SINCE 1948 DAVIS ENGINEERING SERVICE, INC.

Road Assessment and Maintenance Reserve Report

Of the

South Fork Ranches Asphalt Roadways

Rio Grande Club Trail and Entrance Monuments at North River Road

Prepared for the

South Fork Ranches Master Home Owners Association

Prepared

August 2010

Revised

February and March 2011

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Background and Scope

The South Fork Ranches Master Home Owners Association (SFRMHOA) has recently acquired the roads within their subdivisions from the original developer. There are over 10 miles of asphalt paved roads in numerous subdivisions and sub-associations which are all part of the SFRMHOA. The subject roads were briefly reviewed with Mr. Tom Slade of the SFRMHOA, and with Mr. Joe Weinmeister of Hammer Construction Services (HCS) on May 20, 2010. General observations were made during the drive through, and overall the asphalt on the majority of the roads appeared to be weathering reasonably well, with a few specific problem areas and some general concerns. At the site visit, Davis Engineering Service, Inc. (DES) was requested to provide an estimate for preparing a road assessment and maintenance reserve report to assist the SFRMHOA and HCS in developing a pavement management plan and an appropriate budget. DES was ultimately selected to provide these services, which has culminated in this report. After review of the first draft of the report and a meeting on September 24, 2010, additional services were requested. In addition to expanding construction cost breakdowns, the significant modifications primarily consisted of acquiring some geotechnical data throughout the project, incorporating the findings in the discussion, and categorizing the warranted maintenance activities into two groups, normal aging infrastructure or potential inadequate initial construction.

Project Location

The subject subdivisions and roads are generally located to the north of South Fork, Colorado. Several of the subdivisions are positioned in the Rio Grande River valley bottom, while others are along Alder Creek or on the foothills and mountain sides to the north of the river. The subdivisions surround the Rio Grande Club eighteen hole golf course. The area covered by the SFRMHOA (including the golf course) is approaching 800 acres.

Research and Investigation

To support our efforts, DES requested the engineered road plans from SFRMHOA, but was informed they never received any. A call was made to Ms. Rose Vanderpool, Rio Grande County (County) Planner, who informed us that the County did not require engineered plans as the roads were not dedicated to the County and were to be privately maintained. She indicated that the developer might have plans, but the County did not have a copy. Calls to the Colorado Springs office of Land Properties Inc. (LPI) requesting information were never returned. Mr. Kevin Ames of the South Fork LPI office indicated that road alignments were determined by their surveyor (Shy Surveyors & Assoc.) and construction was left to the contractor (Lowry Construction?). Mr. Ames indicated that to the best of his knowledge the contractor was instructed to build County standard roads or better.

Subsequent phone conversations with Mr. Todd Stockebrand of Asphalt Constructors, Inc. (ACI) and Mr. Allen Davey, PE of DES (Alamosa) supported the case that there were no engineered road plans, and that construction was left to the contractor. Without road plans or certifications as to how they were constructed, we recommended having some geotechnical investigation performed. As part of this investigation the asphalt thicknesses could be determined along with underlying gravel and subgrade depths and properties. Western Technologies Inc. (WT) performed 20 borings on October 27, 2010 throughout the SFRMHOA properties, and prepared a report with their findings dated January 20, 2011, a copy of which is included for your

information. Their findings have been utilized in this revision of the report including the contained maintenance recommendations and associated cost estimates.

The statement that "the contractor was instructed to build County standard roads or better" is curious on several levels. First, it is not common in our practice of smaller parcel subdivision development for the contractor to be solely responsible for quality control, quality assurance, quantity verification, and adherence to standards. Next, there are certain aspects of the subdivision layout which prohibit the contractor from meeting applicable sections of the standards, such as the following: dead ends over 600 feet in length; cul-de-sacs with platted right-of-way (ROW) less than 100 feet in diameter; and street intersections sharper than 70 degrees. Also, the County has one typical roadway cross section included in their standards. While this drawing is not well presented and shows only a gravel section, it does appear to indicate that the shoulder to shoulder width of the road surface should be 32 feet (this is also reflected in the typical culvert cross section drawing). This is certainly not the rule for the as-built condition, as many roads have asphalt widths of 24 feet or less with virtually no shoulders. In addition, the typical road cross section shows ditches on both sides of the road, where there are many roads which do not have adequate ditches, particularly on the uphill side, as evident in the photo to the right of Rio Grande Club Trail. Finally, the County standard gravel specifications for sub-base (ASC) and base course aggregates (ABC) call for 5 – 12 percent by weight passing the number 200 sieve. Only four of the twenty three soil property tests from the WT boring samples show adherence to this portion of the standard, with none of the subgrades classified as gravel (mostly sands with a couple of clay areas, see WT Plates B-1 and B-2). The County standard gravel road section is 4 inches of ABC over 8 inches of ASC over suitable subgrade material.

As part of the WT investigation, they analyzed the structural life of the roadways tested based upon the asphalt thickness, sub-grade materials, full build-out Average Daily Traffic, and assumed truck traffic percentage. This analysis was performed to compare the as-built structural life of the roads, assuming they were constructed properly, to the standard 20-year typical design life. The results of this analysis showed that all of the roads have a calculated design life of over 20 years, except for Cliffside Drive, which calculated to a 1 year design life (see WT Plates C-1 and C-2). This calculation is an indication of the structural integrity of the roads, but is reliant on good construction practices. This calculation is also only a measure of theoretical design life, and does not indicate the appropriateness of either the road section selection or the constructability. It will be noted that the design life calculations for the subject roads are very sensitive to the asphalt thickness due to the low anticipated traffic. This is evident for Boring 4 (Cliffside Drive) and Boring 20 (E. Cliffside Court), where the same ADT of 160 and truck percentage of 1 were used for both, but B-4 had an asphalt thickness of 2 inches and B-20 had and asphalt thickness of 2.5 inches, resulting in calculated design lives of 1 year and 383 years, respectively.

To supplement the calculated design life findings, WT also included a section in their report titled "Pavement Performance Considerations". In this narrative they highlight a few important issues which are expanded upon in the paragraphs below. First, although the majority of the sections tested indicate 20 year design lives, or greater, there is often a minimum road section required to accommodate constructability and short duration but high impact construction traffic. For example, WT indicates that many municipalities call for a minimum of 3 inches of asphalt. One reason behind this is that placing thin layers of asphalt makes it more susceptible to damage during construction, such as during rolling to achieve compaction.

With the subject roads, the structural value is predominantly obtained from the asphalt thickness, as there is essentially no gravel (by soil classification) on the roadways. It is also often the case in municipal work that a minimum gravel section is required as part of an asphalt road section, knowing that a stable foundation is required to properly place and compact the asphalt, helping the constructability and to ensure the intended design life. In our climate and soil conditions, it is uncommon for gravel to not be placed below asphalt, unless full depth asphalt sections are designed, which are typically thicker than the 2 to 3.5 inch thickness (average of 2.56 inches) found throughout the SFRMHOA.

Another point from the WT report is that while the calculations indicate that the structural value of the asphalt over the existing non-gravel base materials is sufficient for a 20 year life (for all but one test), this is assuming that these base materials were properly placed, shaped and compacted to allow the asphalt to be correctly placed and compacted as well. WT lists these, and other factors which can affect pavement performance such as the asphalt mix design, pavement section drainage, actual traffic loading, subgrade stability, asphalt placement temperature, and asphalt compaction, to name a few. No quality control or quality assurance documentation has been provided to allow us to gauge how these other factors might affect the structure life.

It is concerning that the base materials below the asphalt cannot be classified as gravel, and that the percent passing the 200 sieve is quite high. The aggregate with the higher percentage of fines potentially makes the material not as free draining as it should be. This coupled with poor surface and/or insufficient roadside drainage could make the roadways more susceptible to frost heave and generate more rapid subgrade soft spot development. Also, with the structural value of the roadway determined primarily from the asphalt, it is logical that more rapid road decay might be noted once the asphalt surface has structurally failed, as the underlying aggregates found are not as structurally sound as those typically placed.

Review of the SFRMHOA roads and comparison to applicable requirements is problematic in that the County indicated that the roadways did not need to meet their standards due to the fact that they were to remain private. It is, however, apparent that the roadways were not constructed entirely to the County standards (as LPI has indicated they instructed the contractor to provide) as evident from the gravel testing, widths, alignments, etc., as indicated above. With the lack of plans, material testing results, quantity verifications, and other certifications typically provided with municipal projects, it leaves many questions concerning the appropriateness and durability of the finished product.

