FULL RESERVE STUDY

TWISTED CREEK TOWNHOMES
HOLLY SPRINGS, NC

Prepared for:
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JULY 25, 2018

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1.0 INTRODUCTION

The Twisted Creek Townhomes Homeowners Owners Association authorized Criterium–Giles Engineers to conduct a Full Reserve Study for the Twisted Creek Townhomes community located in Holly Springs, North Carolina. Studies of this nature are important to ensure a community has sufficient funds for long-term, periodic capital expenditure requirements. Anticipating large expenditures over an extended period of time through a structured analysis and scheduling process assists the Association in meeting financial requirements without increasing the service fees above permitted maximums, borrowing the funds, or levying special financial assessments to the home owners.

Typically, a community association has two broad cash requirements: the general operating reserves and the capital repair and replacement reserves. In this report, we will focus on those items falling under the capital repair and replacement reserve criteria. We have projected a capital repair and replacement reserve for twenty (20) years. The first ten years are the most reliable. Such a study should be updated every five years.

This report is structured to analyze components of the community for which the Association is responsible and to assess a useful expected life and useful remaining life to those components. The anticipated scheduled repair or replacement of the component and the anticipated expense for the activity are then analyzed in conjunction with the current capital reserves funding program for the community. Funding program recommendations are made with the objective of limiting substantial cash excesses while minimizing financial burdens that can result from significant cash inadequacies.

This report is intended to be used as a tool to determine reserve fund allocation requirements for the community, to manage future Association obligations, and to inform the community of future financial needs in general. The report that follows has been prepared from the perspective of what an owner of this property would benefit from knowing. Some items, beyond those of immediate concern, may be discussed. Therefore, the report should be read in its entirety in order to fully understand all of the information that has been obtained.

2.0 EXECUTIVE SUMMARY

Twisted Creek Townhomes is a townhome community which includes a total of 50 townhome units within 11 buildings situated on Florians Drive in Holly Springs, North Carolina. Construction in the community was completed between 2006 and 2015 according to Wake County Tax Records.

The association has responsibility for the exterior facades of the townhome buildings, the private streets and parking areas within the community and various site improvements, including concrete flatwork, mailbox kiosks, and drainage systems.

The buildings, common areas and site improvements are generally in good condition. Based on our review of recent financial statements, there is not a current fund contribution into a reserve account. Based on our evaluation, the current level of funding is **not** projected to maintain a positive balance through the term of this study. We have provided recommendations for annual reserve contribution schedules that provide sufficient funding to meet capital expenditure requirements in the next twenty years. In summary, our recommended funding alternatives are as follows:

Alternative 1: Beginning in 2019, increase the annual reserve contribution to $21,000 ($35.00/unit/month). In 2021 and 2023, increase the annual reserve contributions by $9,600 (increase of $16/unit/month each year). In 2025, increase the annual reserve contribution to $45,000 (increase of $8/unit/month). This alternative is projected to maintain a positive balance through the term of this study.

Alternative 2: Beginning in 2019, increase the reserve contribution to $15,000 ($25/unit/month). In 2020 and 2021, increase the annual reserve contributions by $6,000 (increase of $10/unit/month each year). In 2022 and 2023, increase the annual reserve contributions by $6,600 (increase of $11/unit/month each year). In 2024, increase the annual reserve contribution to $45,000 (increase of $8/unit/month). This alternative is projected to maintain a positive balance through the term of this study.

A more detailed analysis of the reserve fund has been provided in Appendix A.

- Replace building roofs and gutters
- Repair, seal and resurface asphalt paved streets
- Replace decking and rails on rear decks

There are, of course, other capital expenditures to be expected over the next twenty years. Those items that will require attention are discussed later in this report.

3.0 PURPOSE & SCOPE

3.1 Purpose

The purpose of this study is to perform a reserve fund analysis and to determine a capital needs plan. It is intended to be used as a tool for the Twisted Creek Townhomes Homeowners Association in determining the allocation requirements into the reserve fund in order to meet future anticipated capital expenditures for the community.

This report forecasts obligations for the community twenty years into the future. It should be noted that events might occur that could have an effect on the underlying component or system useful life assumptions used in this study. Likewise, inevitable market fluctuations can have an impact on component or system replacement and repair costs. Therefore, a study such as this should be updated from time to time, usually on a three to five-year cycle, in order to reflect the most accurate needs and obligations of the community.

3.2 Scope

This study has been performed according to the scope as generally defined by the Twisted Creek Townhomes Homeowners Association, Criterium-Giles Engineers Inc., Grandchester Meadows, Inc., and the standards of the Community Associations Institute. The findings and recommendations are based on interviews with the community's management personnel; a review of available documents; and an investigation of the buildings and site.

The "Cash Flow Method" of calculating reserves has been utilized, whereby contributions to the reserve fund are designed to offset the variable annual expenditures. Funding alternates are recommended which are designed to achieve a "Baseline Funding" goal by maintaining a positive balance for the term of the study.

The guidelines used to determine which physical components within the community are to be included in the component inventory are based on the following general criteria:

1. The component must be a common element, or otherwise noted to be the responsibility of the Association to replace.
2. The component must have an estimated remaining useful life of twenty years or less. As the site ages, additional components may need to be added.
3. The funding for replacement should be from one source only, not funded from another area of the budget or through a maintenance contract.
4. The cost of replacement should be high enough to make it financially unsound to fund it from the operating budget.

Our reserve study analysis included evaluating the following association property:

- **Buildings:** The HOA is responsible for maintenance and replacement of the roofing and gutters on the Townhome buildings. The association is also responsible for maintaining the exterior façade of the buildings, excluding windows and doors.

- **Site and Grounds:** The HOA is responsible for asphalt paved streets, concrete sidewalks and parking areas, common area fencing, drainage systems and mailboxes.

The above list was obtained from the site inspection and discussions with the management firm prior to the inspection.

This study estimates the funding levels required for maintaining the long-term viability of the facility. Our approach involves:

1. Examining association managed equipment, building and site facilities.
2. Predicting their remaining service life and, approximating how frequently they will require repair or replacement.
3. Estimating repair or replacement costs (in 2018 dollars) for each capital item.
4. Using data developed in Steps 1, 2 and 3 to project Capital Reserve balances for Years 1 through 20.

The statements in this report are opinions about the present condition of the subject community. They are based on visual evidence available during a diligent investigation of all reasonably accessible areas falling under the responsibility of the Association. We did not remove any surface materials, perform any destructive testing, or move any furnishings. This study is not an exhaustive technical evaluation. Such an evaluation would entail a significantly larger scope than this effort. For additional limitations, see Section 8.0.

3.3 Sources of Information

Onsite inspections of the property occurred on the following date:

- November 21, 2017

The following people were interviewed during our study:

- David Robbins, Community Manager, Grandchester Meadows, Inc.
- Rebecca Mousseau, Community Manager, Grandchester Meadows

The following documents were made available to us and reviewed:

- Wake County tax records
- Governing Documents
- Recorded plat maps for community
- Association financial statements

We based our cost estimates on some or all of the following:

- R.S. Means
- Our data files on similar projects
- Local contractor estimates

For your reference, the following definitions may be helpful:

Excellent: Component or system is in "as new" condition, requiring no rehabilitation and should perform in accordance with expected performance.

Good: Component or system is sound and performing its function, although it may show signs of normal wear and tear. Some minor rehabilitation work may be required.

