Engineering and Technical Consultants, Inc.
7165 Columbia Gateway Drive, Suite B; Columbia, Maryland 21046
t 410.312.4761 f 410.312.0482

June 10, 2020

Birchfield Woods Cluster Association
1560 Poplar Grove Drive
Reston, Virginia 20194

ATTENTION: Mr. Tommy Bylund

SUBJECT: Report of Replacement Reserve Study
Birchfield Woods Cluster Association
Reston, Virginia
ETC Project M9-3805

Dear Mr. Bylund:

Engineering and Technical Consultants, Inc., (ETC) respectfully submits this report of our reserve study at the above referenced project. This work was performed in accordance with our proposal (PM9-6895) dated June 9, 2019. Written authorization to proceed with the work (signed by you) was received in our office on June 11, 2019.

Our inspection services were intended to assist you in:

- Evaluating existing conditions;
- Determining immediate or short-term repair needs; and,
- Generating a practical repair/replacement reserve schedule and cash-flow chart.

Our work was confined to the following elements:

1. Pavement;
2. Concrete site elements;
3. Foot Path;
4. Tot-lot;
5. Retaining walls;
6. Entrance sign; and,
7. Exterior common area lighting.

This report includes a brief summary of background information and, for each of the components inspected, discussions of our findings, comments, and recommendations. Some photographs are attached to this report (in Appendix A) to help illustrate certain findings. We have also compiled (in Appendix B) a tabular summary of future capital reserve requirements and a cash-flow chart that tracks anticipated disbursements and contributions to reserves. Provided in Appendix C is some general technical information regarding certain elements of the property.

BACKGROUND INFORMATION

Birchfield Woods Cluster Association is a residential community consisting of nineteen (19) buildings that enclose a total of one hundred (100) townhomes. We understand the community was developed around 1986.

Our findings are based on a physical inspection of the property conducted on July 18, 2019. Our services did not include any intrusive inspection or analysis and no construction plans were provided for our review. Consequently, some evaluations/opinions expressed in this report are based upon assumptions regarding such matters as concealed construction details, construction profile, condition of internal components, etc.

PAVEMENT

Vehicular access and parking are provided by asphalt-paved roadways and parking areas. Surface drainage is facilitated by concrete curb and gutter assemblies that discharge into the storm sewer.

Observations

The asphalt pavement appeared to be in good condition at the time of our inspection. We understand that the pavement was milled and overlaid in 2018. Minor staining from petroleum-based automotive fluids (gasoline, oil, diesel fuel, etc.) was noted in a few locations throughout the community (see Photograph 1). Asphalt is a byproduct of crude oil refinement and vulnerable to attack by other petroleum products.

Conclusions

The primary factors to consider in projecting life-cycle performance of the pavement are construction profile (composition and thickness), substrate stability (bearing capacity) and the loads to which it will be subjected. In the absence of specific information regarding these factors, we can only surmise that the pavement was designed and placed in accordance with typical industry procedures.

Based on the assumed design profile and our experiences in similar circumstances, we project a remaining serviceable life of up to another seventeen (17) to nineteen (19) years for the pavement. The pavement should be seal coated in five (5) year cycles.

Recommendations

In order for the new pavement to achieve maximum life-cycle performance, it must be properly maintained and periodically seal coated, including restriping. The seal coat application will help in preventing continued automotive fluid contamination. Presented in Appendix D are some guidelines for maintaining pavement.

CONCRETE SIDEWALKS AND CURB AND GUTTER ASSEMBLIES

Concrete sidewalks extend around the perimeter of the paved elements and individually-owned sidewalks lead to unit entrances. Concrete curb and gutter assemblies surround the asphalt-paved areas and facilitate drainage of surface water in those locations.

Observations

The concrete sidewalks appeared overall to be in reasonably good condition. Cracked and chipped concrete was observed in a few locations throughout the property (see Photograph 2). Sections of concrete sidewalk were also displaced (sunken or heaved), and some of those conditions present potential tripping hazards (see Photograph 3). The grassy area between the sidewalk and curb and gutter assembly was sunken in one location, and the sidewalk appeared to be undermined (see Photograph 4).