At the March 4, 2011 review of the report, it was requested to show example minimum construction standards and compare them to the subject roads. To accomplish this we have used a combination of the Town of Pagosa Springs (TOPS) Land Use Development Code and the Archuleta County Road and Bridge Standards. A combination of these standards was used as the TOPS document has roadway classification criteria while the Archuleta County requirements have minimum structural sections. The TOPS and Archuleta County standards also would seem to be appropriate for the South Fork area in that there are similar terrain, demographic, and economic conditions in the area.

Roads are typically classified based upon design capacity traffic count, or Average Daily Traffic (ADT). Road classifications generally have minimum requirements associated with them, such as widths for right-of-way (ROW), travel lanes and shoulders; thicknesses for asphalt and aggregate base course (ABC); grades; design and posted speed limit ranges; and additional amenity requirements such as curbs, gutters, sidewalks, bike lanes, etc. For the purposes of this report, we will focus on the potential classifications, width characteristics, and structural requirements.

The table below shows the potential roadway classifications and associated design standards that might be appropriate for the SFRMHOA roadways:

Potential SFRMHOA Road Classification and Design Standards

Design Items	**Major**	**Minor**	**Primary**	**Secondary**	**Tertiary**
Minimum or Range	**Collector**	**Collector**	**Local Street**	**Local Street**	**Local Street**
Design ADT	≥2,500	400 to 2,499	200 to 399	100 to 199	≤99
ROW Width	80'	60'	60'	50'	40'
No. of Lanes	2	2	2	2	2
Asphalt Lane Width	12'	12'	11'	11'	10'
Gravel Shoulder Width	4'	3'	2'	2'	1'
Cross Slope	2%	2%	2%	2%	2%
Asphalt Thickness	4" (2 lifts)	3"	3"	3"	3"
ABC Thickness*	8"	8"	6"	6"	6"

*ABC is often made up of aggregate sub-base course on the bottom, being a coarser gravel, such as a CDOT Class 2, and aggregate base course on the top, being a finer gravel, such as a CDOT Class 6. With thin minimum sections as indicated above, however, it is not uncommon for the entire ABC to be the finer gravel, as coarser gravel cannot be placed in small lift thicknesses.

The gravel and asphalt sections indicated in the table are example minimums, but do not lessen the requirement of recommendations based on site specific geotechnical investigation and road design if those are more stringent. For your information, the subject roads have been classified according to the table above, and the existing conditions (asphalt width, ROW width, asphalt thickness, and gravel thickness), where known, are compared to the associated minimum requirements. This information is contained in a spreadsheet which has been included as Appendix F. Additional review of the project street configurations as compared to other typical design standards can be performed upon request.

Traffic control signage along with the road configuration was briefly reviewed. The typical standard followed for signage is the Manual on Uniform Traffic Control Devices (MUTCD). The project signage does not completely follow the MUTCD, as many street intersections are unsigned and very few warning signs are present, such as winding roads, sharp curves, steep grade, etc. It was also noted that the speed limit (where posted) was indicated at 20 miles per hour, where some of the various curves and configurations probably warrant slower speeds in areas. In several areas there are golf cart crossings, and in some cases the carts also use the road (such as between holes 11 and 12 on Fairway Ridge Lane). The SFRMHOA may wish to consult their attorney on signage requirements and other road safety related issues. A list of the observed traffic control signs is contained in Appendix E.

On-site Review and Data Tabulation

As previously mentioned, a preliminary site visit was attended on May 20, 2010. During this drive through Mr. Tom Slade guided us through the various subdivisions and provided approximate paved road ages. This trip and information was supplemented by a more thorough review of the subject roadways on July 12 and 13, 2010. Over the course of two long days the following site data was gathered:

- Road lengths and widths
- Culvert locations, sizes and conditions
- Asphalt condition
- Drainage configuration and condition
- Other pertinent information

The road lengths measured in the field compared well with the stationing contained on road maps generated by DES based on the record plats. A copy of these maps are contained in the Map Pocket at the back of this report for reference. The road stationing was used to identify culvert locations or other items of interest during the site review. When discussing road features, the right or left side is determined by looking up-station.

The road data was summarized in a spreadsheet by subdivision and street name. A copy of this Road Summary Spreadsheet is included in Appendix A of this report. River Club Drive and Rio Grande Club Trail were broken down into segments due to varying width and different service levels, respectively. Included on the road summary spreadsheet are the following:

- Approximate Year Built
- Length
- Asphalt width
- Number of lots served (generally conservative)
- Potential Average Daily Traffic (ADT) in vehicles per day
- Right-of-Way (ROW) width in feet
- Cul-de-sac diameter in feet
- Estimated Remaining Service Life (RSL) in years
- General comments about the road

The ADT indicated above was determined by assuming 10 vehicle trips per day per residence for the full build-out condition and 36 vehicle trips per day per hole at the golf course. While these

numbers may be high for the seasonal nature of the area, they give good relative traffic use data in comparing different streets within the project.

The RSL for each road was determined based on the approximate age of the asphalt road provided combined with the condition noted in the field. The RSL generally indicates the number of years the road has before significant reconstruction or rehabilitation would be required if no permanent maintenance activities are performed. Most of the streets have an RSL which is commensurate with their age and a 20-year design life, except those in the Alder Creek Meadows and Cliffside subdivisions, Hillside Lane in the Timbers subdivision, and potentially a portion of Rio Grande Club Trail.

An additional summary spreadsheet was created for the drainage culverts, which is contained in Appendix B. The spreadsheet lists culverts by subdivision and street, and also includes:

- Culvert location by approximate station in feet (using standard road stationing format)
- Culvert length in feet
- Culvert diameter in inches
- Culvert material, High Density Polyethylene (HDPE) or Corrugated Metal Pipe (CMP)
- General comments about the culvert

Culvert damage or sedimentation condition is noted in the comments section for each.

As previously mentioned, a summary sheet for the traffic control and street signs (not including monument or other non-traffic related signs) was created and is included in Appendix E. This inventory sheet lists the signs by subdivision and street, and also includes:

- Approximate sign location (using standard road stationing format and ROW side)
- Sign type (stop, speed limit, street, etc.)
- Comments about the sign

Maintenance and Road Condition Discussion

The majority of the roads overseen by the SFRMHOA appear to "look their age", as previously mentioned. This being said, asphalt or pavement preservation measures can be taken to prolong the expected life, or RSL, thus saving money in the long term. Pavement preservation, or "permanent maintenance" items include but are not limited to:

- Crack sealing
- Surface sealing
- Chip sealing
- Full depth patching
- Asphalt overlaying

Crack sealing consists of cleaning, filling, and sealing of cracks with appropriate asphaltic material. It is obvious that significant crack sealing has been performed in the past on most of the project roads. This is a maintenance item that should be pursued on an annual basis, especially as roads age. Crack sealing should be performed in spring or fall during times of moderate temperature, when cracks are not fully open or closed.

Recommended (from many manufacturers) surface sealing consists of cleaning the road and a two coat placement of appropriate surface sealant. The application rate is approximately 0.15

gallons per square yard per application (this may vary depending upon the product used, asphalt condition, dilution rate, etc.). The first coat is usually placed with a squeegee, which helps get the sealant into cracks and surface depressions. The second coat is typically applied with a distributor truck to give a smooth, even surface. It is recommended that sand be included in the sealant application at an application rate of approximately 4 pounds per gallon to improve road surface friction. Surface sealing is used when asphalt is weathering and may have minor raveling.

Chip sealing involves cleaning the road and then having a distributor truck applied asphalt sealant placed prior to a cover coat with aggregate "chips". This is used in areas where sealing and a surface wear course is desired. For residential roadways, a 3/8 inch chip seal is appropriate, with sealant applied at approximately 0.3 gallons per square yard and chips at 23 pounds per square yard. Larger, ½ inch chip seal can also be used, but this requires approximately 0.4 gallons of sealant and 28 pounds of chips per square yard, and can therefore be somewhat more expensive. Chip sealing should be performed in warmer weather to obtain a better bond and setting of the chips in the oil and existing asphalt surface during rolling activities and subsequent vehicle traffic.