Fair: Component or system falls into one or more of the following categories: a) Evidence of previous repairs not in compliance with commonly accepted practice, b) Workmanship not in compliance with commonly accepted standards, c) Component or system is obsolete, d) Component or system approaching end of expected performance. Repair or replacement is required to prevent further deterioration or to prolong expected life.

Poor: Component or system has either failed or cannot be relied upon to continue performing its original function as a result of having exceeded its expected performance, excessive deferred maintenance, or state of disrepair. Present condition could contribute to or cause the deterioration of other adjoining elements or systems. Repair or replacement is required.

Adequate: A component or system is of a capacity that is defined as enough for what is required, sufficient, suitable, and/or conforms to standard construction practices.

All ratings are determined by comparison to other buildings of similar age and construction type. Further, some details of workmanship and materials will be examined more closely in higher quality buildings where such details typically become more relevant.

All directions (left, right, rear, etc.), when used, are taken from the viewpoint of an observer standing in front of a building and facing it.

Repair/Replacement Reserves - Non-annual maintenance items that will require significant expenditure over the life of the buildings. Included are items that will reach the end of their estimated useful life during the course of this forecast, or, in the opinion of the investigator, will require attention during that time.

4.0 DESCRIPTION

Twisted Creek Townhomes is a townhome community which includes a total of 50 townhome units within 11 buildings situated on Florians Drive in Holly Springs, North Carolina. Construction in the community was completed between 2006 and 2015 according to Wake County Tax Records.

The association has responsibility for the exterior facades of the townhome buildings, the private streets and parking areas within the community and various site improvements, including concrete flatwork, mailbox kiosks,

and drainage systems. We understand that the individual unit owners are responsible for maintaining rear decks and patios behind each unit.

The townhome buildings are of wood frame construction on poured concrete slab foundations. Exterior surfaces are primarily comprised of vinyl siding and trim with limited sections of brick veneer.

The building roofs are clad with asphaltic fiberglass shingles. Gutters and downspouts discharge stormwater to grade. Site drainage is provided via landscaped swales and catch basins in the paved and landscaped areas. These systems direct water flow to a stormwater pond located near the South/center of the community

5.0 OBSERVATIONS

The following key observations were made about the current condition of the more significant and costly common elements of the property.

Site and Grounds

The streets and parking sections in the community are asphalt paved and maintained by the association. The paving generally appeared to be in fair to good condition. Some areas of fatigue cracking, rutting and depressions were noted within the asphalt pavements.

Typically, we recommend the application of an oil resistant sealant to all asphalt paved surfaces on an approximately 5 to 7-year cycle. At this same time, all cracks should be properly filled, patched, and sealed. We have allocated funds for crack repairs and to seal the pavement on a 5-year cycle beginning in 2020.

Assuming sealing and crack repairs occur in the interim, we anticipate the asphalt paving in the community to have an estimated useful life of approximately twenty years prior to full resurfacing. We have allocated funds to resurface all of the asphalt paving in two phases, beginning in 2028. Asphalt resurfacing would include full depth repairs of sections of paving with structural failure, milling around curbs and driveways to maintain an adequate drainage profile, surface preparations and the installation of an approximately 1.5” thick new layer of asphalt paving over all of the paved sections.

The areas of fatigue cracking and depressions are typically symptoms of base course/sub-grade failure in the paving. This type of failure would require full depth repairs which would include saw-cutting and removing damaged areas of paving, repairing the sub-grade/base course as needed and installing a new 2” to 4” thick asphalt patch. We have allocated funds for full depth repairs of sections of the asphalt paving on a 5-year cycle in conjunction with seal coating and re-striping noted above.

Concrete curb and gutter line the asphalt paved areas throughout the community. We observed sections of concrete curbing with minor cracking developing. It is likely that due to differential settlement, sections of the curbing will require periodic repairs. Repairs typically include saw-cutting and removing damaged areas, repairing base course and pouring and finishing new concrete curbing. We have allocated funds

for periodic repairs of concrete curbing and assumed that approximately 5% of the curbing will require repair every 8 years beginning in 2023.

The association is responsible for maintaining the concrete sidewalks along the streets and common areas, the concrete drive slabs and the rear concrete patios. The concrete sidewalks and drive slabs generally appeared to be in good condition, with minor cracking developing in some areas. We also noted limited areas of spalling in concrete sidewalk sections. We have allocated funds for periodic repairs and/or replacement of the concrete sidewalks and stone/brick pavers as required and have assumed that approximately 5% of the surfaces will require maintenance every 8 years beginning in 2023.

Common area drainage systems include inlet basins in the curbing and landscaped areas that lead to buried storm water piping. Additional drainage systems include landscaped swales. The drainage systems route storm water to a dry pond located within the South/central portion of the community.

The dry pond includes one reinforced concrete pipe inlet, a concrete riser structure leading to a reinforced concrete pipe outlet discharging through the earthen dam, and a riprap-armored emergency spillway. We noted moderate vegetation growth in the pond, including planted shrubbery on the earthen dam. Earthen dams should be maintained free of woody vegetation.

We have allocated funds for common area drainage improvements on an 8-year cycle beginning in 2023. Repairs would include those concerns noted above in the near term. Long term repairs would likely include re-trenching and re-armoring landscaped swales, repairing/hydro-jetting buried storm water piping and other drainage system improvements. As the infrastructure ages, the association may consider video borescope inspections and mapping of the buried storm water piping to proactively maintain and repair the piping as needed. Repairs to piping may include hydro-jetting to remove debris, vacuuming out debris from inlet basins and excavating and replacing sections of the piping.

We recommend the association contract with a pond maintenance professional to perform routine inspections and maintenance of the ponds in the community. This would include nuisance pest removal, maintaining vegetation and general inspections and repairs as needed. The association should maintain the ponds in accordance with any applicable requirements for such devices. In addition to routine maintenance and periodic drainage improvements noted above, it is likely that the pond will require significant repairs and possibly dredging of accumulated sediment/debris over the long term. We have allocated funds for repairs/dredging of the pond on a 20-year cycle beginning in 2037.

A limited area of wood rail fencing and segmental block retaining wall exists behind at the rear corner of Unit 102. These features appear to have been installed during site construction and are likely not the individual responsibility of the unit owner. The fencing and retaining wall appeared to be in good condition (building was constructed circa 2015). We assume

repairs to the limited wood rail fencing would be funded from the annual maintenance budget. We have allocated funds for retaining wall repairs on a 20-year cycle beginning in 2037.

Mailbox inserts are installed in small mail structures in the community. The mail box inserts generally appeared to be in good condition and have an expected useful life of approximately 20 years. We have allocated funds to replace the mailboxes in 2028.

The association is likely responsible for buried plumbing piping in common areas. The association will likely be responsible for the sections of water supply piping from the meter to the entry into each unit. Additionally, the association is likely responsible for maintaining buried common area sewer lines, which appear to be comprised of PVC. These buried plumbing components typically have an expected useful life of 40+ years. However, it is likely that sections of the piping will begin to require repair/replacement near the end of the term. We have provided an allocation of funds at the end of the term for repairs to sections of the buried common area piping.

A brick veneer monument is located at the main entrance to the community and includes a metal signage with stucco finish and metal lettering. The entrance signage includes landscape irrigation systems and low-voltage landscape lighting systems. The monument structure and signage appeared to be in good condition. We have allocated funds to refurbish the entrance monument and associated landscaping fixtures on a 15-year cycle beginning in 2026.