The concrete curb and gutter assemblies appeared overall to be in relatively good condition. Broken concrete was noted in areas (see Photographs 5 and 6). At least some of that damage could have been inflicted by snow plowing operations.

Discussion

There are many factors that could impact on the serviceable lives of the concrete elements, and all should be considered when projecting life-cycle estimates. Foremost among those factors is the construction profile (thickness, reinforcement, and concrete mix). No information regarding profile was provided to us, and our inspections did not include any sampling or analysis of the concrete. Therefore, our assessments are based only on assumed "typical" construction practices.

The long-term stability of the substrate (soil) is also a major factor. Movement (settlement) and/or inadequate compaction of the substrate can result in cracks and/or uneven displacement. These conditions could present potential tripping hazards as well as accelerated erosion of the substrate.

Site drainage characteristics (such as water discharge onto the concrete systems from improperly routed roof downspouts and/or inadequate site drainage provisions) will also influence the useful lives of the concrete elements. Deficient drainage will contribute to undermining of the substrate as well as frost heaving.

Tree roots can severely damage concrete and asphalt. As the roots expand they can exert sufficient pressure to break and/or heave sidewalks, curb and gutter assemblies, pavement, etc. It is common practice to remove tree roots during concrete replacement projects; however, caution should be exercised. Removing or damaging major roots (particularly those within the drip line of the tree canopy) could render trees unstable and vulnerable to toppling. An arborist should be consulted before removing structural roots.

The most critical factor in assessing conditions is the potential for personal injury (hazards). This potential and the Association's exposure to liability can become significant, particularly with respect to those isolated areas of the sidewalk, curb/gutter, and/or landing systems that exhibit conditions which could currently be considered hazardous or could deteriorate to hazardous in the near future.

Conclusions

Based on observable conditions and anticipated short-term repairs and replacements, we project a remaining serviceable life of approximately twenty to (20) years for the concrete elements. Some elements may fail within the first five (5) years; others may remain serviceable well beyond twenty (20) years. Interim repairs and replacements should be anticipated. Life-cycle estimates are only intended to help assure that funds in reserve will meet ongoing needs.

Recommendations

The concrete sidewalk and curb and gutter assemblies should be inspected at least twice a year for cracks, spalled surfaces, displacement, evidence of substrate erosion (voids), etc. Seriously distressed areas should be mapped and clearly marked (for repairs).

Correction of the most obvious (and potentially hazardous) conditions should be deemed imperative. Cracks, settlement, or other defects that result in a height disparity of one-half (1/2) inch or more present potential tripping hazards. These conditions indicate serious damage that should be properly repaired. Surface treatments, patching, and other expedient methods are not recommended, as they generally prove ineffective in the long term. Therefore, total replacement of damaged concrete sections should be undertaken.

Unit costs for concrete replacement tend to decrease as quantity increases; therefore, the inclination is to defer minor repairs. It can be financially advantageous to delay (and accumulate) repairs to minor cracks, cosmetic flaws and moderate spalling; however, most defects tend to be progressive. Such marginal conditions should be monitored and promptly corrected if they deteriorate to potentially hazardous states.

FOOTPATHS

Asphalt footpaths extend through portions of the community. A timber bridge connects one portion of the communities footpath to the public footpath. Additionally, a timber stair assembly extends from a public sidewalk along Lake Newport Road and leads to the path.

Observations

The asphalt footpaths were in good condition overall. The paths were rehabilitated in 2018. No issues were noted, and none were reported to us.

The timber stair assembly and bridge appeared to be in fair and good conditions, respectively. Some deterioration was noted in the stair assembly timbers (see Photograph 7).

Conclusions

In our opinion, the footpath pavement could remain serviceable for up to another sixteen (16) to nineteen (19) years. The timber stair assembly could remain serviceable for another two (2) to four (4) years, while the timber bridge should have a remaining serviceable life of approximately seven (7) to ten (10) years.