Full depth patching is required for areas where alligator cracks, washboards, potholes, or heaving have occurred. These patches consist of saw-cutting a rectangular patch, removal of deteriorated material, re-compacting aggregate subgrade material, applying tack coat to asphalt road contact perimeter, and placing an asphalt patch of equal depth to the adjacent asphalt roadway.

Asphalt overlays are constructed when the road structure is still good but bleeding, minor surface fluctuations, or significant weathering and raveling is occurring. If significant cracking is occurring in conjunction with those issues above, an overlay might be suitable along with a pavement fabric to keep cracks from reflecting through the overlay. If significant surface fluctuations are present, full depth patching or milling may be necessary prior to the overlay. Asphalt overlays in our climate and environment should be a minimum of 1½ inches thick and are typically a maximum of 3 inches thick.

Some "temporary maintenance" items which should be annually (or more frequently) pursued include but are not limited to:

- Drainage ditch maintenance
- Drainage structure maintenance
- Pothole repair
- Surface "feather patches"
- Weed Control
- Other emergency or safety related repairs

Drainage ditch and structure maintenance are key components to road longevity. Having adequately shaped ditches to keep surface runoff out of road subgrade, and culverts clean so they can handle the expected runoff are a must. There are several areas throughout the project where ditches can be improved, and a number of culverts that currently require cleaning. Along with ditch and structure maintenance, other temporary or permanent erosion control measures such as seeding, fiber mat, straw wattles, drop structures, or catch basins may be warranted on a case-by-case basis.

For the roads where ditches are not present, additional discussion is warranted and more detailed survey or review required as to the implications of installing or not installing ditches. It appears several of the culverts in The Ridge subdivision were significantly damaged during installation, as evidenced in the photo to the left of the Ellingwood Drive station 5+80 structure. While this may not pose immediate danger, it does reduce culvert capacity, and would generally be considered an unacceptable installation, in our opinion.

Potholes, feather patches, and other "temporary maintenance" measures should be undertaken annually, or at the appropriate time. Some potholes may need to be repaired outside of normal maintenance season if there is a safety or vehicle damage concern. Feather patches may be desired in areas where surface irregularities have developed, or damage has occurred to minimize further degradation. A good example of a candidate for a feather patch would be as shown in the photo to the right where apparently a chained snow removal vehicle spun the tires and gouged the asphalt (E. Riverside Ct.).

An aggressive weed control plan should be pursued, as significant intrusion can quickly deteriorate the asphalt mat. There are several areas throughout the project where shoulder weed intrusion was noted, such as on Hillside Lane as shown in the picture to the left. Where roots have invaded the road space (such as on E. Riverside Court), the road material may have to be removed, the roots severed, the aggregate material properly replaced, and a full depth patch constructed.

Another potential concern for many of the roads was the shoulder patching and cracking noted. Shoulder cracking is typically caused by one or a combination of the following:

- Lack of gravel shouldering which provides lateral support
- Construction of asphalt on loose or improperly constructed fill
- Frost heave due to lack of proper ditches or water intrusion into the subgrade

Asphalt repairs to the shoulders should be diligently continued, to minimize water intrusion into the road subgrade. If water is allowed to penetrate these cracks, it is likely that shoulder degradation will worsen. If significant cracking or settling is persistent in areas, a more detailed review of the site specific condition may be warranted.

Settlement of roads in a residential development can be a lingering issue where there are numerous drainage structures and anyplace utilities have be installed within the streets. Extra care is required by a contractor during initial construction to completely eliminate settlement, and the deeper the road crossing, the more time consuming it is. Settlement is usually the most pronounced over the first few years, and tends to taper off as the infrastructure ages. If settlement appears to get progressively worse in an area, it should be reviewed and further analyzed to determine if there are potential "piping" issues along drainage structures or utilities where groundwater is removing the surrounding soils, or where potable water or sanitary sewer leaks may exist. Some areas of settlement were noted throughout the project relating to large fills, drainage structures, and utilities, with some of the most pronounced indicated in the Road Summary Spreadsheet. Performing permanent repairs to address road surface settlement should be done on a case by case basis to ensure the proper fix is selected for the problem at hand. Routine maintenance, however, should be continually pursued, as with the shoulder cracking repair, to minimize water intrusion below the asphalt.

The roads which appear to be in the worst overall condition for their age are all of those in the Alder Creek Meadows and Cliffside subdivisions, and Hillside Lane in the Timbers subdivision. In Alder Creek Meadows there is significant cracking and surface deterioration, as apparent in the picture to the left, which ages the roads beyond their years. Due to the severity of the cracking, raveling, marginal drainage, and lack of underlying road base, it may be most prudent for long term sustainability to perform a complete reconstruction of these roads. This would include pulverization of the asphalt and utilizing the existing road bed as much as practical, then performing subgrade stabilization where necessary, reshaping, supplementing with appropriate aggregate base, and repaving with new asphalt, along with drainage improvements and other associated reconstruction activities.

For the Cliffside roads, it would appear there may be subgrade, drainage, and utility trench issues which have caused enhanced deterioration. The photo to the right shows the magnitude of settlement which has occurred most likely over a water main installation. Again, due to the severity of the poor road condition, significant reconstruction may be the most economical long term solution, including similar construction measures as indicated above for the Alder Creek Meadows roads. Hillside Lane in the Timbers shows the same type of surface issues as the Cliffside roads, again

potentially warranting significant reconstruction at some point. As Hillside Lane has been assigned an RSL of 10, and due to the fact that it serves only three lots, it does not show up as a reconstruction effort within the next 10 years.

After the roads mentioned above, the next street showing some signs of structural distress is Rio Grande Club Trail from North River Road to the Rio Grande Club House, primarily on top where some rutting and shoulder cracking is occurring. The rutting is apparent in the picture to the left, where the water is standing in the roadway along the wheel path. This section of the road has the highest potential for ADT of all the SFRMHOA streets, shown at 3,318 vehicles per day in the Road Summary Spreadsheet. It also is the road experiencing the highest present day traffic. It is likely that this road will require significant refurbishment as well, potentially including asphalt pulverization, aggregate addition, and new asphalt paving along with proper shouldering and road side ditches. Improvements should be designed as appropriate for the expected traffic (the current configuration of 2.5 inches of asphalt is shown to have a 23 year design life in the WT report. Therefore, the indicated refurbishment will have a design life in excess of this as long as 2.5 inches or more of new asphalt is placed).

Determining whether warranted road maintenance is due to age or to possible initial construction deficiencies is not a black and white issue. As infrastructure ages, it will need to be maintained and refurbished at some point to preserve the same level of service. Improperly constructed items are likely to degrade faster, and potentially require more significant refurbishment or reconstruction. As mentioned in the WT report, the relatively low construction traffic experienced on some of the roads due to the present build out condition may not completely show all of the potential construction deficiencies which may be non-asphalt in nature. For the current condition of the SFRMHOA roads there are a few which stand out from the others as being more degraded than would be expected from their age and limited traffic. In our opinion, the Alder Creek Meadows and Cliffside roads, along with Hillside Lane visibly appear to show degradation beyond that expected for their age, as previously discussed. These roads would appear to have some construction deficiencies associated with them, possibly including poor asphalt, lack of drainage, unsuitable subgrade, improper utility installation, incorrect construction practices, or a combination thereof.

While the asphalt on the portion of Rio Grande Club Trail between the North River Road and the Rio Grande Club House is showing some rutting and shoulder cracking in the upper portions, this is borderline as to whether it is primarily age related or may have been accelerated due to lack of good road base gravel and poor drainage. For the remainder of the roads, they generally appear to have normal aging issues, with the exception of some of the shoulder cracking and patching, and some settlement areas, as discussed above.

Maintenance Plan and Estimated Costs

Using a combination of the present road conditions, ADT, RSL, the findings of the WT report, and potential annual expenditures, the maintenance plan, including preservation and

reconstruction over the next several years was generated. Pavement preservation activities, primarily surface sealing, have been indicated for the present conditioned roads in the RSL range of 9 to 12 years. After a road has been reconstructed or rehabilitated, surface sealing was prescribed at an RSL of 15. Once a road has been sealed, additional sealing has been indicated approximately every 5 years (which will be reviewed for appropriateness in the future). Chip seal costs are similar to surface sealing, and may be desired for some of the steeper or more frequently traveled road sections to improve surface friction. Sealing activities can add 3 to 8 years to the RSL of a road, based on the condition at the time of application and the heavy traffic experienced. Significant rehabilitation or reconstruction is indicated when a road's RSL is approaching 0.