Common Building Exteriors

The buildings in the community are of wood framed construction and are primarily clad in vinyl siding with vinyl and aluminum trim components. Limited sections of the buildings are clad in brick veneer. We do not anticipate significant brick veneer repairs over the term other than minor repointing of mortar (if required) and have not allocated any reserve funds for major brick veneer repair/replacement. The exterior vinyl siding appeared to be in good condition and has an expected useful life well beyond the term of this study. Painted components on the exterior of the building include columns, doors, railings and limited trim components. We have allocated funds to paint the trim components and make minor repairs on a 8-year cycle beginning in 2023. Exterior painting projects should include repair/replacement of damaged trim components, replacing deteriorated caulking, surface preparation and cleaning and the application of two coats of a high-quality exterior paint.

The predominant pitched roof surfaces over the buildings are covered in asphaltic fiberglass three-tab roof shingles. Roof surfacing is applied over roof sheathing, and appears to be in relatively good condition. Typically, this type of roofing surface will last approximately twenty years. We strongly recommend that any re-roofing project closely follow procedures outlined by the National Roofing Contractors Association's *Roofing and Waterproofing Manual*. A re-roofing sequence should include removal of the existing roofing material, replacement of any inadequate roof

sheathing, replacement of any damaged flashing, and replacement of drip edge components.

We have allocated funds to replace the building roofs on a 20-year cycle. We have included funds for roof replacement in two phases based on dates of original construction: in 2028 (for buildings constructed between 2006-2008), and in 2037 (for buildings constructed between 2014-2015). Gutters and downspouts appeared to be in relatively good condition and sectional replacement of these components will likely be required at the time of roof replacement.

It is likely that minor roofing repairs will be required in the interim. Repairs would likely include replacing exhaust vent boots and flashing repairs. We have assumed that these minor repairs would be funded from the Maintenance budget.

Sections of wood privacy fencing have been installed between units at some of the rear yards. We have assumed maintenance repairs to the privacy fencing is the responsibility of the Association. Generally, this type of fencing has a useful life of approximately 20 years. We have allocated funds for repair / replacement of the wood privacy fencing on a 20-year cycle beginning in 2035.

The townhomes include rear decks and concrete patios. We have been advised that these features are the responsibility of the individual unit owners and have not allocated funds for repairs or replacement.

6.0 RESERVE FUND ANALYSIS

Using software developed by Criterium Engineers and KPMG Peat Marwick, we have analyzed capital reserves draw-down for the projected capital expenditures to determine the amount needed. The following is a projected reserve fund analysis for non-annual items as discussed in the report. This projection takes into consideration a reasonable return on invested moneys and inflation. Please review this thoroughly and let us know of any changes that may be desired.

The intent of this reserve fund projection is to help the Association develop a reserve fund to provide for anticipated repair or replacements of various system components during the next twenty years.

The capital items listed are those that are typically the responsibility of the Association and are derived from a list provided the Association with several items added as a result of the inspection. However, association by-laws vary, and therefore, which components are the responsibilities of the owner and which are the responsibilities of the Association can vary. The Association should confirm that the items listed should be financed by the reserve fund.

This projection provides the following:

- An input sheet that defines all the criteria used for the financial alternatives, including the assumed inflation rate of 3% annually and rate of return on deposited reserve funds of 1.5% annually.

- A table that lists anticipated replacement and/or repair items complete with estimated remaining life expectancies, projected costs of replacement and/or repair, a frequency in years of when these items require replacement and/or repair, and a projection based on this frequency.

- A table and graph that represent end of year balances versus capital expenditures based on your current funding program and reserve balances, and alternatives to your current program. The provided graphs illustrate what effects the funding methods will have over the presented twenty-year period versus the anticipated capital expenditures.

- Note that based on our developed list of capital items and taking inflation into account; the current funding level is not adequate.

- The Association should bear in mind that unanticipated expenditures can always arise and maintenance of a significant reserve fund balance can be viewed as a way to avoid special assessments.

We have included alternatives to your current reserve funding program and recommend that the board adopt an alternative that best reflects the objectives of the community. In summary they are as follows:

Current Reserve Funding Rate: $0.00; ($0.00/unit/month)
Current Reserve Balance: $0.00 (1/1/18 balance)

Alternative 1: Beginning in 2019, increase the annual reserve contribution to $21,000 ($35.00/unit/month). In 2021 and 2023, increase the annual reserve contributions by $9,600 (increase of $16/unit/month each year). In 2025, increase the annual reserve contribution to $45,000 (increase of $8/unit/month). This alternative is projected to maintain a positive balance through the term of this study.

Alternative 2: Beginning in 2019, increase the reserve contribution to $15,000 ($25/unit/month). In 2020 and 2021, increase the annual reserve contributions by $6,000 (increase of $10/unit/month each year). In 2022 and 2023, increase the annual reserve contributions by $6,600 (increase of $11/unit/month each year). In 2024, increase the annual reserve contribution to $45,000 (increase of $8/unit/month). This alternative is projected to maintain a positive balance through the term of this study.

Alternative 3: We have not provided an alternative that incorporates special assessments. Special assessments are not a preferred method of funding reserves.

Please note that the reserve fund study does not include typical annual maintenance items. Our assumption is that you already have an annual operating budget that provides for these typical, repetitive items. This includes miscellaneous repairs, lawn and grounds maintenance, routine minor painting, etc. We have focused on those significant, non-annual items where careful financial planning is important.

Finally, please note that the estimates we have developed are based on 2018 dollars. Our reserve fund study does adjust for an estimated annual inflation and a given return on investment assuming that the indicated fund balances are maintained.

7.0 CONCLUSION

The alternatives provided above will provide sufficient funding to meet estimated capital expenditures during the next twenty years. Further detail of the reserve fund analysis is provided in Appendix A.

8.0 LIMITATIONS

The observations described in this study are valid on the date of the investigation and have been made under the conditions noted in the report. We prepared this study for the exclusive use of the Twisted Creek Townhomes Homeowners Association. Criterium-Giles Engineers Inc. does not intend any other individual or party to rely upon this study without our express written consent. If another individual or party relies on this study, they shall indemnify and hold Criterium-Giles Engineers Inc. harmless for any damages, losses, or expenses they may incur as a result of its use.

This study is limited to the visual observations made during our inspection. We did not remove surface materials, conduct any destructive or invasive testing, move furnishings or equipment, or undertake any digging or excavation. Accordingly, we cannot comment on the condition of systems that we could not see, such as buried structures and utilities, nor are we responsible for conditions that could not be seen or were not within the scope of our services at the time of the investigation. We did not undertake to completely assess the stability of the buildings or the underlying foundation soil since this effort would require excavation and destructive testing. Likewise, this is not a seismic assessment.

We did not investigate the following areas:

- Buried utilities or infrastructure
- Concealed structural members or systems
- Unit interiors

We do not render an opinion on uninvestigated portions of the community. We did not perform any computations or other engineering analysis as part of this evaluation, nor did we conduct a comprehensive code compliance investigation. This study is not to be considered a warranty of condition, and no warranty is implied. The appendices are an integral part of this report and must be included in any review.

Members of the Criterium-Giles Engineers team working on this reserve study are not members of, or otherwise associated with the association. Criterium-Giles Engineers has disclosed any other involvement with the association that could result in conflicts of interest.

