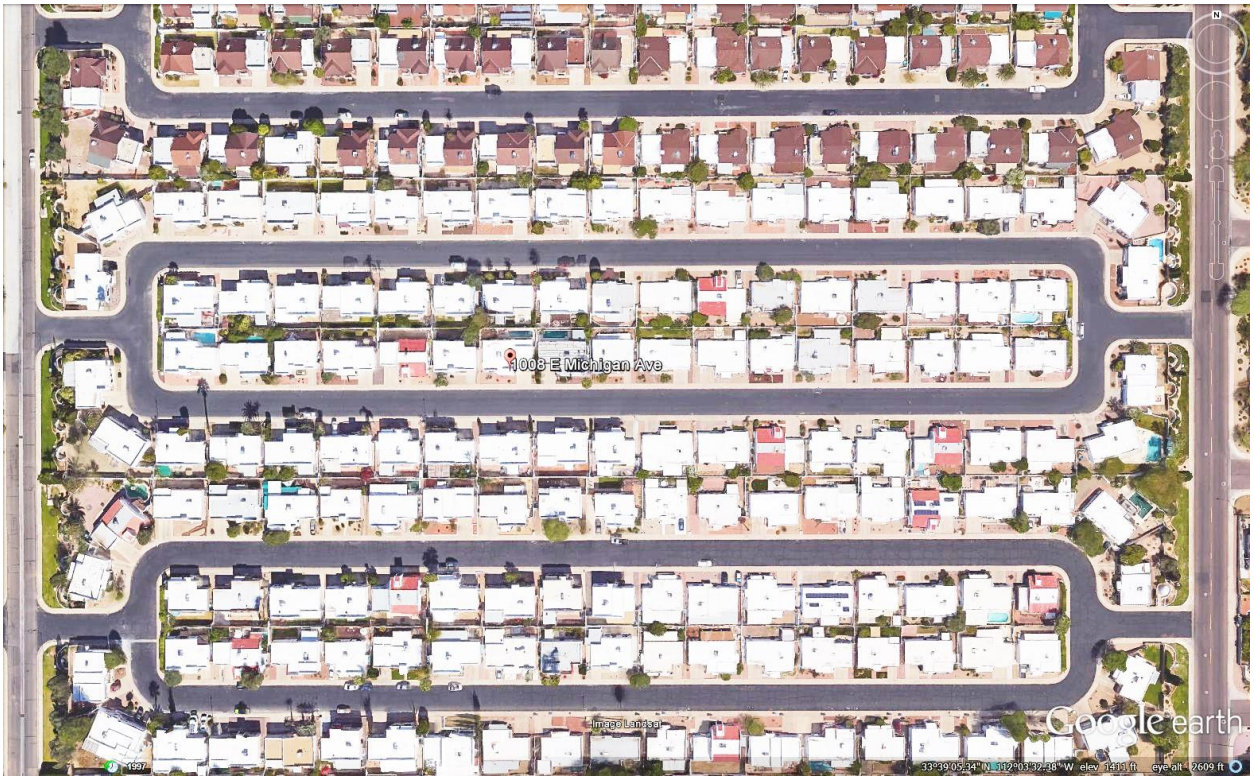
Field assessment topics & conclusions
The ***Field Assessment – Inspection Items*** listed below are standard inspection points established through the Asphalt Institute's Pavement Distress Summary. The presence or absence of these common items provides an in-depth insight into the condition of existing pavement, base, and subgrade, as well as any previously completed installation or repair work.

Summary
Extreme fatigue cracking throughout the property suggests existing base/subgrade issues which can only be addressed through partial or complete removal and replacement. The wider cracks and sunken utilities constitute trip hazard liabilities and will require immediate attention.

Total pavement surface area

- Approximately 75,922 square feet



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Field Assessment – Inspection Items

Traffic volume damage
Caused by site specific traffic volume ranging from standard passenger vehicles to heavy commercial and municipal trucks and buses. May apply to all or limited sections of the roadways

a) Status: Present in limited areas
b) Severity: Low
c) Recommendation: Where applicable, require agencies, jurisdictions or entities imparting significant heavy loading to pay into a fund to offset the cost associated with the inevitable accelerated pavement deterioration

Water damage
Caused by overspray or runoff from improperly adjusted water systems and standing water due to improper drainage

d) Status: Present throughout the property due to improper drainage
e) Severity: High
f) Recommendation: Reduce runoff, raise pavement surface 1/4" above concrete curbing