As mentioned above, asphalt sealing, along with annual drainage structure maintenance, weed control, shouldering, asphalt patching, and crack sealing are prescribed for the majority of the roads, as shown in the maintenance task breakdown in Appendix C. The exceptions are for the roads in Cliffside, Alder Creek Meadows, and the first ±2,500 feet of Rio Grande Club Trail, which have been shown to be reconstructed in 2014, 2015, and 2018, respectively. It will be noted in the next three years (2011 through 2013) that extra resources have been assigned to maintenance of drainage structures, shoulders, and ditches. In this way, it is thought to "get ahead of the game" so that annual attention to these matters in the future will require less effort.

The extent that preservation measures will prolong asphalt life depends on a number of factors including heavy traffic, weather, and the quality of original construction, to name a few. For roadways with little heavy traffic, it is not unheard of to have original asphalt surfaces last 30 to 40 years, with proper maintenance. However, at some point more significant rehabilitation will be required, such as asphalt overlays or pulverization and new asphalt surface courses, with associated work. Some roads may be in need of this type of work just beyond the time frame we have looked at, such as Hillside Lane and additional portions of Rio Grande Club Trail. Future site conditions and maintenance plan revisions will better identify when the SFRMHOA will get into the mode of performing more involved asphalt refurbishment on a regular basis.

Cost data for typical maintenance activities was initially obtained from discussions with a local asphalt contractor, Strohecker Asphalt & Paving, Inc. (SAP), and from similar recent construction experience. Additional pricing and historical information (amount of previous crack sealing, patching, etc.) was obtained after the initial draft of this report had been submitted (and reviewed) from ACI of Alamosa at a September 24, 2010 meeting. In developing estimates, the most conservative numbers were used, and it should be noted that this type of construction is highly affected by oil prices. Reconstruction and rehabilitation quantities have been estimated based on current configuration (road width, alignment, etc.), and site specific plans and SFRMHOA desires will dictate the extent of the improvements required and the resulting cost (for example, increased road width and shoulders would have a correspondingly higher cost).

It will be noted that the annual and resulting total estimated cost is significantly higher than that indicated in the previous draft. This is due to several factors based on requests stemming from the previous draft review, additional project research including the WT investigation and report, and an increase in some of the unit pricing. First, it was requested that the annual costs be broken down and include costs for engineering and construction services necessary to bid the

work out and secure a qualified low bid contractor for the work. Engineering had previously been included in the reconstruction projects, but not necessarily for the maintenance projects. Engineering has been estimated at 10% of the construction cost for the maintenance projects, and 15% for the reconstruction projects. These percentages correspond to those experienced on similar municipal projects. The engineering services would include site surveying, mapping, plan creation, specification preparation, contract development, bidding, construction layout, contract administration, materials testing, and construction review as appropriate for the type of project being pursued. As far as construction costs, mobilization and bonding have been included on all projects, and the reconstruction projects have been broken down to include the likely work elements. Additionally, a contingency has been allowed, being shown at 10% for the maintenance projects, and 15% for the reconstruction projects. The contingency should cover limited quantity adjustments, unit price variations, scope modifications, or other unknowns at this time.

Additional project research, via the WT geotechnical investigation, revealed that there was no material which could be classified as gravel below the subject roads. This changed our recommendation for the Alder Creek Meadows roads from a surface refurbishment to a reconstruct. This recommendation was reinforced by sentiments from Mr. Todd Stockebrand of ACI who has familiarity with the site. Mr. Stockebrand was asked at our September 24, 2010 meeting (prior to the geotechnical work) if he thought that pulverizing the existing asphalt and paving over the top would be appropriate, and he indicated that he was uncomfortable with the underlying material. As expected, changing the Alder Creek Meadows recommendation to a reconstruct more than doubled the cost within this subdivision.

Finally, some of the key unit prices (sealing, patching, asphalt, etc.) were adjusted upward, based on information provided by Mr. Stockebrand, and due to the fact that oil prices are presently higher than last year, and are expected to get somewhat higher. While we have tried to balance the annual expenditures (especially for the preservation work), for the purposes of this report, we have kept the asphalt preservation (or reconstruction) work for a given subdivision within one construction season. Budget, site conditions, or other factors might dictate that work within a given subdivision be phased over two or more years. Schedule wise, the only change made was to move the sealing of the Fairway Glen, River Greens, and Timbers roads from the 2018 to the 2019 construction season. In this manner, these sealing activities were not shown in the same year as the Rio Grande Club Trail reconstruction work, currently scheduled for 2018.

The estimated costs for the next several years are summarized in the three tables below. The first shows the estimated year to year costs. The second table breaks down the estimated costs by construction, contingency, maintenance plan revisions, and engineering. The third table indicates the estimated cost contributed to maintenance and poor construction, the later consisting of the Cliffside and Alder Creek Meadows reconstruction efforts. As previously indicated, a more detailed breakdown of work to be performed and associated costs is contained in a spreadsheet located in Appendix C.

Estimated Annual Road Maintenance Costs	
Construction Year	**Estimated Cost**
2011	99,840.00
2012	127,699.20
2013	151,536.00
2014	378,045.20
2015	913,017.30
2016	107,966.40
2017	220,784.40
2018	496,483.00
2019	165,279.60
2020	76,963.20
Total Est. Cost 2011 - 2020	**$ 2,737,614.30**

Estimated 2011 to 2020 Road Maintenance Costs by Category	
Category	**Estimated Cost**
Construction	2,157,759.00
Contingency	284,527.65
Maintenance Plan Revisions	10,800.00
Design/Construction Engineering	284,527.65
Total Est. Cost 2011 - 2020	**$ 2,737,614.30**

Estimated 2011 to 2020 Road Cost Maintenance or Poor Initial Construction (See Additional Discussion Below)	
Category	**Estimated Cost**
Expected Maintenance	1,488,411.80
Poor Initial Construction	1,249,202.50
Total Est. Cost 2011 - 2020	**$ 2,737,614.30**

Care should be taken in comparing the expected maintenance costs and those attributed to poor initial construction. In the table above, the cost is broken down by pulling out the reconstruction items for Cliffside and Alder Creek Meadows, applying the 15% each for contingency and engineering, and subtracting this from the total 10 year cost estimate. While this gives a strong indication of the significant extra expense associated with these two subdivisions within the next 5 years, it does not account for the fact that these roadways would require significant refurbishment at some point in the future (possibly 10 to 20 years) due to the asphalt being "worn out". With proper base having been originally constructed, and assuming that interim maintenance activities would have been equal, it seems that the worst case refurbishment might have entailed pulverization of the existing asphalt, re-shaping and re-compacting the road bed, new asphalt pavement surfacing, and some gravel shouldering. This type of surface refurbishment for the two subdivisions is estimated to cost $655,603.00, which compared to the

$1,249,202.50 reconstruction cost is $593,599.50 less. A spreadsheet showing these calculations included in Appendix D. It should be noted that neither the time value of money nor inflation have been considered in this comparison.

We have attempted to be conservative in the estimates provided, and believe that competitively bidding annual, well established projects will be the most economical and generate the highest quality results for the SFRMHOA. It is hoped that in doing competitively bid projects that prices below those estimated could be realized, which has been the case on similar projects we have been involved with in the past couple of years. The costs in the tables above and those contained in the spreadsheet in Appendix C have been provided based on familiarity with the construction industry, but in no way is it guaranteed that construction bids or costs will not exceed these values.

It should be noted that the maintenance plan should be reviewed every few years so that the work recommended matches the road conditions, SFRMHOA priorities, budget, or other relevant factors that may not be currently available. During these reviews additional roadways can be added to the plan, such as those for new or unfinished developments or subdivisions which are not included in the plan at this time (such as Village at Alder Creek and The Reserve). An allowance in the cost estimate for revisiting the maintenance plan has been included every three years.