Information provided by the official representative of the association regarding financial, physical, quantity, or historical issues, will be deemed reliable by Criterium-Giles Engineers. The reserve balance presented in the Reserve Study is based upon information provided and was not audited. Information provided about reserve projects will be considered reliable.

Any on-site inspection should not be considered a project audit or quality inspection. Criterium-Giles Engineers is not aware of any additional material issues which, if not disclosed, would cause a distortion of the association's situation.

In our Reserve Fund Analysis, we have provided estimated costs. These costs are based on our general knowledge of building systems and the contracting and construction industry. When appropriate, we have relied on standard sources, such as Means Building Construction Cost Data, to develop estimates. However, for items that we have developed costs (e.g.: structural repairs), no standard guide for developing such costs exists. Actual costs can vary significantly, based on the availability of qualified contractors to do the work, as well as many other variables. We cannot be responsible for the specific cost estimates provided.

We have performed no design work as part of this study, nor have we obtained competitive quotations or estimates from contractors as this also is beyond the scope of the project. The actual cost to remedy deficiencies and deferred maintenance items that we have identified may vary significantly from estimates and competitive quotations from contractors.

If you have any questions about this study or the reserve fund analysis, please feel free to contact us. Thank-you for the opportunity to be of assistance to you.

Respectfully submitted,

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Appendix A: RESERVE FUND PROJECTIONS

Itemized Worksheet

Capital Item To Be Replaced	Quantity		Unit cost	Reserve Requirement (*)	Frequency (yrs**)	Remaining Life (yrs)	Information Source
Site							
Common area drainage improvements	1	LS	$6,500.00	$6,500.00	8	5	
Replace mailbox inserts	2	EA	$1,800.00	$3,600.00	20	10	
Allocation for repairs to common buried piping	1	LS	$20,000.00	$20,000.00	20	19	
Repair retaining wall behind unit 102	70	SF	$50.00	$3,500.00	20	19	
Refurbish Entrance Monument	1	LS	$3,500.00	$3,500.00	15	8	Replace lettering, apply new coating, painting
Repair/dredge BMP	1	LS	$15,000.00	$15,000.00	20	19	
Seal coat, crack fill asphalt pavement	2,700	SY	$2.00	$5,400.00	5	2	
Resurface asphalt pavement phase 1	1,350	SY	$18.00	$24,300.00	20	10	
Resurface asphalt pavement phase 2	1,350	SY	$18.00	$24,300.00	20	19	
Full depth repair sections of asphalt pavement	60	SY	$45.00	$2,700.00	5	2	
Repair sections of concrete curbing	110	LF	$40.00	$4,400.00	8	5	Approx. 5% every 8 years
Repair sections of concrete flatwork	180	SY	$110.00	$19,800.00	8	5	Approx. 5% every 8 years
Building Exterior							
Replace roofs - phase 1	565	SQ	$265.00	$149,725.00	20	10	
Replace roofs - phase 2	375	SQ	$265.00	$99,375.00	20	19	
Replace gutters and downspouts - phase 1	1,265	LF	$10.00	$12,650.00	20	10	Sectional Repairs
Replace gutters and downspouts - phase 2	960	LF	$10.00	$9,600.00	20	19	Sectional Repairs
Repair / replace wood privacy fences behind units	160	LF	$30.00	$4,800.00	20	17	16 @ 10LF/EA
Paint/repair exterior trim components	11	EA	$2,000.00	$22,000.00	8	5	
Building Interior							
Mechanical							
Amenities							
Other							
			Totals	$431,150.00			
			Total Over Term	$508,150.00			

* Costs are typically 10%±

** Reserve study is based on a 20 year projection of non-annual maintenance

Annual Expense By Year

Year:	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Year Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Site																
Common area drainage improvements	0	0	0	0	0	6,500	0	0	0	0	0	0	0	6,500	0	0
Replace mailbox inserts	0	0	0	0	0	0	0	0	0	0	3,600	0	0	0	0	0
Allocation for repairs to common buried piping	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repair retaining wall behind unit 102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refurbish Entrance Monument	0	0	0	0	0	0	0	0	3,500	0	0	0	0	0	0	0
Repair/dredge BMP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seal coat, crack fill asphalt pavement	0	0	5,400	0	0	0	0	5,400	0	0	0	0	5,400	0	0	0
Resurface asphalt pavement phase 1	0	0	0	0	0	0	0	0	0	0	24,300	0	0	0	0	0
Resurface asphalt pavement phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Full depth repair sections of asphalt pavement	0	0	2,700	0	0	0	0	2,700	0	0	0	0	2,700	0	0	0
Repair sections of concrete curbing	0	0	0	0	0	4,400	0	0	0	0	0	0	0	4,400	0	0
Repair sections of concrete flatwork	0	0	0	0	0	19,800	0	0	0	0	0	0	0	19,800	0	0
Building Exterior																
Replace roofs - phase 1	0	0	0	0	0	0	0	0	0	0	149,725	0	0	0	0	0
Replace roofs - phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replace gutters and downspouts - phase 1	0	0	0	0	0	0	0	0	0	0	12,650	0	0	0	0	0
Replace gutters and downspouts - phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repair / replace wood privacy fences behind units	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paint/repair exterior trim components	0	0	0	0	0	22,000	0	0	0	0	0	0	0	22,000	0	0
Building Interior																
Mechanical																
Amenities																
Other																
Total Costs	**0**	**0**	**8,100**	**0**	**0**	**52,700**	**0**	**8,100**	**3,500**	**0**	**190,275**	**0**	**8,100**	**52,700**	**0**	**0**
Total Costs Adjusted For 3% Inflation	**0**	**0**	**8,593**	**0**	**0**	**61,094**	**0**	**9,962**	**4,434**	**0**	**255,714**	**0**	**11,549**	**77,392**	**0**	**0**

Annual Expense By Year

Year:	2034	2035	2036	2037
Year Number:	17	18	19	20
Site				
Common area drainage improvements	0	0	0	0
Replace mailbox inserts	0	0	0	0
Allocation for repairs to common buried piping	0	0	0	20,000
Repair retaining wall behind unit 102	0	0	0	3,500
Refurbish Entrance Monument	0	0	0	0
Repair/dredge BMP	0	0	0	15,000
Seal coat, crack fill asphalt pavement	0	5,400	0	0
Resurface asphalt pavement phase 1	0	0	0	0
Resurface asphalt pavement phase 2	0	0	0	24,300
Full depth repair sections of asphalt pavement	0	2,700	0	0
Repair sections of concrete curbing	0	0	0	0
Repair sections of concrete flatwork	0	0	0	0
Building Exterior				
Replace roofs - phase 1	0	0	0	0
Replace roofs - phase 2	0	0	0	99,375
Replace gutters and downspouts - phase 1	0	0	0	0
Replace gutters and downspouts - phase 2	0	0	0	9,600
Repair / replace wood privacy fences behind units	0	4,800	0	0
Paint/repair exterior trim components	0	0	0	0
Building Interior				
Mechanical				
Amenities				
Other				
Total Costs	**0**	**12,900**	**0**	**171,775**
Total Costs Adjusted For 3% Inflation	**0**	**21,322**	**0**	**301,209**

Reserve Study Worksheet

General Information:

1 Organization: **Twisted Creek HOA**

2 Address: **101 Florians Drive**
Holly Springs, NC

3	Number of Units	**50**
4	Age of Building (in years)	**11**
5a	Study Period (in years)	**20**
5b	Normal Fiscal Year starts:	**January 1, 2018**
5c	Partial Fiscal Year starts:	**January 1, 2018**
5d	Partial Year Length:	**12 months**
6	Site Inspection Date	**November 21, 2017**
7	Reserve Funds at start	**$0**
8	Rate of Return on invested Reserve Funds (%)	**1.5%**
9	Inflation Rate (%)	**3.0%**

