

NORTH TAHOE REGIONAL PARK PLANNING REPORT

**PREPARED FOR:
NORTH TAHOE PUBLIC UTILITY DISTRICT**

**BY:
LLOYD CONSULTING GROUP, LLC**

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recreation

NORTH TAHOE PUBLIC UTILITY DISTRICT

EXECUTIVE SUMMARY

NORTH TAHOE REGIONAL PARK (NTRP) is a special place with the potential to exceed the expectations set forth by the North Tahoe community, and the entire Lake Tahoe region. Spread over 124 acres of forest, the park is home to several sports facilities, more than ten kilometers of trails and undeveloped open space connecting to National Forest lands. North Tahoe Public Utility District (NTPUD) hopes to transform the park into a source of pride for the community and a special destination for Lake Tahoe tourism. Prior to these efforts, the park has not undergone a comprehensive design process. This process comes at a critical time in order to meet the challenges of updating the aging facilities, addressing access and traffic issues and providing recreational facilities for the current and future programs.

The conditions of the synthetic playing field, tennis courts, and the overall appearance of the park are key elements that shape the park and community brand. Building brand loyalty with high quality fields and courts should not be undervalued as new competing facilities enter the market each year. Additionally, user expectations of recreation facilities are ever increasing while social media provides endless reviews of the user experience. Providing the highest quality sports venues that are easily maintained will result in a better brand for NTPUD and promote a more active community.

The following report reviews and analyzes several key metrics and decisions that are necessary for NTPUD to successfully design, develop and maintain NTRP. The District's dedicated staff have many resources in place and have been operating efficiently to achieve the current park successes. However, improvements and investment in targeted areas will enhance operations, yield higher quality recreation experiences, and extend the life of the investments.

The park's mix of sporting venues includes: a synthetic turf soccer/multi-use field, tennis, pickleball, bocce ball, baseball, and softball fields spread across the forested landscape. The synthetic turf multi-use field, tennis/pickleball courts, bocce ball and associated upgrades are the focus of this evaluation, along with Lloyd Consulting Group's (Lloyd) recommendations for development and improvement. Lloyd has prepared this planning report with careful consideration of District and community feedback, site observations, engineering studies, research of District records, comparisons to other parks and prior experiences.

The synthetic turf soccer field was completed in 2007 and is now 12 years old. The existing synthetic turf surfacing is at the end of its competitive life, as is common for fields over 10 years old. On-site investigations have also identified drainage and field planarity issues that are detailed in the report.

District and community feedback provided valuable information on the tennis/pickleball asphaltic concrete courts. Further on-site observation with a photometric study, and geotechnical investigations, show the courts and substrate are also reaching the end of their usable life. Significant cracking and damage to the court surfaces have been identified. The fencing and netting are well past their design life and the lighting does not meet sport court requirements. Additionally, District and community feedback indicates significant interest in converting some of the tennis courts to pickleball courts.

Accessibility and way finding improvements are also critical elements to the future success of the park. This report provides analysis of the pathways and general connectivity to park elements with recommendations for possible improvements and ADA compliance.

Lloyd is pleased to present this report and provide the evaluations and recommendations here in.



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NORTH TAHOE REGIONAL PARK



FIELD #4

FIELD #5

FIELD #3

FIELD #2

FIELD #1

NTPUD FACILITIES

SECTION

1

EXISTING CONDITIONS ASSESSMENT

FACILITY BASELINES

PHOTOMETRIC STUDY

GEOTECHNICAL INVESTIGATION

ACCESSIBILITY

OPERATIONS AND MAINTENANCE

DISTRICT COMMENTS AND FEEDBACK

INTRODUCTION



North Tahoe Regional Park is located in northeastern Placer County, California on the northern shore of Lake Tahoe. It is the primary recreational park for North Lake Tahoe attracting both members of the community and tourists for year-round recreation. NTRP is the flagship park of the North Tahoe Region with its' five athletic fields, five tennis courts, ropes park, disc golf, and community garden. NTPUD owns and operates the park including one synthetic turf field, four natural grass fields and the five asphaltic concrete tennis courts.

The safety, performance and aesthetic requirements of publicly used athletic fields are significant and so are the cost to build, operate and maintain these assets. While hosting competitions, practices, and training, these fields experience high intensity use for long durations. The oversight and management of these facilities are critical to the long-term performance and safety of these assets.