The maintenance and associated costs provided over the next ten years should assist the SFRMHOA and HCS in project planning and establishing the proper funding reserve. It is recommended that a surplus of some level be established to deal with unforeseen road issues that may need to be dealt with in a timely manner. Catastrophic or "mother nature" induced road issues (flooding, earthquake, landslide, etc.) may be covered by insurance, depending upon your policy. Further assistance to SFRMHOA and HCS in reviewing fees, existing reserve, annual budget, dealing with individual subdivisions, etc. in association with the road maintenance can be provided upon request. The 2011 road maintenance project scope and supporting documentation (contract, specifications, and schematic plan) can be generated upon authorization to initiate the SFRMHOA asphalt (and road) preservation effort.

Appendix A

Road Summary Spreadsheet

South Fork Ranches - Road Summary

Revised in Februrary 2011

Subdivision	Street	±Year Built	Length (ft.)	Width (ft.)	Lots	Potential ADT	ROW Width (ft.)	Cul-de-sac Dia. (ft.)	Estimated RSL (yrs.)	Comments
Big River	Big River Way	2006	1120	22	15	150	40	n/a	17	Gated, good shape, very few cracks, a little wavy
	Spur to Left ±7+20	2006	106	12	1	10	n/a	n/a	17	Private Drive for Lot 7?
River Greens	River Side Drive	2003	2128	24	32	320	60	n/a	14	Gated ±6+50, sealed shoulder cracks
	Spur to Left ±12+24	2003	914	17.5	3	30	n/a	n/a	14	Areas of bad shoulder weeds
	W. River Side Ct.	2003	1300	24	21	210	60	64	14	
	E. River Side Ct.	2003	1270	24	7	70	40	58	13	Root/weed instrusion areas 2+30, 9+00 & Cul-de-sac
	Iron Bridge Pl.	2003	760	22	13	130	60 & 40	62	14	Gated, lack of ditches, no driveway culverts, shoulder weeds
	Iron Bridge Ct.	2003	320	22	4	40	40	60	14	
River Bend	River Bend Pl.	2004	380	21	16	160	?	50	15	Curb & gutter, concrete paved entrance, some storm sewer
River Club	River Club Dr.	2004	330	24	56	560	28	n/a	15	Curb & gutter, partially completed, storm sewer?
	River Club Dr.	2004	780	12	28	280	28	n/a	15	Paved lane to River Club House, some edge deterioration
	River Club Ct.	2004	255	24	16	160	28	81	15	Curb & gutter
La Lomita	La Lomita Cir.	2001	3035	25	23	230	60	n/a	11	Transverse cracks ±60' apart, some utility trench settlement, ditches and shoulders marginal, shoulder cracking 22+00 to end, settlement cracking over deep culvert at ±29+70
	Vista De Verde Cir.	2001	3360	25	22	220	60	n/a	11	Transverse cracks ±100' apart, some ditches and shoulders marginal
	Spur to Left ±22+20	2001	495	12	3	30	30	n/a	11	Some shoulder weeds, potentially used by Lots 33, 34 & 35
	Spur to Right ±22+90	2001	435	12	4	40	30	n/a	11	Potentially used by Lots 19, 20, 21 & 22
	Cumbre Ct.	2001	1960	24.5	8	80	60	66	11	No culvert at possible low spot ±10+50
	Alder Creek Rd.	2001	574	22	0	?	60	n/a	15	Another 1240 ft. of gravel road beyond asphalt in subdivision?
Cliffside	Cliffside Dr.	2001	200	25	25	250	80	n/a	5	Transverse cracks ±25' apart, shoulder cracking, alligator cracking, surface weathering
	Cliffside Ct. West	2001	365	24	9	90	60	79	4	Transverse cracks ±25' apart, shoulder cracking, alligator cracking, surface weathering, utility trench settling
	Cliffside Ct. East	2001	1330	24	15	150	60	n/a	4	Transverse cracks ±25' apart, shoulder cracking, alligator cracking, surface weathering, utility trench settling, marginal ditches
Alder Creek Meadows	Fairway Dr.	2001	1340	24.5	68	680	60	n/a	6	Significant transverse & longitudinal cracking, shoulder cracking
	Par Ln.	2001	340	23	41	410	50	n/a	7	Significant transverse & longitudinal cracking
	Greenside Ct.	2001	765	24	17	170	50	76	7	Significant transverse & longitudinal cracking, some weeds
	N. Alder Creek Ln.	2001	1400	24	22	220	60	61	5	Significant transverse & longitudinal cracking, shoulder cracking, surface weathering
	S. Alder Creek Ln.	2001	1150	23.5	10	100	50	77	6	Significant transverse & longitudinal cracking, shoulder cracking
	Emergency Access	2001	400	12	0	0	±37	n/a	13	Failure on right shoulder at ±3+15
	Alder Creek Cutoff	2001	700	22	0	0	60	n/a	12	Gated Emergency Access, settlement at creek
Fairway Glen	Rio Grande Club Tr.	2002	2500	24	267	3318	60	n/a	8	Minimal ditches, shoulder & wheel path cracking, some rutting, curb & gutter w/storm sewer at Clubhouse, estimated 648 ADT due to Golf Course
	Rio Grande Club Tr.	2002	1800	23	177	1770	60	n/a	10	25+00 to 43+00 - Patched areas, marginal ditches, transverse cracking ±75' apart
	Rio Grande Club Tr.	2003	4470	23	58	580	60	54	10	43+00 to 87+70 - Patched shoulders, transverse cracking ±100' apart
	Fairway Glen Ct.	2002	960	20.5	11	110	60 & 40	46.5	13	Minor cracking
	Spur to Right ±60+50	2002	150	12	3	30	30	n/a	14	Potentially used by Lots 36, 37 & 38
	Fairway Ridge Ln.	2002	1045	22	10	100	40	45	14	Marginal ditches, areas of steep grade
	Spur to Right ±66+50	2002	200	12	4	40	20	n/a	14	Potentially used by Lots 46, 47, 48 & 49
Timbers	Timberline Tr.	2003	3090	23	22	220	60	46	14	Downhill shoulder cracking & patching, marginal uphill ditches
	Hillside Ln.	2003	465	21.5	3	30	40	38	10	Shoulder weeds, settlement
	Valley View Ct.	2003	415	21	4	40	60	56	14	Steep grade, hairpin curve, irregular cul-de-sac
	Birdie Ln.	2003	375	19	3	30	40	40	14	No uphill ditch, significant patch on right
The Ridge	Blanca Vista Dr.	2005	5135	22.5	97	970	60	54	16	Significant patch left side ±9+30 to 16+80, no culvert at golf path ±18+00?, settlement cracks at culvert ±4+95
	Mojave Ct.	2005	335	21.5	6	60	60	56	16	
	Little Bear Cir.	2005	2280	22	35	350	60	n/a	16	Two valve boxes sticking up, settlement at culvert ±3+10, shoulder cracking ±10+00
	Ellingwood Dr.	2005	2195	22.5	20	200	60	n/a	16	
	Mt. Lindsey Ct.	2005	420	23.5	6	60	60	56	16	
	Hopi Ct.	2005	1045	22	11	110	60	51	16	No culverts