Recommendations

The footpath should be routinely inspected and repaired as needed. Of particular concern are potential tripping hazards. Where tree roots intrude beneath the path, they should be cut and root barrier should be installed. An arborist should be consulted before cutting major roots. Plants should be removed from cracks and the cracks should be sealed to discourage future growth.

TOT-LOT

The tot-lot features steel framed equipment with plastic components. The equipment included two (2) plastic sliding boards, a horizontal ladder (monkey bars) and a c-spring rider. The resilient surfacing consists of shredded wood mulch. The area is enclosed by molded plastic timbers that are secured with steel spikes. A vinyl covered steel bench is situated within the tot-lot area.

Observations

The tot-lot equipment appeared to be in good condition at the time of our inspection. Staining from pollution was evident on the tunnel slide (see Photograph 8). Additionally, the concrete footings for the bench were exposed and presented a safety hazard (see Photograph 9).

The resilient surfacing (wood chips) was displaced in a few areas. This condition was most evident at the base of the slides and in front of the bench. Wood chips, mulch, or other materials are normally placed around tot-lot equipment to provide some cushioning in the event of a fall.

The plastic timbers enclosing the tot-lot were in good condition as well. Minor corrosion was noted on the steel spikes (see Photograph 10).

Conclusions

In our opinion, the tot-lot equipment could remain serviceable for another fifteen (15) to twenty (20) years. Some repairs should be anticipated in the interim.

Recommendations

Padding or additional mulch should be placed around the exposed concrete bench footings. The tot-lot equipment should be periodically inspected and maintained. Presented in Appendix C are some general inspection and maintenance guidelines. Additional information can be obtained from the Consumer Products Safety Commission.

RETAINING WALLS

Tiered timber retaining walls extend along the rears of some of the units. No information was provided to us regarding retaining wall design. No legible stamps were noted identifying the wood as preservative-treated.

Observations

The visible elements of the retaining walls were in fair condition. Deteriorated (decayed) timbers were observed within walls in a number of areas (see Photographs 11 and 12). The deterioration typically occurred in the timbers along the top and bases of the walls. In some instances, the exposed ends of the tiebacks were deteriorated (decayed) (see Photograph 13). Tiebacks are used to support the wall from bulging under the load of the retained soil. Deterioration could compromise the connection to the wall and destabilize the wall.

Conclusions

The retaining walls could remain serviceable for another eight (8) to ten (10) years provided they were properly designed and constructed.

ENTRANCE SIGN

The main entrance to the community is defined by a wood sign. The legend was created by sand-blasting away the background.

Observations

The entrance sign appeared overall to be in good condition. No issues were noted, and none were reported to us.

Conclusions

Provided that it is properly maintained, the entrance sign could remain serviceable for up to another ten (10) to fifteen (15) years. The assembly should be repainted every three (3) to five (5) years.

EXTERIOR COMMON AREA LIGHTING

The parking lots and primary pedestrian areas are illuminated by pole-mounted luminaires that utilize high-intensity-discharge (HID) sources. The devices appear to be controlled by photovoltaic cells.

Observations

The exterior lighting provisions were inspected during non-operational (daylight) hours and we cannot comment on the operation of individual fixtures. The lighting system appeared to provide reduced illumination in areas, due in part to obstruction by leaves of nearby trees. The posts appeared to have been repainted; although, corrosion was evident at the bases of some of the posts (see Photograph 14).

Conclusions

Luminaires of the type installed at this property can normally be expected to have useful lives of up to thirty (30) to forty (40) years; however, improvements in energy efficiency have rendered most HID devices economically obsolete. Light-emitting-diode (LED) luminaires are among the most efficient currently available and represent a substantial improvement over HID lighting. In addition to better efficacy (more lumens per watt of energy), the lamps are far longer-lived and do not require ballasts.

SITE DRAINAGE/EROSION

Wooded areas are located at the rears of the buildings and adjacent to the tot-lot. The terrain is steeply sloped in the grassy areas adjacent to the forested areas (see Photograph 15). Gutter and downspout assemblies deposit stormwater on grade in most areas. Swales direct stormwater towards the steeply sloped areas at the rears of the buildings.