10 Current Funding Levels

Existing Funding Levels

	Total/Month	Total Annual	Per Unit/Month	Per Unit/Year
Reserve Fund Contribution.....	$0	**$0**	**$0.00**	**$0.00**

	Years Out	**Total Annual**	**Per Unit**
Planned Special Assessment.....	0	$0	$0
Balance Computed.....	**($751,267)**		

11 Alternative Reserve Fund Contribution

Alternative 1 Level Funding with Steps

	Total/Month	Total Annual	Per Unit/Month	Per Unit/Year
Monthly Amount, (First Year).....	**$1,750**	**$21,000**	**$35.00**	**$420.00**
Monthly Amount, (Last Year).....	**$3,750**	**$45,000**	**$75.00**	**$900.00**
Balance Required Final Year.....	$37,563			

Special Assessments:	**Years Out**	Total/Year	Per Unit
First Assessment.....	0	$0	$0
Second Assessment.....	0	$0	$0
Balance Computed.....	**$54,911**		

Alternative 2 Incremental Funding Increases Through 2024

	Total/Month	Total Annual	Per Unit/Month	Per Unit/Year
Monthly Amount, (First Year).....	**$1,250**	**$15,000**	**$25.00**	**$300.00**
Monthly Amount, (Last Year).....	**$3,350**	**$40,200**	**$67.00**	**$804.00**
Balance Required Final Year.....	$37,563			
Base Escalation %.....				

Special Assessments:	**Years Out**	Total/Year	Per Unit
First Assessment.....	0	$0	$0
Second Assessment.....	0	$0	$0
Balance Computed.....	**$52,032**		

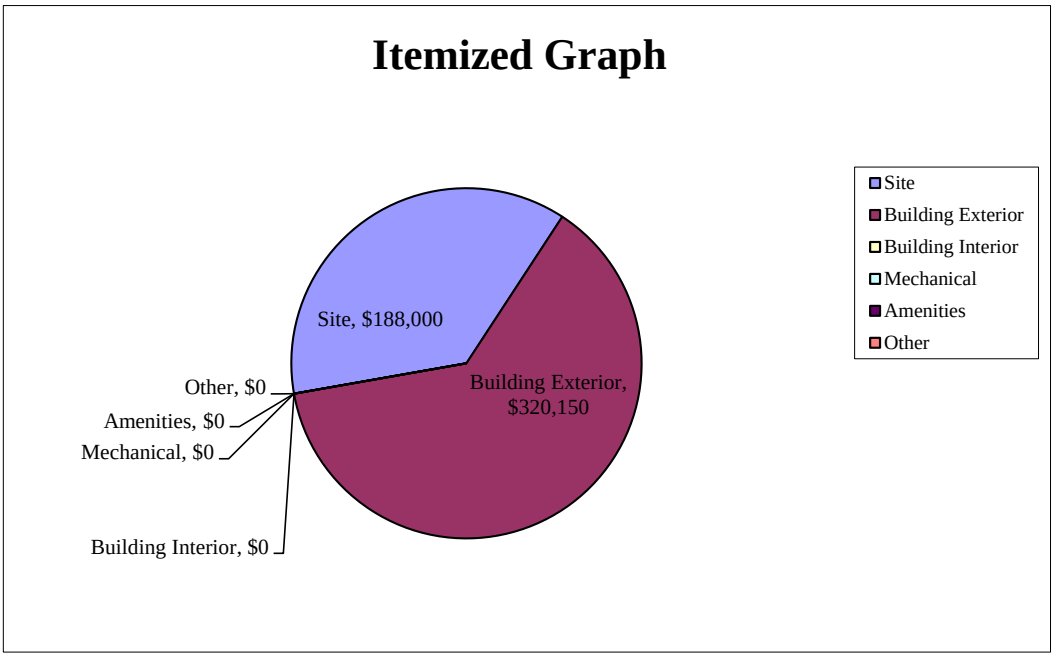
Alternative 3 Escalating Funding with Special Assessments

	Total/Month	Total Annual	Per Unit/Month	Per Unit/Year
Monthly Amount, (First Year).....	**$0**	**$0**	**$0.00**	**$0.00**
Monthly Amount, (Last Year).....	**$0**	**$0**	**$0.00**	**$0.00**
Balance Required Final Year.....	$37,563			
Base Escalation %.....	**0.00%**			

Special Assessments:	**Years Out**	Total/Year	Per Unit
First Assessment.....	0	$0	$0
Second Assessment.....	0	$0	$0
Balance Computed.....	**($751,267)**		

Itemized Graph

Categories	Totals
Site	$188,000
Building Exterior	$320,150
Building Interior	$0
Mechanical	$0
Amenities	$0
Other	$0
Total	**$508,150**



Existing Funding Levels

Year	Year Number	Beginning Reserve Fund Balance	Fee Revenue	Special Assessments	Investment Earnings	Capital Expenditures	Ending Balance
2018	1	$0	$0	$0	$0	$0	$0
2019	2	$0	$0	$0	$0	$0	$0
2020	3	$0	$0	$0	$0	$8,593	($8,593)
2021	4	($8,593)	$0	$0	$0	$0	($8,593)
2022	5	($8,593)	$0	$0	$0	$0	($8,593)
2023	6	($8,593)	$0	$0	$0	$61,094	($69,687)
2024	7	($69,687)	$0	$0	$0	$0	($69,687)
2025	8	($69,687)	$0	$0	$0	$9,962	($79,649)
2026	9	($79,649)	$0	$0	$0	$4,434	($84,083)
2027	10	($84,083)	$0	$0	$0	$0	($84,083)
2028	11	($84,083)	$0	$0	$0	$255,714	($339,796)
2029	12	($339,796)	$0	$0	$0	$0	($339,796)
2030	13	($339,796)	$0	$0	$0	$11,549	($351,345)
2031	14	($351,345)	$0	$0	$0	$77,392	($428,737)
2032	15	($428,737)	$0	$0	$0	$0	($428,737)
2033	16	($428,737)	$0	$0	$0	$0	($428,737)
2034	17	($428,737)	$0	$0	$0	$0	($428,737)
2035	18	($428,737)	$0	$0	$0	$21,322	($450,059)
2036	19	($450,059)	$0	$0	$0	$0	($450,059)
2037	20	($450,059)	$0	$0	$0	$301,209	($751,267)