Appendix B

Culvert Summary Spreadsheet

South Fork Ranches - Culvert Summary

Revised in February 2011

Subdivision	Street	Station	Length (ft.)	Dia. (in.)	Material	Comments
Big River	Big River Way	9+20	40	15	HDPE	
River Greens	River Side Drive	11+95	52	18	CMP	d/s end in air against tree
		14+00	48	18	CMP	u/s end has vertical sag
	E. River Side Ct.	3+25	95	24	CMP	Irrigation Structure on left side
La Lomita	La Lomita Cir.	4+25	40	15	CMP	d/s end 1/2 full sediment
		20+90	50	15	CMP	u/s end 1/3 full sediment
		29+67	62	21	CMP	d/s end 1/2 full sediment
	Vista De Verde Cir.	6+70	40	24	CMP	d/s end 1/4 full sediment
		13+50	40	15	CMP	
		27+30	61	15	CMP	ditch full on u/s end
		32+90	54	15	CMP	
	Cumbre Ct.	0+00	60	18	CMP	
		6+85	40	15	CMP	u/s end 1/2 full sediment
		15+90	59	15	CMP	vertical sag nearer d/s end
	Alder Creek Rd.	0+30	48	30	CMP	has u/s and d/s end sections
Cliffside	Cliffside Dr.	1+60	38	15	CMP	1/3 full sediment
Alder Creek Meadows	Fairway Dr.	5+05	40	18	CMP	slight vertical sag
	Greenside Ct.	0+44	40	18	CMP	u/s 1/2 full, d/s totally full sediment
		6+45	33	18	CMP	u/s 1/3 full, d/s 3/4 full sediment
	N. Alder Creek Ln.	0+25	52	21	CMP	d/s 3/4 full sediment, vertical sag
	S. Alder Creek Ln.	6+95	40	21	CMP	u/s 1/3 full, d/s 1/2 full sediment
		10+40	40	15	CMP	u/s & d/s smashed, u/s end full sediment
	Emergency Access	0+40	52	18	CMP	u/s & d/s ends buried, guess on length & dia.
	Alder Creek Cutoff	3+30	60	36	CMP	top damaged 20' from d/s
		3+40	60	36	CMP	vertical bend 20' from u/s
Fairway Glen	Rio Grande Club Tr.	41+50	60	24	CMP	deep culvert
		54+35	45	24	CMP	u/s end smashed, d/s 1/2 full sediment
		64+35	35	15	CMP	d/s end totally buried
		74+60	60	18	CMP	horizontal alignment deflection
		79+10	34	15	CMP	d/s 1/4 full sediment
	Fairway Glen Ct.	2+80	30	15	CMP	d/s 3/4 full sediment
Timbers	Timberline Tr.	6+70	57	15	CMP	corkscrew alignment
		14+75	39	15	CMP	u/s ditch marginal
		28+50	51	15	CMP	u/s 3/4 blocked, d/s 2/3 full sed., deep
	Hillside Ln.	3+30	35	15	CMP	has u/s and d/s end sections
The Ridge	Blanca Vista Dr.	4+95	60	18	CMP	vertical sag
		14+10	50	18	CMP	slight horizontal bend, deep
		36+00	40	15	CMP	d/s totally buried
		46+00	56	18	CMP	1/3 crushed inside 20' from d/s end
		49+20	54	24	CMP	1/4 crushed inside both 20' from u/s & d/s
	Mojave Ct.	0+30	48	15	CMP	d/s end crushed and buried
	Little Bear Cir.	3+10	40	24	CMP	damaged u/s, inside joint & d/s
		22+00	56	18	CMP	dent in top 20' from u/s
	Ellingwood Dr.	5+80	48	18	CMP	sharp bend, crushed, debris 10' from u/s
		Total	**2142**			

Appendix C

Maintenance Tasks and Estimated Cost

South Fork Ranches - Maintenance Tasks and Estimated Cost

Revised in February 2011

Year	Work Item	Quantity	Units	Unit Cost	Extension
2011	Weed Control	1	l.s.	2,500.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	10,000	l.f.	1.00	10,000.00
	Drainage Structure Maintenance	5	days	1,600.00	8,000.00
	Rio Grande Club Tr. Seal 25+00 to 87+70	16,023	s.y.	3.00	48,069.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	1,631.00	1,631.00
				2011 Construction Subtotal	**83,200.00**
				Contingency @ 10%	8,320.00
				Design & Construction Engineering @ 10%	8,320.00
				2011 Project Total	**99,840.00**
2012	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	10,000	l.f.	1.00	10,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	La Lomita Road Seal	25,743	s.y.	3.00	77,229.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	2,087.00	2,087.00
				2012 Construction Subtotal	**106,416.00**
				Contingency @ 10%	10,641.60
				Design & Construction Engineering @ 10%	10,641.60
				2012 Project Total	**127,699.20**
2013	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	5,000	l.f.	1.00	5,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	Fairway Glen Road Seal (Less Rio Grande Tr.)	5,208	s.y.	3.00	15,624.00
	River Greens Road Seal	16,945	s.y.	3.00	50,835.00
	Timbers Road Seal	10,768	s.y.	3.00	32,304.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	2,417.00	2,417.00
				2013 Construction Subtotal	**123,280.00**
				Contingency @ 10%	12,328.00
				Revisit Maintenance Plan	3,600.00
				Design & Construction Engineering @ 10%	12,328.00
				2013 Project Total	**151,536.00**

South Fork Ranches - Maintenance Tasks and Estimated Cost

Revised in February 2011

Year	Work Item	Quantity	Units	Unit Cost	Extension
2014	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	Cliffside Clear, Grub, Topsoil Rmv. & Repl.	6,317	s.y.	0.50	3,158.50
	Cliffside Pulverize Existing Asphalt	5,076	s.y.	1.00	5,076.00
	Cliffside Excavation & Embankment	846	c.y.	10.00	8,460.00
	Cliffside Excavation & Removal	846	c.y.	15.00	12,690.00
	Cliffside Subgrade Stabilization	1,000	c.y.	60.00	60,000.00
	Cliffside Prepare Subgrade	1,053	c.y.	3.00	3,159.00
	Cliffside Aggregate Base Course, Cl. 6, 6" Thick	1,211	c.y.	40.00	48,440.00
	Cliffside Asphalt Pavement, 3" Thick	894	tons	120.00	107,280.00
	Cliffside Grade Shoulders & Ditches	3,790	l.f.	2.00	7,580.00
	Cliffside Seeding & Mulching	6,317	s.y.	0.50	3,158.50
	Cliffside Straw Wattles	500	l.f.	6.00	3,000.00
	Cliffside Maintenance of Traffic	1	l.s.	2,000.00	2,000.00
	Mobilization & Demobilization	1	l.s.	5,000.00	5,000.00
	Bonding	1	l.s.	5,702.00	5,702.00
				2014 Construction Subtotal	**290,804.00**
				Contingency @ 15%	43,620.60
				Design & Construction Engineering @ 15%	43,620.60
				2014 Project Total	**378,045.20**
2015	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	Alder Creek Clear, Grub, Topsoil Rmv. & Repl.	19,483	s.y.	0.50	9,741.50
	Alder Creek Pulverize Existing Asphalt	14,926	s.y.	1.00	14,926.00
	Alder Creek Excavation & Embankment	2,488	c.y.	10.00	24,880.00
	Alder Creek Excavation & Removal	2,488	c.y.	15.00	37,320.00
	Alder Creek Subgrade Stabilization	1,000	c.y.	60.00	60,000.00
	Alder Creek Prepare Subgrade	3,247	c.y.	3.00	9,741.00
	Alder Crk. Aggregate Base Course, Cl. 6, 6" Thick	3,734	c.y.	40.00	149,360.00
	Alder Creek Asphalt Pavement, 3" Thick	2,628	tons	120.00	315,360.00
	Alder Creek Grade Shoulders & Ditches	11,690	l.f.	2.00	23,380.00
	Alder Creek Seeding & Mulching	19,483	s.y.	0.50	9,741.50
	Alder Creek Straw Wattles	1,500	l.f.	6.00	9,000.00
	Alder Creek Maintenance of Traffic	1	l.s.	4,000.00	4,000.00
	Mobilization & Demobilization	1	l.s.	5,000.00	5,000.00
	Bonding	1	l.s.	13,771.00	13,771.00
				2015 Construction Subtotal	**702,321.00**
				Contingency @ 15%	105,348.15
				Design & Construction Engineering @ 15%	105,348.15
				2015 Project Total	**913,017.30**