Observations

Bare areas of ground were observed in numerous locations and were typically observed in areas shaded by trees (see Photograph 16). The ground in these areas was moderately eroded and tree roots were exposed in most instances. The erosion in these areas is probably due to the lack of vegetation and the flow of stormwater.

Steeply sloped terrain was located close to backyards in some instances. Over time, the grounds adjacent to these areas could erode due to the lack of ground cover and the flow of stormwater.

Recommendations

A ground cover that thrives in shady conditions (such as periwinkle or pachysandra) should be planted in the bare areas and on the faces of the steeply sloped areas to help reduce erosion. The installation of a subsurface drainage system, of which all downspouts, condensate lines, sump pump piping, etc. are tied into would be beneficial as it would reduce the flow of stormwater. If erosion adjacent to the steeply sloped terrain worsens, construction of retaining walls may be required in the future. These areas should be inspected periodically to determine whether erosion is occurring.

FINAL COMMENTS

The attached photographs (in Appendix A), repair/replacement reserve schedule and cash-flow charts (in Appendix B) should help to delineate more clearly the conditions found and our recommendations for this project. The supplementary technical information (in Appendix C) is provided to assist the Association with future repairs and maintenance.

We strongly recommend that a comprehensive preventive maintenance program be designed and implemented as soon as possible. Without question, preventive maintenance affords substantial financial benefits. Qualified specialty consultants should be retained for this project to:

- Identify and inventory all maintenance worthy elements;
- Specify explicit procedures (tasks);

- Specify material;
- Specify task frequency; and
- Develop a periodic schedule.

To be effective, any program must be routinely monitored by management. This can be accomplished either directly or through specialty services.

In addition, timely corrective maintenance is generally less costly in the long term than deferred repairs. Moreover, if repairs are made as needed, before they are allowed to accumulate, the expenses should be incremental and easier to absorb.

For all major repair or replacement work, a qualified engineer should be retained to provide technical assistance in the following areas.

- Where feasible (such as for pavement), samples should be obtained to better determine in-place conditions.
- Specifications, plans, details, etc. should be developed for repair and/or replacement work.
- Bids should be solicited from contractors that are qualified and have performed similar work in the past.
- The work should be inspected to help assure that it complies with contract documents and applicable industry standards.

Due to the nature of our work, no responsibility can be assumed for latent defects that may appear in the future, for items that were not examined, or for differing opinions of others. Our services do not constitute a certification, guarantee, or warranty of the property (or any of its components) or compliance with applicable codes, standards, safety requirements, building plans, offering statements, etc.

We appreciate this opportunity to be of service. Please contact us if any questions arise or if we can be of further assistance.

Very truly yours,

ENGINEERING AND TECHNICAL
CONSULTANTS, INC.

Kyle P. Parsons, RS, RRC
Senior Project Manager

APPENDICES: A - Photographs
B - Repair/Replacement Reserve Schedule and Cash-Flow Chart
C - Supplementary Technical Information

APPENDIX A

PHOTOGRAPHS

Photograph 1 – Stainng on pavement from automotive fluid

Photograph 2 – Crack in sidewalk

Photograph 3 – Sunken section of sidewalk

Photograph 4 – Sunken ground between sidewalk and curb – note sidewalk undermined

Photograph 5 – Cracked section of curb and gutter assembly

Photograph 6 – Broken section of curb and gutter assembly

Photograph 7 – Deteriorated timber in stair assembly

Photograph 8 – Pollution staining on slide

Photograph 9 – Exposed bench concret footings presenting safety hazard

Photograph 10 – Corrosion on tot-lot border spike

Photograph 11 – Deteriorated timber along base of retaining wall

Photograph 12 – Deteriorated timber along top of retaining wall

Photograph 13 – Deteriorated end of retaining wall tie-back timber

Photogrpah 14 – Corosion at base of light post

Photograph 15 – Steep-sloped area along rear of house

Photograph 16 – Steep-sloped area adjacent to tot-lot – note bare areas and exposed roots