Existing Funding Levels

Beginning Balance as of start of year beginning Jan 2018: $

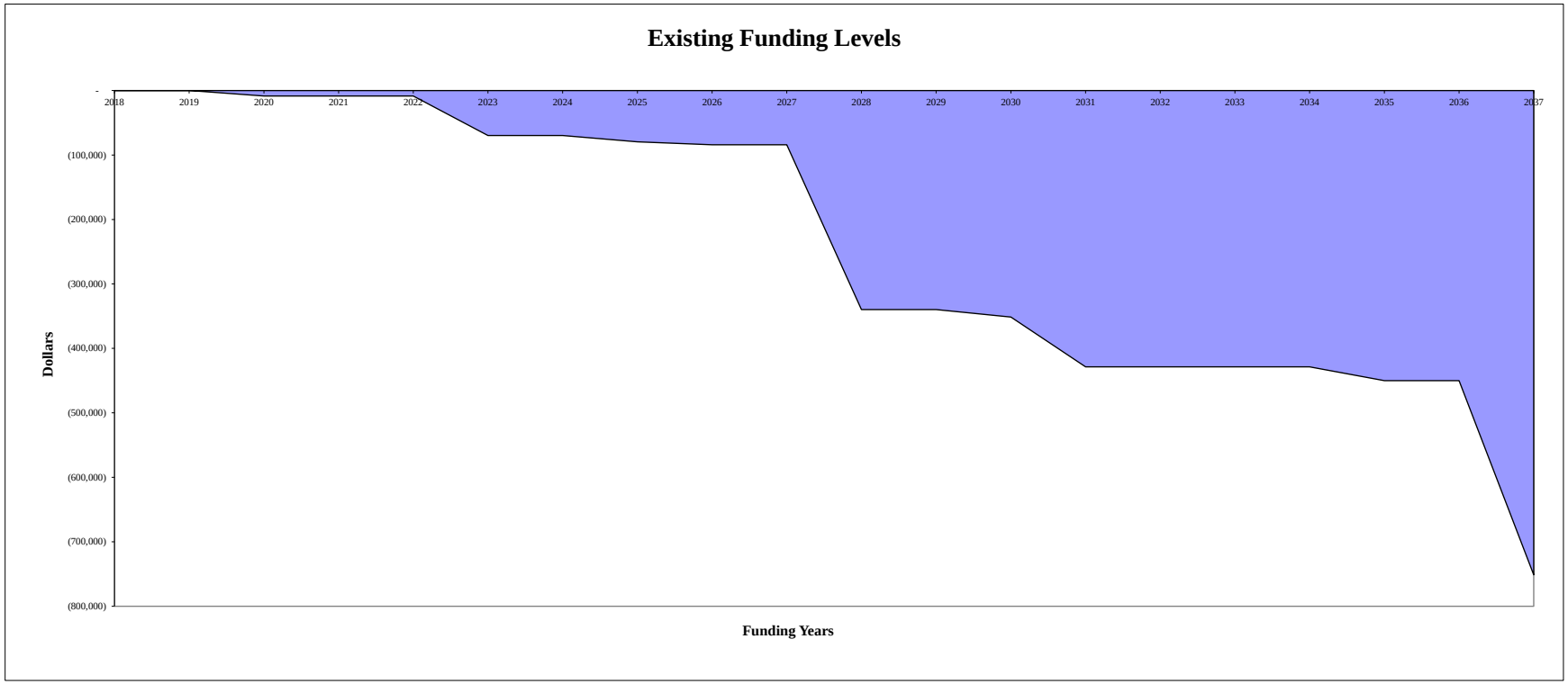
CONTRIBUTIONS	
AMOUNT	
$0.00	**per year**
$0.00	**per unit per year**
$0.00	**per month**
$0.00	**per unit per month**

SPECIAL ASSESSMENTS			
Totals			
Per Year	$0	**Per Unit**	$0

Projected Annual Funding and Expenditures:

Year:	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Year Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
End of Year Reserve Fund Balance	-	-	(8,593)	(8,593)	(8,593)	(69,687)	(69,687)	(79,649)	(84,083)	(84,083)	(339,796)	(339,796)	(351,345)	(428,737)	(428,737)
Capital Expenditures:	-	-	8,593	-	-	61,094	-	9,962	4,434	-	255,714	-	11,549	77,392	-
Total Revenue (all sources)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Year:	2033	2034	2035	2036	2037
Year Number:	16	17	18	19	20
End of Year Reserve Fund Balance	(428,737)	(428,737)	(450,059)	(450,059)	(751,267)
Capital Expenditures:	-	-	21,322	-	301,209
Total Revenue (all sources)	-	-	-	-	-



Alternative 1: Level Funding with Steps

Year	Year Number	Beginning Reserve Fund Balance	Fee Revenue	Special Assessments 1	Special Assessments 2	Investment Earnings	Capital Expenditures	Ending Balance
2018	1	$0	$0	$0	$0	$0	$0	$0
2019	2	$0	$21,000	$0	$0	$315	$0	$21,315
2020	3	$21,315	$21,000	$0	$0	$506	$8,593	$34,228
2021	4	$34,228	$30,600	$0	$0	$972	$0	$65,800
2022	5	$65,800	$30,600	$0	$0	$1,446	$0	$97,846
2023	6	$97,846	$40,200	$0	$0	$1,154	$61,094	$78,106
2024	7	$78,106	$40,200	$0	$0	$1,775	$0	$120,081
2025	8	$120,081	$45,000	$0	$0	$2,327	$9,962	$157,446
2026	9	$157,446	$45,000	$0	$0	$2,970	$4,434	$200,982
2027	10	$200,982	$45,000	$0	$0	$3,690	$0	$249,672
2028	11	$249,672	$45,000	$0	$0	$584	$255,714	$39,543
2029	12	$39,543	$45,000	$0	$0	$1,268	$0	$85,811
2030	13	$85,811	$45,000	$0	$0	$1,789	$11,549	$121,051
2031	14	$121,051	$45,000	$0	$0	$1,330	$77,392	$89,989
2032	15	$89,989	$45,000	$0	$0	$2,025	$0	$137,014
2033	16	$137,014	$45,000	$0	$0	$2,730	$0	$184,744
2034	17	$184,744	$45,000	$0	$0	$3,446	$0	$233,191
2035	18	$233,191	$45,000	$0	$0	$3,853	$21,322	$260,722
2036	19	$260,722	$45,000	$0	$0	$4,586	$0	$310,308
2037	20	$310,308	$45,000	$0	$0	$811	$301,209	$54,911

Alternative 1: Level Funding with Steps

Beginning Balance as of start of year beginning Jan 2018: $

CONTRIBUTIONS		
FIRST YR	**LAST YR**	
$21,000.00	$45,000.00	**per year**
$420.00	$900.00	**per unit per year**
$1,750.00	$3,750.00	**per month**
$35.00	$75.00	**per unit per month**