South Fork Ranches - Maintenance Tasks and Estimated Cost

Revised in February 2011

Year	Work Item	Quantity	Units	Unit Cost	Extension
2016	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	River Bend Road Seal	887	s.y.	3.00	2,661.00
	River Club Road Seal	2,600	s.y.	3.00	7,800.00
	Big River Road Seal	2,879	s.y.	3.00	8,637.00
	Rio Grande Club Tr. Seal 25+00 to 87+70	16,023	s.y.	3.00	48,069.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	1,705.00	1,705.00
				2016 Construction Subtotal	**86,972.00**
				Contingency @ 10%	8,697.20
				Revisit Maintenance Plan	3,600.00
				Design & Construction Engineering @ 10%	8,697.20
				2016 Project Total	**107,966.40**
2017	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	La Lomita Road Seal	25,743	s.y.	3.00	77,229.00
	The Ridge Road Seal	28,350	s.y.	3.00	85,050.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	3,608.00	3,608.00
				2017 Construction Subtotal	**183,987.00**
				Contingency @ 10%	18,398.70
				Design & Construction Engineering @ 10%	18,398.70
				2017 Project Total	**220,784.40**
2018	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	Rio Grnd. Club Tr. (RGCT) 0+00 to 25+00 Reconst.				
	RGCT Clear, Grub, Topsoil Rmv. & Repl.	8,333	s.y.	0.50	4,166.50
	RGCT Pulverize Existing Asphalt	6,667	s.y.	1.00	6,667.00
	RGCT Excavation & Embankment	1,111	c.y.	10.00	11,110.00
	RGCT Excavation & Removal	1,111	c.y.	15.00	16,665.00
	RGCT Subgrade Stabilization	1,000	c.y.	60.00	60,000.00
	RGCT Prepare Subgrade	1,389	c.y.	3.00	4,167.00
	RGCT Aggregate Base Course, Cl. 6, 8" Thick	2,125	c.y.	40.00	85,000.00
	RGCT Asphalt Pavement, 3" Thick	1,174	tons	120.00	140,880.00
	RGCT Grade Shoulders & Ditches	5,000	l.f.	2.00	10,000.00
	RGCT Seeding & Mulching	8,333	s.y.	0.50	4,166.50
	RGCT Straw Wattles	750	l.f.	6.00	4,500.00
	RGCT Maintenance of Traffic	1	l.s.	6,000.00	6,000.00
	Mobilization & Demobilization	1	l.s.	5,000.00	5,000.00
	Bonding	1	l.s.	7,488.00	7,488.00
				2018 Construction Subtotal	**381,910.00**
				Contingency @ 15%	57,286.50
				Design & Construction Engineering @ 15%	57,286.50
				2018 Project Total	**496,483.00**

South Fork Ranches - Maintenance Tasks and Estimated Cost

Revised in February 2011

Year	Work Item	Quantity	Units	Unit Cost	Extension
2019	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	Fairway Glen Road Seal (Less Rio Grande Tr.)	5,208	s.y.	3.00	15,624.00
	River Greens Road Seal	16,945	s.y.	3.00	50,835.00
	Timbers Road Seal	10,768	s.y.	3.00	32,304.00
	Cliffside Road Seal	5,076	s.y.	3.00	15,228.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	2,642.00	2,642.00
				2019 Construction Subtotal	**134,733.00**
				Contingency @ 10%	13,473.30
				Revisit Maintenance Plan	3,600.00
				Design & Construction Engineering @ 10%	13,473.30
				2019 Project Total	**165,279.60**
2020	Weed Control	1	l.s.	1,000.00	1,000.00
	Crack Sealing	3	days	3,000.00	9,000.00
	Patching	50	s.y.	70.00	3,500.00
	Shouldering & Ditching	1,000	l.f.	1.00	1,000.00
	Drainage Structure Maintenance	1	days	1,600.00	1,600.00
	Alder Creek Road Seal	14,926	s.y.	3.00	44,778.00
	Mobilization & Demobilization	1	l.s.	2,000.00	2,000.00
	Bonding	1	l.s.	1,258.00	1,258.00
				2020 Construction Subtotal	**64,136.00**
				Contingency @ 10%	6,413.60
				Design & Construction Engineering @ 10%	6,413.60
				2020 Project Total	**76,963.20**
				2011 to 2020 Grand Total	**2,737,614.30**

2011 to 2020 Total Construction	2,157,759.00
2011 to 2020 Total Contingency	284,527.65
2011 to 2020 Total Maintenance Plan Revisions	10,800.00
2011 to 2020 Total Engineering	284,527.65
2011 to 2020 Grand Total	**2,737,614.30**

Appendix D

Comparative Refurbishment Cost Estimate
For Cliffside and Alder Creek Meadows

South Fork Ranches - Comparitive Refurbishment of Cliffside and Alder Creek Meadows Estimated Cost

Revised in February 2011

Year	Work Item	Quantity	Units	Unit Cost	Extension
2014 *	Cliffside Pulverize Existing Asphalt	5,076	s.y.	1.00	5,076.00
	Cliffside Prepare Subgrade	1,053	c.y.	3.00	3,159.00
	Cliffside Asphalt Pavement, 3" Thick	894	tons	120.00	107,280.00
	Cliffside Gravel Shouldering	70	c.y.	80.00	5,600.00
	Cliffside Maintenance of Traffic	1	l.s.	2,000.00	2,000.00
	Mobilization & Demobilization	1	l.s.	5,000.00	5,000.00
	Bonding	1	l.s.	2,562.00	2,562.00
	2014 Cliffside Refurbishment Construction Subtotal				**130,677.00**
	Contingency @ 15%				19,601.55
	Design & Construction Engineering @ 15%				19,601.55
	2014 Cliffside Refurbishment Project Total				**169,880.10**
2015 *	Alder Creek Pulverize Existing Asphalt	14,926	s.y.	1.00	14,926.00
	Alder Creek Prepare Subgrade	3,247	c.y.	3.00	9,741.00
	Alder Creek Asphalt Pavement, 3" Thick	2,628	tons	120.00	315,360.00
	Alder Creek Gravel Shouldering	216	c.y.	80.00	17,280.00
	Alder Creek Maintenance of Traffic	1	l.s.	4,000.00	4,000.00
	Mobilization & Demobilization	1	l.s.	5,000.00	5,000.00
	Bonding	1	l.s.	7,326.00	7,326.00
	2015 Alder Creek Meadows Refurbishment Construction Subtotal				**373,633.00**
	Contingency @ 15%				56,044.95
	Design & Construction Engineering @ 15%				56,044.95
	2015 Alder Creek Meadows Refurbishment Project Total				**485,722.90**
	Cliffside and Alder Creek Meadows Refurbishment Grand Total				**655,603.00**

Total Construction	504,310.00
Total Contingency	75,646.50
Total Engineering	75,646.50
Grand Total	**655,603.00**

* The 2014 and 2015 dates are those indicated for the reconstruction activities. It is anticipated that had the roads been properly constructed that the refurbishment could have been delayed 10 to 20 years. No consideration for inflation or the time value of money has been made in the comparison provided below.

Reconstruction Total	1,249,202.50
Refurbishment Total	655,603.00
Difference	**593,599.50**

Appendix E

Sign Summary Spreadsheet

South Fork Ranches - Sign Summary

Revised in February 2011

Subdivision	Street	Station	Sign Type	Comments
Big River	Big River Way	0+15 R	Street Sign	wooden, non-reflective
River Greens	River Side Drive	8+75 R ?	Street Sign	wooden, non-reflective
	E. River Side Ct.	0+00 L	Street Sign	wooden, non-reflective
	Iron Bridge Ct.	0+30 R	Street Sign	wooden, non-reflective
River Bend	River Bend Pl.	0+15 L	Stop Sign	
River Club	River Club Dr.	0+15 L	Stop Sign	
		0+20 L	Street Sign	wooden, non-reflective
La Lomita	La Lomita Cir.	0+15 L	Stop Sign	
		0+20 L	Street Sign	wooden, non-reflective
		1+20 R	Street Sign	wooden, non-reflective
		30+50 L	Street Sign	wooden, non-reflective
		30+50 R	Stop Sign	
	Vista De Verde Cir.	33+50 L	Street Sign	wooden, non-reflective
		33+50 R	Stop Sign	
	Cumbre Ct.	0+15 L	Stop Sign	
	Alder Creek Rd.	0+15 L	Stop Sign	
Cliffside	Cliffside Dr.	0+15 L	Stop Sign	
		0+20 L	Street Sign	wooden, non-reflective
		0+50 R	Speed Limit 20	
	Cliffside Ct. West	0+00 R	Street Sign	wooden, non-reflective
Alder Creek Meadows	Fairway Dr.	0+45 L	Street Sign	wooden, non-reflective
		0+50 L	Stop Sign	
		1+40 R	Speed Limit 20	
		6+40 R	Slow Sign	
	Greenside Ct.	0+45 R	Street Sign	wooden, non-reflective
	N. Alder Creek Ln.	0+00 R	Street Sign	wooden, non-reflective
	S. Alder Creek Ln.	3+00 L	Slow Sign	
	Emergency Access	0+50 R	Emergency Access	small, red on white
		1+50 R	Cart Crossing	small, black on yellow
		2+00 L	Cart Crossing	small, black on yellow
		3+00 L	Emergency Access	small, red on white