APPENDIX B

REPAIR/REPLACEMENT RESERVE SCHEDULE AND CASH FLOW CHART

APPENDIX B
REPAIR/REPLACEMENT RESERVE SCHEDULE AND CASH-FLOW CHART
BIRCHFIELD WOODS CLUSTER ASSOCIATION
RESTON, VIRGINIA
ETC PROJECT M9-3805

The recommended reserve requirements outlined in the attached schedule are based on our opinions of current conditions and costs for materials, equipment, labor, etc. These opinions are based upon:

- Methods and materials that generally comply with accepted industry standards;
- Perceived existing conditions as noted during our limited visual inspections;
- Information provided to us; and
- Our experience with similar circumstances.

It must be noted that no laboratory tests or analyses were performed on any elements and our conclusions are based solely on visual examinations. Unless otherwise noted, our life cycle projections are based on the assumptions that construction materials (such as asphalt, concrete, etc.) generally comply with accepted industry standards and that the listed elements will be properly maintained.

Repair/replacement costs and suggested annual contributions have been calculated using several basic assumptions. They are suggested budget figures, not guaranteed costs. These amounts are estimated in current (2019) U.S. dollars. Accordingly, some accommodation should be made for normal cost increases, by either factoring in annual increases at some reasonable rate (such as three percent per year) or allowing interest on deposited funds to accumulate and remain in reserves.

Typical labor and material costs were used to estimate dollar amounts for repairs and replacements. Incidental costs (such as necessary modifications, rigging, etc.) are factored in as very rough approximations.

According to information provided to us, approximately $121,651 was available for reserves as of January 1, 2020. We understand that amount is divided amongst a reserve account, a savings account, and a certificate of deposit (CD). That amount was distributed as available funds among the elements on the reserve schedule.

The attached cash flow table delineates recommended minimum contributions and anticipated disbursements relative to replacement reserves between 2020 and 2039. Reserves are currently funded at a rate of $30,420.00 per year. In our opinion, continued funding at that this rate is acceptable.

The proposed reserve analysis should be reevaluated on a regular basis. Real property is dynamic by nature and economic conditions are often subject to vast fluctuations. Therefore, we strongly recommend that a comprehensive study be conducted every three to five years to assess changes in the physical condition of the various systems and related components.

Financial information should be assessed annually if pertinent economic changes are to be accurately reflected. Without these regular assessments, long-range planning may not be effective and critical needs may not be properly met.

Finally, it should be noted that the reserve schedule and cash-flow chart are not intended to be autonomous documents. They are key elements of our investigative report and represent a partial summation of our conclusions. Taken out of context, the information contained solely within the reserve schedule and cash-flow chart must be considered incomplete.

APPENDIX B
REPAIR/REPLACEMENT RESERVE SCHEDULE
BIRCHFIELD WOODS CLUSTER ASSOCATION
RESTON, VIRGINIA
ETC PROJECT M9-3805
JUNE 10, 2020

Items	Comments/ Notes	Model/Type	Unit	Estimated Quantity	General Condition	Typical Design Life (years)	Estimated Remaining Useful Life (years)	Estimated Replacement		Available Funds	Annual Contribution
								Unit cost	Total Cost		
Pavement											
Overlay	A, B	Asphalt	sy	9,200	Good	18	16	$ 16	$ 147,200	$ 42,263	$ 6,559
Seal Coat	A, B	Asphalt	sy	9,200	Good	5	3	$ 2	$ 18,400	$ 5,283	$ 4,372
Curb and Gutter	C	Concrete	al		Good	5	4		$ 5,000	$ 1,436	$ 891
Sidewalks	C	Concrete	al		Good	5	4		$ 6,000	$ 1,723	$ 1,069
Footpaths											
Pavement		Asphalt	sy	200	Good	18	16	$ 90	$ 18,000	$ 5,168	$ 802
Stair Assembly		Timber	ls		Fair	25	4		$ 5,000	$ 1,436	$ 891
Bridge		Timber	ls		Fair	30	9		$ 10,000	$ 2,871	$ 792
Tot-Lot		Timber	ls		Good	20	14		$ 20,000	$ 5,742	$ 1,018
Retaining Walls	A	Timber	lf	670	Fair	30	6	$ 280	$ 187,600	$ 53,863	$ 22,290
Entrance Sign		Wood	ls		Good	20	9		$ 1,500	$ 431	$ 119
Exterior Lighting	C	HID	al		Fair	5	4		$ 5,000	$ 1,436	$ 891
Totals									$ 423,700	$ 121,651	$ 39,694