Existing patch failures
Caused by improper installation techniques, inadequate compaction, improper materials, failure of surrounding or underlying pavement

a) Status: None present
b) Severity: n/a
c) Recommendation: Semi-annual preventative walkthrough inspections

Existing overlay failures
Caused by improper installation techniques, thin overlay, inadequate compaction, improper materials, failure of surrounding or underlying pavement

a) Status: Present in limited areas
b) Severity: Low
c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete

Potholes
Caused by poor surface mix, base/subgrade deficiencies, poor drainage, chemical and oil residue

a) Status: Present in limited areas. Small, shallow, 1st-stage
b) Severity: Medium – due to location and depth creating trip hazard liabilities
c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete

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Raveling/weathering
Caused by poor compaction or improper temperature during pavement installation, lack of protective sealcoat, frequent exposure to water

a) Status: Present in limited areas
b) Severity: Low
c) Recommendation: Clean and remove raveling surface fines and apply surface coat

Reflection cracking
Caused by reflection of cracks from original surface below top layers

a) Status: None present
b) Severity: n/a
c) Recommendation: Semi-annual preventative walkthrough inspections

Fatigue cracking
Caused by excessive loading, thin surface, base/subgrade deficiencies, poor drainage

a) Status: Present throughout property
b) Severity: High, large areas of severe cracking with spalled edges
c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete

Longitudinal and transverse cracking
Caused by poorly constructed joint cracks, shrinkage of asphalt layer, operation of paver

a) Status: Present throughout property
b) Severity: High, 1" and 2" in width, spalled edges
c) Recommendation: Treatment of cracks outside of fatigued areas with hot-applied sealant

Edge cracks
Caused by lack of lateral support, thinning of pavement near edges

a) Status: See "Settlement/grade depressions" below
b) Severity: n/a
c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete

Slippage cracks
Caused by lack of efficient bond between top layer and original surface, tack coat was not used before installation, asphaltic concrete mix had a high sand content

a) Status: None present
b) Severity: n/a
c) Recommendation: Semi-annual preventative walkthrough inspections

Corrugations & shoving
Caused by mixtures too high in asphalt, fine aggregate content too high, incorrect asphalt grade

a) Status: None present
b) Severity: n/a
c) Recommendation: Semi-annual preventative walkthrough inspections

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Settlement/grade depressions

Caused by settlement or failure in the lower pavement layers, base/subgrade deficiencies

a) Status: Present throughout property along roadway edges
b) Severity: High, due to quantity, 1/2" to 1" in depth, retaining water
c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete

Rutting

Caused by consolidation or lateral movement of pavement or subgrade under traffic, moisture infiltration, improper base/subgrade material and compaction

a) Status: None present
b) Severity: n/a
c) Recommendation: Semi-annual preventative walkthrough inspections

Lane/shoulder drop-off

Caused by erosion of the pavement lane edge, settlement of the shoulder, or by building up the roadway without adjusting the shoulder level

a) Status: n/a
b) Severity: n/a
c) Recommendation: n/a

Bleeding

Caused by too much liquid asphalt in mix, too heavy bond/tack coat, improper sealcoat

a) Status: None present
b) Severity: n/a
c) Recommendation: Quality assurance inspections and controls for future paving to confirm mix design

Peeling & flaking

Caused by buildup of surface treatment products in low-traffic areas

a) Status: None present
b) Severity: n/a
c) Recommendation: Detailed specifications for future surface treatment projects to avoid product build-up. Semi-annual preventative walkthrough inspections

Longitudinal/transverse sealcoat streaking

Caused by improper spray bar height, nozzle issues, inconsistent application

a) Status: None present
b) Severity: n/a
c) Recommendation: Define proper application methods and rates for future sealcoating projects

Sunken utilities

Caused by failure to adjust height of existing utilities to match surface treatment grade and level

a) Status: Present in limited areas
b) Severity: Medium, due to trip hazard liability
c) Recommendation: Height adjustments after any grade or elevation changes

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Oil & chemical residue

Caused by runoff from existing structures, leaking vehicles, spillage

a) Status: Present in limited areas
b) Severity: Low
c) Recommendation: Thorough cleaning followed by treatment with poly bonding material prior to sealcoating

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Traffic volume damage

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Water damage

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Existing overlay failures

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Potholes

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Raveling/weathering

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Longitudinal and transverse cracking

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Edge cracks

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Sunken utilities

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Oil or chemical residue

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Cost projections in current dollar value

The contributions made to the pavement reserve fund are a means to supply for the ongoing maintenance of the pavement, as well as to build funds for the eventual replacement. Since asphalt surfaces deteriorate at varying rates and the finances of the property are typically changing on an annual basis, the need to maintain balance between the two is an ongoing process. To maintain this balance, periodic updates to the cost analysis are recommended. Annual updates may be warranted depending on the age of the property and the amount of repair or replacement activity.