South Fork Ranches - Sign Summary

Revised in February 2011

Subdivision	Street	Station	Sign Type	Comments
Fairway Glen	Rio Grande Club Tr.	0+15 L	Stop Sign	
		9+45 L	Slow Sign	
		9+45 R	Speed Limit 20	
		16+40 R	Golf Cart Sign	
		18+35 L	Golf Cart Sign	
		19+80 R	Street Sign	wooden, non-reflective
		22+60 R	Golf Cart Sign	
		25+25 L	Golf Cart Sign	
		27+00 L	Slow Sign	
		27+00 R	Speed Limit 20	
		41+05 R	Slow Sign	
		41+90 R	Golf Cart Sign	
		44+25 L	Cart Crossing	small, black on yellow
		44+45 L	Golf Cart Sign	
		45+50 R	Speed Limit 20	
		68+05 R	Golf Cart Sign	
		68+05 R	Cart Crossing	small, black on yellow
		69+45 L	Slow Sign	
		69+45 L	Cart Crossing	small, black on yellow
		70+20 L	Golf Cart Sign	
	Fairway Glen Ct.	0+40 L	Street Sign	wooden, non-reflective
		3+50 R	Street Sign	wooden, non-reflective
	Fairway Ridge Ln.	0+40 L	Street Sign	wooden, non-reflective
		2+00 R	Cart Crossing	small, black on yellow
Timbers	Timberline Tr.	1+10 R	Golf Cart Sign	
		3+16 L	Cart Crossing	small, black on yellow
		3+35 L	---	post with no sign
		10+25 R	Speed Limit 20	
		23+15 R	No Outlet	
		26+15 L	Street Sign	wooden, non-reflective
	Hillside Ln.	0+40 L	Street Sign	wooden, non-reflective
		1+90 L	Cart Crossing	small, black on yellow
	Birdie Ln.	0+40 L	Street Sign	wooden, non-reflective
		1+00 L	Cart Crossing	small, black on yellow
The Ridge	Blanca Vista Dr.	0+50 L	Street Sign	wooden, non-reflective
		0+60 L	Stop Sign	
		1+75 R	Speed Limit 20	
		16+60 R	Golf Cart Sign	
		19+00 L	Golf Cart Sign	
		30+75 R	Street Sign	wooden, non-reflective
	Mojave Ct.	0+40 L	Street Sign	wooden, non-reflective
	Little Bear Cir.	0+40 R	Street Sign	wooden, non-reflective
		22+50 R	Street Sign	wooden, non-reflective
	Ellingwood Dr.	0+40 L	Street Sign	wooden, non-reflective
		48+50 L	Street Sign	wooden, non-reflective
	Mt. Lindsey Ct.	0+40 L	Street Sign	wooden, non-reflective
	Hopi Ct.	0+50 R	Street Sign	wooden, non-reflective
		1+15 R	Golf Cart Sign	leaning
		3+55 L	Golf Cart Sign	
		3+95 L	Cart Crossing	small, black on yellow
		Total	**81**	

Appendix F

Street Classification Spreadsheet

South Fork Ranches - Street Classification and Comparison to Potential Standards

Revised in March 2011

Potential SFRMHOA Asphalt Road Classification and Design Standards

Design Items Min./Range	Major Collector	Minor Collector	Primary Local St.	Secondary Local St.	Tertiary Local St.
Design ADT	≥2,500	400 to 2,499	200 to 399	100 to 199	≤99
ROW Width	80'	60'	60'	50'	40'
No. of Lanes	2	2	2	2	2
Lane Width	12'	12'	11'	11'	10'
Gravel Shldr.	4'	3'	2'	2'	1'
Cross Slope	2%	2%	2%	2%	2%
Asphalt Thick.	4" (2 lifts)	3"	3"	3"	3"
ABC Thick.	8"	8"	6"	6"	6"

Subdivision	Street Name	Potential ADT	Potential Classification	Existing Asphalt Width (ft.)	Potential Required Asphalt Width (ft.)	Existing ROW Width (ft.)	Potential Required ROW Width (ft.)	Existing Asphalt Thick. (in.)	Potential Required Asphalt Thick. (in.)	Existing Gravel Thick. (in.)	Potential Required Gravel Thick. (in.)
Big River	Big River Way	150	Secondary LS	22	22	40	50	2.5	3	0	6
	Spur to Left ±7+20	10	Tertiary LS	12	20	0	40		3		6
River Greens	River Side Drive	320	Primary LS	24	22	60	60	3.5	3	0	6
	Spur to Left ±12+24	30	Tertiary LS	17.5	20	0	40		3		6
	W. River Side Ct.	210	Primary LS	24	22	60	60		3		6
	E. River Side Ct.	70	Tertiary LS	24	20	40	40		3		6
	Iron Bridge Pl.	130	Secondary LS	22	22	60 & 40	50	2	3	0	6
	Iron Bridge Ct.	40	Tertiary LS	22	20	40	40		3		6
River Bend	River Bend Pl.	160	Secondary LS	21	22	?	50	3	3	18	6
River Club	River Club Dr.	560	Minor C	24	24	28	60	3.5	3	32.5	8
	River Club Dr.	280	Primary LS	12	22	28	60		3		6
	River Club Ct.	160	Secondary LS	24	22	28	50		3		6
La Lomita	La Lomita Cir.	230	Primary LS	25	22	60	60	2	3	0	6
	Vista De Verde Cir.	220	Primary LS	25	22	60	60	2.5	3	0	6
	Spur to Left ±22+20	30	Tertiary LS	12	20	30	40		3		6
	Spur to Right ±22+90	40	Tertiary LS	12	20	30	40		3		6
	Cumbre Ct.	80	Tertiary LS	24.5	20	60	40	3	3	0	6
	Alder Creek Rd.	?	?	22	?	60	?		?		6
Cliffside	Cliffside Dr.	250	Primary LS	25	22	80	60	2	3	1	6
	Cliffside Ct. West	90	Tertiary LS	24	20	60	40		3		6
	Cliffside Ct. East	150	Secondary LS	24	22	60	50	2.5	3	0	6
Alder Creek Meadows	Fairway Dr.	680	Minor C	24.5	24	60	60	3	3	0	8
	Par Ln.	410	Minor C	23	24	50	60		3		8
	Greenside Ct.	170	Secondary LS	24	22	50	50		3		6
	N. Alder Creek Ln.	220	Primary LS	24	22	60	60	2	3	0	6
	S. Alder Creek Ln.	100	Secondary LS	23.5	22	50	50		3		6
	Emergency Access	0	Tertiary LS	12	20	±37	40		3		6
	Alder Creek Cutoff	0	Tertiary LS	22	20	60	40		3		6
Fairway Glen	Rio Grande Club Tr.	3318	Major C	24	24	60	80	2.5	4	0	8
	Rio Grande Club Tr.	1770	Minor C	23	24	60	60	2.3	3	0	8
	Rio Grande Club Tr.	580	Minor C	23	24	60	60	2.5	3	0	8
	Fairway Glen Ct.	110	Secondary LS	20.5	22	60 & 40	50		3		6
	Spur to Right ±60+50	30	Tertiary LS	12	20	30	40		3		6
	Fairway Ridge Ln.	100	Secondary LS	22	22	40	50		3		6
	Spur to Right ±66+50	40	Tertiary LS	12	20	20	40		3		6
Timbers	Timberline Tr.	220	Primary LS	23	22	60	60	2.5	3	0	6
	Hillside Ln.	30	Tertiary LS	21.5	20	40	40	2.5	3	0	6
	Valley View Ct.	40	Tertiary LS	21	20	60	40		3		6
	Birdie Ln.	30	Tertiary LS	19	20	40	40		3		6
The Ridge	Blanca Vista Dr.	970	Minor C	22.5	24	60	60	3	3	3	8
	Mojave Ct.	60	Tertiary LS	21.5	20	60	40		3		6
	Little Bear Cir.	350	Primary LS	22	22	60	60	2	3	0	6
	Ellingwood Dr.	200	Primary LS	22.5	22	60	60		3		6
	Mt. Lindsey Ct.	60	Tertiary LS	23.5	20	60	40		3		6
	Hopi Ct.	110	Secondary LS	22	22	60	50		3		6

Note: Existing asphalt and gravel thicknesses from WT report. Gravel thickness indicated where WT classified material as "Base Course". The red highlighted cells show where existing conditions do not meet potential requirements for indicated classification.