A. Cost/life cycle estimates assume immediate completion of recommended short-term repair/replacement/modifications.

B. Estimated cost to place two (2) inch thick (compacted) asphalt overlay

C. Estimated cost for cyclical repairs, not total replacement

APPENDIX B
CASH FLOW CHART
BIRCHFIELD WOODS CLUSTER ASSOCIATION
RESTON, VIRGINIA
ETC PROJECT M9-3805
JUNE 10, 2020

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Pavement										
Overlayment										
Seal Coat			18,400					18,400		
Curb and Gutter			5,000					5,000		
Sidewalk			6,000					6,000		
Footpath										
Pavement										
Stair Assembly				5,000						
Bridge									10,000	
Tot-lot										
Retaining Walls							196,000			
Entrance Sign									2,000	
Exterior Lighting				5,000					5,000	
Total Expenditures	-	-	29,400	10,000	-	-	196,000	29,400	17,000	-
Current Funding - $30,420 Annually										
Beginning Balance	121,651	152,071	182,491	183,511	203,931	234,351	264,771	99,191	100,211	113,631
Annual Contributions	30,420	30,420	30,420	30,420	30,420	30,420	30,420	30,420	30,420	30,420
Assessments										
Year End Balance	**152,071**	**182,491**	**183,511**	**203,931**	**234,351**	**264,771**	**99,191**	**100,211**	**113,631**	**144,051**
Component Method Funding - See Reserve Schedule										
Beginning Balance	121,651	161,345	201,040	211,334	241,028	280,723	320,417	164,111	174,406	197,100
Annual Contributions	39,694	39,694	39,694	39,694	39,694	39,694	39,694	39,694	39,694	39,694
Assessments										
Year End Balance	**161,345**	**201,040**	**211,334**	**241,028**	**280,723**	**320,417**	**164,111**	**174,406**	**197,100**	**236,794**

APPENDIX B
CASH FLOW CHART
BIRCHFIELD WOODS CLUSTER ASSOCIATION
RESTON, VIRGINIA
ETC PROJECT M9-3805
JUNE 10, 2020

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Pavement										
Overlayment						147,200				
Seal Coat			18,400							
Curb and Gutter			5,000			5,000				
Sidewalk			6,000			6,000				
Footpath										
Pavement						18,000				
Stair Assembly										
Bridge										
Tot-lot				20,000						
Retaining Walls										
Entrance Sign										
Exterior Lighting				5,000					5,000	
Total Expenditures	-	-	29,400	25,000	-	176,200	-	-	5,000	-

Current Funding - $30,420 Annually

Beginning Balance	144,051	174,471	204,891	205,911	211,331	241,751	95,971	126,391	156,811	182,231
Annual Contributions	30,420	30,420	30,420	30,420	30,420	30,420	30,420	30,420	30,420	30,420
Assessments										
Year End Balance	**174,471**	**204,891**	**205,911**	**211,331**	**241,751**	**95,971**	**126,391**	**156,811**	**182,231**	**212,651**

Component Method Funding - See Reserve Schedule

Beginning Balance	236,794	276,489	316,183	326,478	341,172	380,866	244,361	284,055	323,749	358,444
Annual Contributions	39,694	39,694	39,694	39,694	39,694	39,694	39,694	39,694	39,694	39,694
Assessments										
Year End Balance	**276,489**	**316,183**	**326,478**	**341,172**	**380,866**	**244,361**	**284,055**	**323,749**	**358,444**	**398,138**

APPENDIX C

SUPPLEMENTARY TECHNICAL INFORMATION

APPENDIX C
SUPPLEMENTARY TECHNICAL INFORMATION
BIRCHFIELD WOODS CLUSTER ASSOCIATION
RESTON, VIRGINIA
ETC PROJECT M9-3805

PAGE(S)	SUBJECT	REFERENCES
1	Pavement	Various sources, including the Virginia Asphalt Association Association and The Asphalt Institute.
2	Tot-Lots	Patrick E. Gray

PAVEMENT

Broken Pavement Repairs - Network (interconnected) cracking, potholes and other forms of seriously distressed pavement should be repaired in accordance with the full-depth patching methods presented below.