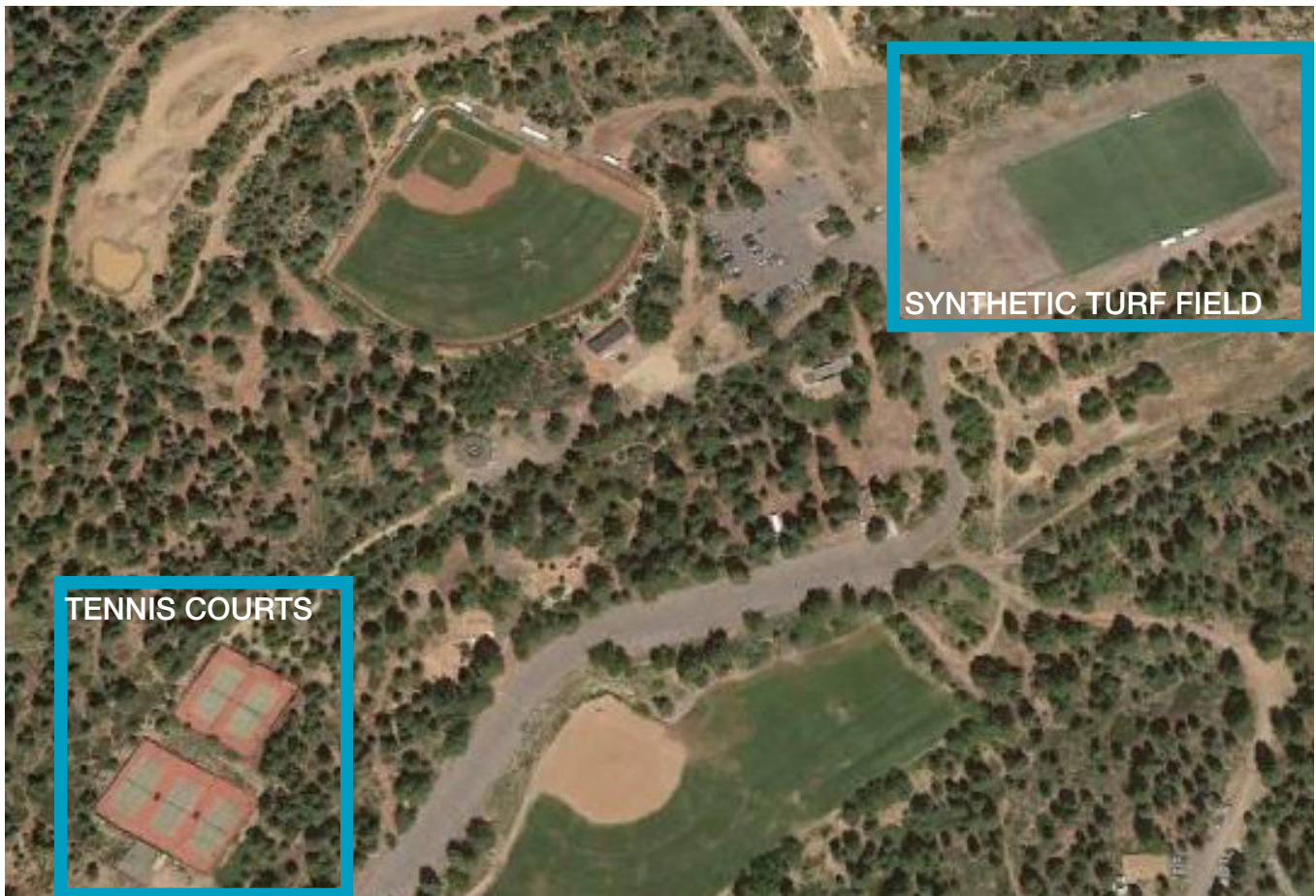
This planning study documents the condition of the existing athletic facilities and provides a capital forecast for the maintenance and renovation of these assets. It will set forth a flexible road map to maximize the value the community can yield from past and future investments in the park.

NTRP has one synthetic turf soccer field which typically lasts between 8 and 12 years depending upon use, maintenance, safety, environmental factors, and community expectations for sport performance.

The Existing Conditions Assessment will provide insight into the current conditions of the synthetic turf field and tennis courts through facility baselines, accessibility studies, a photometric study, and geotechnical investigation. Facility baselines will provide a qualitative analysis of the sports surfaces with knowledge gained from an extensive engineer site walk. The photometric study and geotechnical investigation will provide quantitative data on information unable to obtain through visual means. Including a study on the accessibility of the park in relation to improvements to the tennis courts, this section of the Existing Conditions Report will provide a solid background for the planning study moving forward.