Option 1 – Delay removal till 2027

Year	Project Scope	Projected Budget
2015	Asphalt repair, cracks, sealcoat	$ 67,800
2019	Asphalt repair, cracks, sealcoat	$ 38,000
2023	Cracks, sealcoat	$ 12,800
2027	Complete removal and replacement	$ 200,000
2028	Sealcoat (12 months after installation)	$ 8,000
2032	Asphalt repair, cracks, sealcoat	$ 15,200

Option 2 – 2015 removal with scheduled maintenance program

Year	Project Scope	Projected Budget
2015	Complete removal and replacement	$ 200,000
2016	Sealcoat (12 months after installation)	$ 8,000
2020	Asphalt repair, cracks, sealcoat	$ 15,200
2024	Asphalt repair, cracks, sealcoat	$ 19,800
2028	Asphalt repair, cracks, sealcoat	$ 24,000
2032	Asphalt repair, cracks, sealcoat	$ 30,300

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General Assumptions

Several general assumptions have been made for the completion of this report:

a) The pavement will eventually be replaced with like kind unless otherwise noted or directed by a representative of the property to use alternate materials
b) All new installations will comply with current city, state and local construction code requirements
c) A maintenance program will be implemented to ensure that the pavement will be regularly maintained and repaired
d) The projected costs are at current value and will require recalculation on a yearly basis to include the rate of inflation and changes in the industry

Expert Analysis Terms & Conditions

This study and report is based on observations of the visible and apparent conditions of a reasonable observation and evaluation of the property's pavement at the time of inspection. Although due diligence was performed during the inspection phase, ProConsult makes no representations regarding latent or concealed defects that may exist. Judgments in this study are based on estimates of the age and typical useful life of the pavement surface. The predictions of useful life and remaining useful life are based on industry and/or statistical comparisons.

The methods of installation, deferral of maintenance, or other unforeseen conditions make it virtually impossible to predict precisely when the pavement will require major repair or replacement. If the property representative has not disclosed any known issues or problems with materials, components, or systems, it is noted that the validity of this study may be impacted.

This report is intended solely for the use of the client and job site specified on page one and may not be used by any other party for any purpose.

This analysis does not purport to all of the safety and liability concerns, if any, associated with this property. It is the responsibility of the client to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use of this report.

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ProConsult Field Assessment

Evaluation of existing pavement — including maintenance and replacement cost projections.

Client: Turtle Rock III HOA

Project Consultant: Clay Jordan

Date of Report: October 3, 2015

Summary: *Extreme fatigue cracking throughout the property suggests existing base/subgrade issues which can only be addressed through partial or complete removal and replacement*. The wider cracks and sunken utilities constitute trip hazard liabilities and will require immediate attention.

Cost Projections in Current Dollar Value *

Option 1 – Delay removal till 2027

Year	Project Scope	Projected Cost
2015	**Asphalt repair, cracks, sealcoat**	**67,800**
2019	**Asphalt repair, cracks, sealcoat**	**38,000**
2023	**Cracks, sealcoat**	**12,800**
2027	**Complete removal and replacement**	**200,000**
2028	**Sealcoat (12 months after installation)**	**8,000**
2032	**Asphalt repair, cracks, sealcoat**	**15,200**

Option 2 – 2015 removal with scheduled maintenance program

Year	Project Scope	Projected Cost
2015	**Complete removal and replacement**	**200,000**
2016	**Sealcoat (12 months after installation)**	**8,000**
2020	**Asphalt repair, cracks, sealcoat**	**15,200**
2024	**Asphalt repair, cracks, sealcoat**	**19,800**
2028	**Asphalt repair, cracks, sealcoat**	**24,000**
2032	**Asphalt repair, cracks, sealcoat**	**30,300**

* The report was written with immediate action in mind, hence the beginning date of 2015.