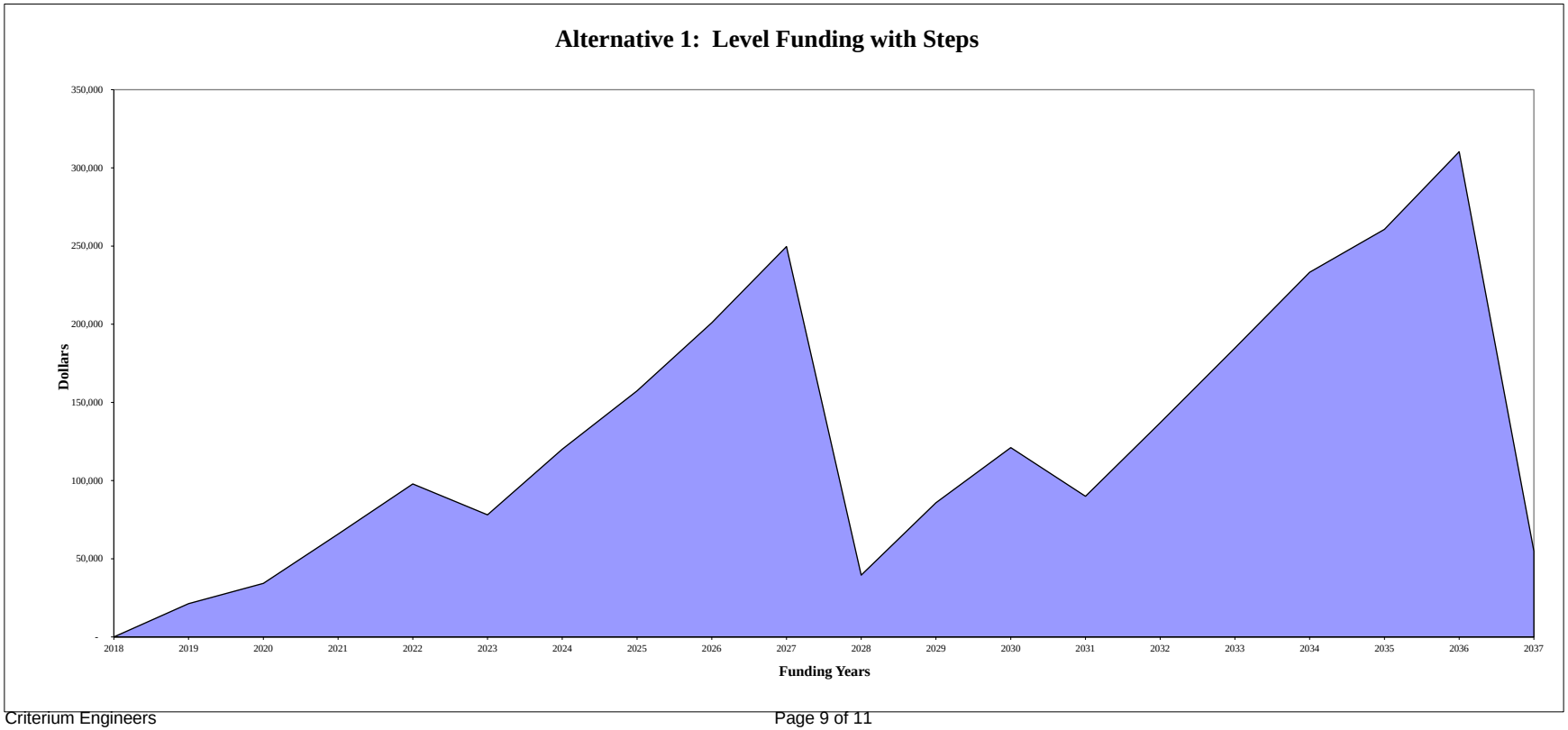
SPECIAL ASSESSMENTS				
	Totals			
First	**Per Year**	$0	**Per Unit**	$0
Second	**Per Year**	$0	**Per Unit**	$0

SETTINGS (analyzed by year)		
Starting amount ($):	1750	
Increment by ($):	1000	
Every	2	year
Frequency:	2	time

Projected Annual Funding and Expenditures:

Year:	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Year Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
End of Year Reserve Fund Balance	0	21,315	34,228	65,800	97,846	78,106	120,081	157,446	200,982	249,672	39,543	85,811	121,051	89,989	137,014
Capital Expenditures:	-	-	8,593	-	-	61,094	-	9,962	4,434	-	255,714	-	11,549	77,392	-
Total Revenue (all sources)	-	21,315	21,506	31,572	32,046	41,354	41,975	47,327	47,970	48,690	45,584	46,268	46,789	46,330	47,025

Year:	2033	2034	2035	2036	2037
Year Number:	16	17	18	19	20
End of Year Reserve Fund Balance	184,744	233,191	260,722	310,308	54,911
Capital Expenditures:	-	-	21,322	-	301,209
Total Revenue (all sources)	47,730	48,446	48,853	49,586	45,811



Alternative 2: Incremental Funding Increases Through 2024

Year	Year Number	Beginning Reserve Fund Balance	Fee Revenue	Special Assessments 1	Special Assessments 2	Investment Earnings	Capital Expenditures	Ending Balance
2018	1	$0	$0	$0	$0	$0	$0	$0
2019	2	$0	$15,000	$0	$0	$225	$0	$15,225
2020	3	$15,225	$21,000	$0	$0	$414	$8,593	$28,046
2021	4	$28,046	$27,000	$0	$0	$826	$0	$55,872
2022	5	$55,872	$33,600	$0	$0	$1,342	$0	$90,814
2023	6	$90,814	$40,200	$0	$0	$1,049	$61,094	$70,969
2024	7	$70,969	$45,000	$0	$0	$1,740	$0	$117,709
2025	8	$117,709	$45,000	$0	$0	$2,291	$9,962	$155,038
2026	9	$155,038	$45,000	$0	$0	$2,934	$4,434	$198,538
2027	10	$198,538	$45,000	$0	$0	$3,653	$0	$247,191
2028	11	$247,191	$45,000	$0	$0	$547	$255,714	$37,025
2029	12	$37,025	$45,000	$0	$0	$1,230	$0	$83,255
2030	13	$83,255	$45,000	$0	$0	$1,751	$11,549	$118,457
2031	14	$118,457	$45,000	$0	$0	$1,291	$77,392	$87,356
2032	15	$87,356	$45,000	$0	$0	$1,985	$0	$134,342
2033	16	$134,342	$45,000	$0	$0	$2,690	$0	$182,032
2034	17	$182,032	$45,000	$0	$0	$3,405	$0	$230,437
2035	18	$230,437	$45,000	$0	$0	$3,812	$21,322	$257,927
2036	19	$257,927	$45,000	$0	$0	$4,544	$0	$307,471
2037	20	$307,471	$45,000	$0	$0	$769	$301,209	$52,032

Alternative 2: Incremental Funding Increases Through 2024

Beginning Balance as of start of year beginning Jan 2018: $

CONTRIBUTIONS		
FIRST YR	**LAST YR**	
$15,000.00	$40,200.00	**per year**
$300.00	$804.00	**per unit per year**
$1,250.00	$3,350.00	**per month**
$25.00	$67.00	**per unit per month**