- The patch outline should be saw-cut to a regular (squared) shape that extends at least one (1) foot beyond the distressed area. The shape should align with traffic patterns and the faces should be straight and vertical.

- All broken and unstable material should be excavated to a depth necessary to establish a firm base. The bed should be compacted in order to enhance support.

- A tack coat of emulsified or liquid-asphalt should be applied to the vertical surfaces to enhance adhesion between the patching and existing materials.

- Hot-mix asphaltic concrete should be placed into the excavation starting at the perimeter (rather than center-filling and raking to the edges). The composition of the patching material and depth of the excavation will dictate compaction procedures; however, most patches (for this project) could be accompanied in a single lift (operation) followed by compaction.

- The completed patch should be at the same level as the surrounding pavement (with full compaction). If hand tamping or light compaction techniques are used, the patch should be slightly higher that the surrounding pavement to allow for further compression by traffic.

Resurfacing - When the existing pavement nears the end of its serviceable life, the system should be overlain with a new asphaltic concrete wearing surface. Properly executed, resurfacing could extend the serviceable life of the system an additional ten (10) to fifteen (15) years. proper application should include the following preparation and execution methods.

- Prior to repaving, the substrate (existing pavement) must be stabilized by complete removal and replacement (patching) of broken and severely cracked sections.

- Minor cracks should be sealed against water intrusion, prior to repaving.

- Existing pavement should be milled to a depth of two (2) inches along the gutter joints, tapering to zero (0) inches five (5) feet in toward the center. This method helps assure a uniform two (2) inch surface and a smooth transition at the gutter joint.

- The surfacing should be reasonably clean and free of debris and contaminants.

- Installation of a paving fabric over the existing surface would help to stabilize the structure and inhibit the transmission of faults (cracks) to the new surface.

- The new surface should be seal coated with a coal-tar emulsion as soon as possible after the asphalt has cured (60 to 90 days). The seal coat will help to protect against both water intrusion and attack by automotive fluids.

TOT LOTS

Presented below are some general guidelines for inspection and maintenance of the tot lots and associated equipment. These recommendations do not constitute a "safety program" and should not be construed as such.

Grounds - The tot lot grounds should be frequently and closely inspected for and cleared of potential hazards. Visible hazards (glass, nails, etc.) should obviously be removed immediately and the mulch beds should be periodically raked and turned to reveal any hidden hazards. The grounds (and surrounds) should also be inspected for and cleared of potentially harmful plant life (certain fungi, poison ivy, brambles, etc.). The surfacing material (wood chips, mulch, etc.) should be maintained at appropriate depths.

Fasteners - All bolts, screws or other fasteners should be closely inspected and periodically retorqued. Machine bolts should be installed with flat and lock washers. Fasteners should be installed in a manner that presents no projections or sharp edges in the accessible portions of the equipment.

Metal Components - Surfaces should be inspected for irregularities (such as gouges, breaks, cracks, etc.) or exposed sharp edges that could present cutting hazards. All metal components should be inspected for rust, fatigue or other conditions that could compromise the structural integrity.

The painted surfaces should be periodically recoated with rust inhibiting paint. Any existing rust should be removed with a wire brush prior to painting.

Wood Components - Wooden frames, steps, benches, etc. should be inspected for rot or other forms of deterioration as well as overall soundness of assembly. The surfaces should be inspected for irregularities (such as splinters) that could present possible puncture hazards.

Anchors - All apparatus should be periodically inspected to ensure that they are firmly anchored.