ProConsult Field Assessment — Inspection Items

Water Damage

Caused by overspray or runoff from improperly adjusted water systems and standing water due to improper drainage.

d) Status: Present throughout the property due to improper drainage

e) Severity: **HIGH**

f) Recommendation: Reduce runoff, raise pavement surface 1/4" above concrete curbing.

Fatigue Cracking

Caused by excessive loading, thin surface, base/subgrade deficiencies, poor drainage.

a) Status: Present throughout property

b) Severity: **HIGH** — large areas of severe cracking with spalled edges

c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete.

Longitudinal and Transverse Cracking

Caused by poorly constructed joint cracks, shrinkage of asphalt layer, operation of paver.

a) Status: Present throughout property

b) Severity: **HIGH** — 1" and 2" in width, spalled edges

c) Recommendation: Treatment of cracks outside of fatigued areas with hot-applied sealant.

Edge Cracks

Caused by lack of lateral support, thinning of pavement near edges.

a) Status: See "Settlement/Grade Depressions" below

b) Severity: (see below)

c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete.

Settlement/Grade Depressions

Caused by settlement or failure in the lower pavement layers, base/subgrade deficiencies.

a) Status: Present throughout property along roadway edges

b) Severity: **HIGH** — due to quantity, 1/2" to 1" in depth, retaining water

c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete.

Potholes

Caused by poor surface mix, base/subgrade deficiencies, poor drainage, chemical and oil residue.

a) Status: Present in limited areas. Small, shallow, 1st-stage

b) Severity: **Medium** — due to location and depth creating trip hazard liabilities

c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete.

Sunken Utilities

Caused by failure to adjust height of existing utilities to match surface treatment grade and level.

a) Status: Present in limited areas

b) Severity: **Medium** — due to trip hazard liability

c) Recommendation: Height adjustments after any grade or elevation changes.

Existing Overlay Failures

Caused by improper installation techniques, thin overlay, inadequate compaction, improper materials, failure of surrounding or underlying pavement.

a) Status: Present in limited areas

b) Severity: **Low**

c) Recommendation: Full-depth removal of specified areas and 3" replacement with hot asphaltic concrete.

Raveling/Weathering

Caused by poor compaction or improper temperature during pavement installation, lack of protective sealcoat, frequent exposure to water.

a) Status: Present in limited areas

b) Severity**:** **Low**

c) Recommendation: Clean and remove raveling surface fines and apply surface coat.

Oil & Chemical Residue

Caused by runoff from existing structures, leaking vehicles, spillage.

a) Status: Present in limited areas

b) Severity: **Low**

c) Recommendation: Thorough cleaning followed by treatment with poly bonding material prior to sealcoating.

Traffic Volume Damage

Caused by site specific traffic volume ranging from standard passenger vehicles to heavy commercial and municipal trucks and buses. May apply to all or limited sections of the roadways.

a) Status: Present in limited areas

b) Severity: **Low**

c) Recommendation: Where applicable, require agencies, jurisdictions or entities imparting significant heavy loading to pay into a fund to offset the cost associated with the inevitable accelerated pavement deterioration.

Road Reserve Fund -- 14-Yr. Projection *

Beginning Balance: $43,100

	- Annual Assessment -		Road	Ending
	Rate	Amount	Repairs	Balance
2016	325	24,700	(67,800)	0
2017	125	9,500	0	9,500
2018	125	9,500	0	19,000
2019	125	9,500	0	28,500
2020	125	9,500	(38,000)	0
2021	125	9,500	0	9,500
2022	125	9,500	0	19,000
2023	125	9,500	0	28,500
2024	125	9,500	(12,800)	25,200
2025	600	45,600	0	70,800
2026	600	45,600	0	116,400
2027	600	45,600	0	162,000
2028	600	45,600	(200,000)	7,600
2029	125	9,500	(8,000)	9,100

* *based on ProConsult "Option 1"*

$3,850 Total Assessments

Road Reserve Fund with Loan -- 14-Year Projection **

Beginning Balance: $43,100

	- Annual Assessment -		Road	Loan	Loan	Ending
	Rate	Amount	Repairs	Proceeds	Payments	Balance
2016	150	11,400	(67,800)	25,000	(2,150)	9,550
2017	150	11,400	0	--	(4,300)	16,650
2018	150	11,400	0	--	(4,300)	23,750
2019	150	11,400	0	--	(4,300)	30,850
2020	150	11,400	(37,950)	--	(4,300)	0
2021	150	11,400	0	--	(4,300)	7,100
2022	150	11,400	0	--	(4,300)	14,200
2023	150	11,400	0	--	(2,150)	23,450
2024	150	11,400	(12,850)	--	0	22,000
2025	600	45,600	0	--	0	67,600
2026	600	45,600	0	--	0	113,200
2027	600	45,600	0	--	0	158,800
2028	600	45,600	(200,000)	--	0	4,400
2029	167	12,700	(8,000)	--	0	9,100