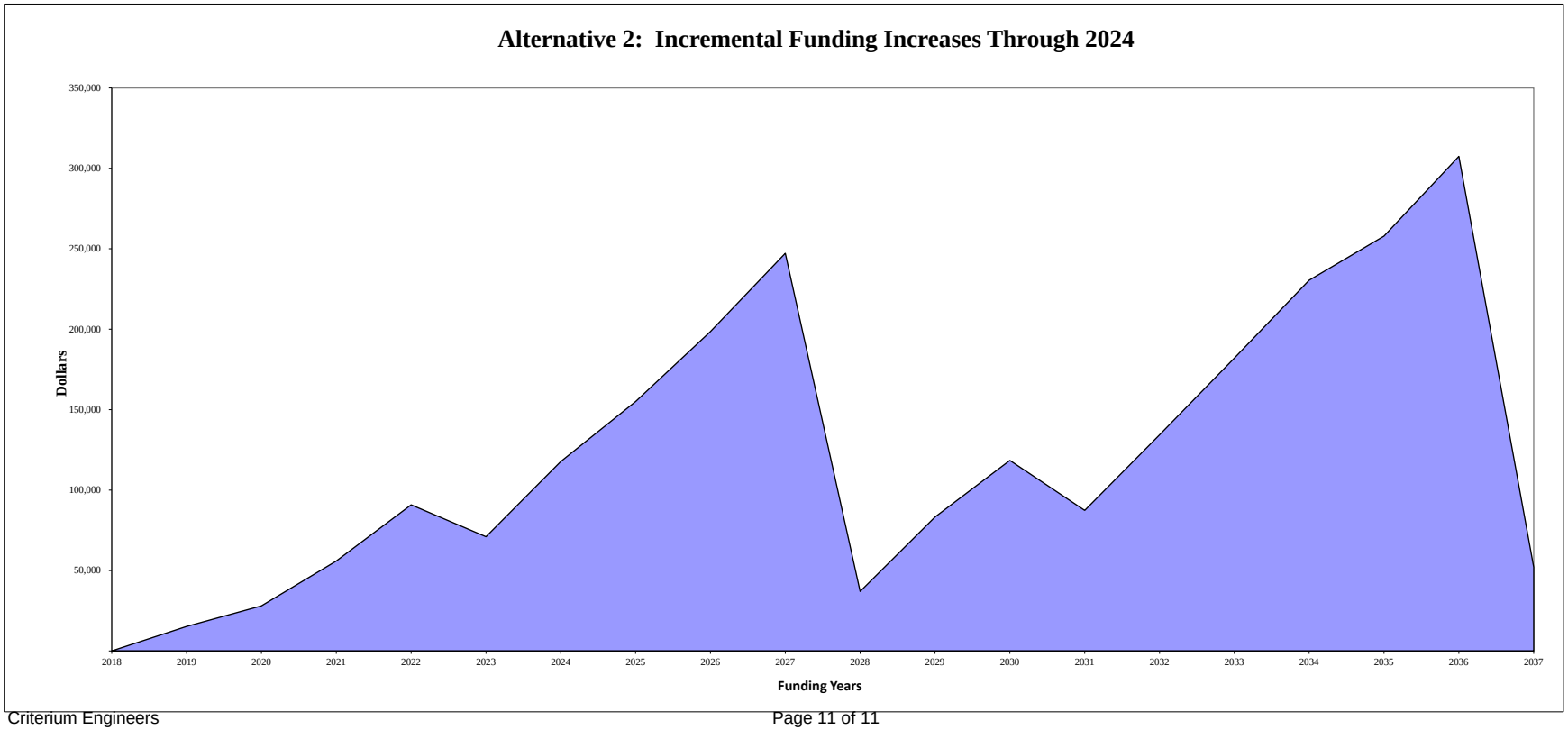
SPECIAL ASSESSMENTS				
	Totals			
First	**Per Year**	$0	**Per Unit**	$0
Second	**Per Year**	$0	**Per Unit**	$0

SETTINGS (analyzed by year)		
Starting amount ($):	2291.667	
Increment by (%):	6.25	
Step (%):		
Every	1	year
Frequency:	8	time

Projected Annual Funding and Expenditures:

Year:	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Year Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
End of Year Reserve Fund Balance	-	15,225	28,046	55,872	90,814	70,969	117,709	155,038	198,538	247,191	37,025	83,255	118,457	87,356	134,342
Capital Expenditures:	-	-	8,593	-	-	61,094	-	9,962	4,434	-	255,714	-	11,549	77,392	-
Total Revenue (all sources)	-	15,225	21,414	27,826	34,942	41,249	46,740	47,291	47,934	48,653	45,547	46,230	46,751	46,291	46,985

Year:	2033	2034	2035	2036	2037
Year Number:	16	17	18	19	20
End of Year Reserve Fund Balance	182,032	230,437	257,927	307,471	52,032
Capital Expenditures:	-	-	21,322	-	301,209
Total Revenue (all sources)	47,690	48,405	48,812	49,544	45,769



Appendix B: PROJECT PHOTOGRAPHS

Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
View at entrance monument to community at Florians Drive

Photo Number
1

Description:
Typical view of townhome units within community

Photo Number
2

Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
View of asphalt pavement along Florians Drive

Photo Number
3

Description:
Area of fatigue cracking, rutting/raveling in asphalt pavement

Photo Number
4

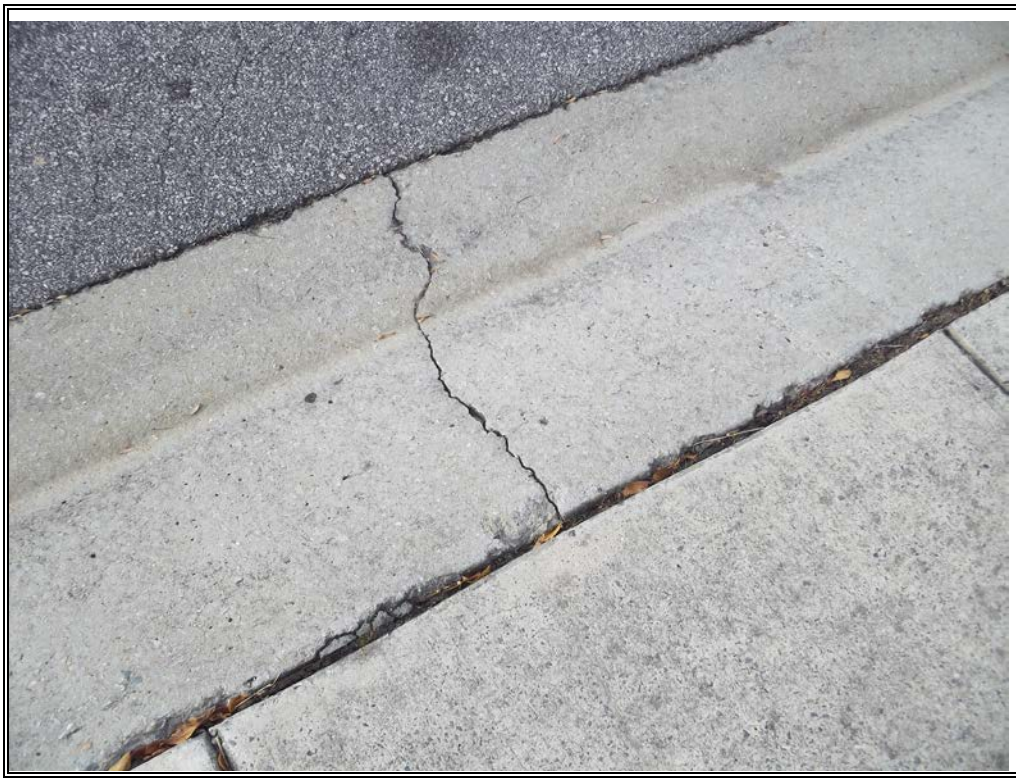
Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
Portion of asphalt pavement has been resurfaced in the recent term

Photo Number
5



Description:
Some areas of cracking have developed in concrete curbing.

Photo Number
6

Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
Flatwork maintained by the HOA includes concrete drive slabs.

Photo Number
7

Description:
Limited area of site retaining wall with wood rail fencing.

Photo Number
8

Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
Typical mailbox kiosk, centrally located within community

Photo Number
9

Description:
View overlooking BMP dry pond

Photo Number
10

Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
Dry pond includes concrete riser structure, and earthen dam with riprap-armored emergency spillway. Some shrubbery is planted on earthen dam.

Photo Number
11

Description:
Typical view of townhome facades, which include areas of brick veneer and vinyl lap siding. Note limited areas of standing seam metal roofing over front entrances.

Photo Number
12

Location:
Twisted Creek Townhomes
Holly Springs, NC

Photo Taken by:
Andrew D. Crook, PE

Date:
November 21, 2017

Description:
Roofing surfaces are covered in asphaltic fiberglass three-tab shingles

Photo Number
13