** *with a $25,000 loan in 1st year, amortized over 7 years @ 5½% ($359.25/mo. paym*

$3,917 Total Assessments $67 "excess" per owner $5,100 = total interest

Option #2 -- with LARGE Assessment

Beginning Balance: $43,100

	- Annual Assessment -		Road	Ending
	Rate	Amount	Repairs	Balance
2016	2,125	161,500	(200,000)	4,600
2017	60	4,560	(8,000)	1,160
2018	60	4,560	0	5,720
2019	60	4,560	0	10,280
2020	60	4,560	0	14,840
2021	60	4,560	(15,200)	4,200
2022	60	4,560	0	8,760
2023	60	4,560	0	13,320
2024	60	4,560	0	17,880
2025	90	6,840	(19,800)	4,920
2026	90	6,840	0	11,760
2027	90	6,840	0	18,600
2028	90	6,840	0	25,440
2029	90	6,840	(24,000)	8,280

3,055 Total Assessments

Option #2 -- Road Fund with Loan -- 14-Year Projection *

Beginning Balance: $43,100

	- Annual Assessment -		Road	Loan	Loan	Ending
	Rate	Amount	Repairs	Proceeds	Payments	Balance
2016	300	22,800	(200,000)	150,000	(9,550)	6,350
2017	300	22,800	(8,000)	--	(19,100)	2,050
2018	300	22,800	0	--	(19,100)	5,750
2019	300	22,800	0	--	(19,100)	9,450
2020	300	22,800	0	--	(19,100)	13,150
2021	300	22,800	(15,200)	--	(19,100)	1,650
2022	325	24,700	0	--	(19,100)	7,250
2023	325	24,700	0	--	(19,100)	12,850
2024	325	24,700	0	--	(19,100)	18,450
2025	325	24,700	(19,800)	--	(19,100)	4,250
2026	125	9,500	0	--	(9,550)	4,200
2027	125	9,500	0	--	0	13,700
2028	125	9,500	0	--	0	23,200
2029	120	9,120	(24,040)	--	0	8,280

* *$150,000 loan in 1st year, amortized over 10 years @ 5% ($1,591/mo. payment)*

$3,595 Total Assessments | $540 "excess" per owner | $41,000 = total interest

Road Reserve Fund -- 14-Yr. Projection *

Beginning Balance: $43,100

	- Annual Assessment -		Road	Ending
	Rate	Amount	Repairs	Balance
2016	325	24,700	(67,800)	0
2017	125	9,500	0	9,500
2018	125	9,500	0	19,000
2019	125	9,500	0	28,500
2020	125	9,500	(38,000)	0
2021	125	9,500	0	9,500
2022	125	9,500	0	19,000
2023	125	9,500	0	28,500
2024	125	9,500	(12,800)	25,200
2025	600	45,600	0	70,800
2026	600	45,600	0	116,400
2027	600	45,600	0	162,000
2028	600	45,600	(200,000)	7,600
2029	125	9,500	(8,000)	9,100

* *based on ProConsult "Option 1"*

$3,850 Total Assessments

Road Reserve Fund with Loan -- 14-Year Projection **

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2020	150	11,400	(37,950)	--	(4,300)	0
2021	150	11,400	0	--	(4,300)	7,100
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2023	150	11,400	0	--	(2,150)	23,450
2024	150	11,400	(12,850)	--	0	22,000
2025	600	45,600	0	--	0	67,600
2026	600	45,600	0	--	0	113,200
2027	600	45,600	0	--	0	158,800
2028	600	45,600	(200,000)	--	0	4,400
2029	167	12,700	(8,000)	--	0	9,100

** *with a $25,000 loan in 1st year, amortized over 7 years @ 5½% ($359.25/mo. paym*

$3,917 Total Assessments $67 "excess" per owner $5,100 = total interest

Option #2 -- with LARGE Assessment

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* *$150,000 loan in 1st year, amortized over 10 years @ 5% ($1,591/mo. payment)*

$3,595 Total Assessments | $540 "excess" per owner | $41,000 = total interest