FACILITY BASELINES

The goal of this section is to establish facility baselines for the synthetic turf field and existing tennis courts through onsite observation and understanding of surface characteristics



FACILITY BASELINES: FIELD #4 SYNTHETIC TURF

The synthetic turf field at NTRP was designed and completed in 2007. The 75,000 sq. ft. surface is striped primarily for soccer with one full size field, 110 yards x 60 yards and two fields that run perpendicular. NCAA soccer field dimensions range from a width of 70-75 yards and a length of 115-120 yards. As it's currently striped, the field is approximately 10 yards short in both directions. In addition to soccer, the field is striped for a full size lacrosse field. Pedestrian access is from the southwest corner of the field. A backflow device and drinking fountain are located at the pedestrian access connection to the parking lot west of the field. Spectator seating exists on the south end of the field along with another drinking fountain. Team benches are located on the north side of the field. Lloyd performed a site walk on August 27th to establish facility baselines, outlined below:

OBSERVATIONS

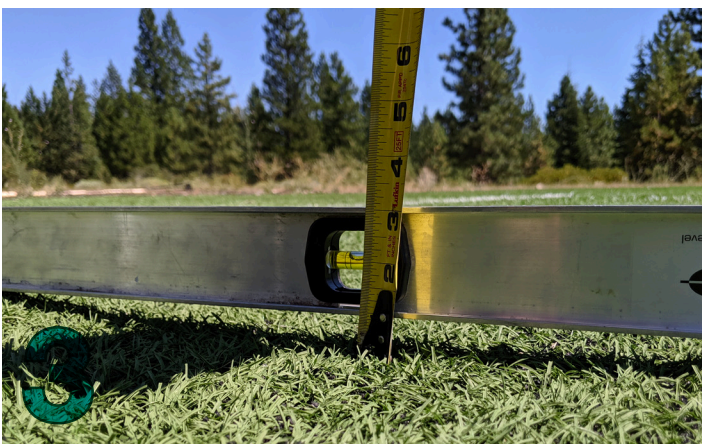
1. SIGNIFICANT PONDING IN THE DECOMPOSED GRANITE AREA WEST OF THE FIELD LIMITS
2. HIGH WEAR ON THE TURF THROUGHOUT THE ENTIRE FIELD
3. APPARENT PLANARITY ISSUES
4. FIELD EXPANSION WAS CONSIDERED AND DEEMED FEASIBLE



Decomposed Granite Low-Lying Area



Turf Degradation



Field Planarity Measurement



Field Expansion Area

1. SIGNIFICANT PONDING IN THE DECOMPOSED GRANITE AREA WEST OF THE FIELD LIMITS.

The west end, off the limits of the field, is a low-lying decomposed granite area. Runoff contributing to this area comes from the northwest via a drainage channel. Because of the drainage channel and existing surrounding slopes, significant ponding occurs with snow melt or after heavy rainfall. Ponding is mostly evident in the spring, per discussions with NTPUD staff.

2. HIGH WEAR ON THE TURF THROUGHOUT THE ENTIRE FIELD

Lloyd observed high-wear areas on the turf throughout the entire field. The white and yellow field lines were in poor and very poor condition, respectively. The turf fibers were matted down and easily tore when pulled on. The west end of the field had numerous patches due to excessive wear on the turf. Walking around the perimeter of the field, there was noticeable decomposed granite intrusion around the limits of the turf. It appeared that cleaning efforts are made to clear off the contaminants, but it is inevitable with that sort of landscaping around the perimeter. No obvious separation or gaps were observed along the turf edge.

3. APPARENT PLANARITY ISSUES

The east end of the field had significant planarity issues around the penalty area upwards of 1"-2". All observed planarity issues were indicated as dips in the surface. Minor movement of the base was evident across the entire playing surface. The planarity issues appear to be localized within the field of play. Parks staff has not observed new or increasing planarity issues. We anticipate there is not wide spread settlement, only localized which will need to be addressed during the field renovation.

4. FIELD EXPANSION WAS CONSIDERED AND DEEMED FEASIBLE

NTPUD has acknowledged interest in expanding the field from its current size to accommodate the requests from NTPUD's recreational partners, Sierra Nevada College and North Tahoe High School. Both requested the soccer field be expanded to 120 yards x 75 yards, to accommodate teams and spectators on the sidelines, and provide additional room for increased use by student-athletes. The expansion will be discussed in the later sections. Initial observations indicate that expansion is feasible, but designs will need to consider potential runoff issues that may be encountered from the slope to the north of the field limits. Currently, there is a decomposed granite buffer of approximately 65' from toe of slope to turf edge.

IMPACT ON DESIGNATED USE

All of the following were noted visual clues on the synthetic turf field that indicates the field is beyond its useful life:

- Loose Inlays
- Splitting and Shedding Turf Fibers
- Turf Degradation
- Loss/Movement of Infill
- Significantly Worn Lines and Inlays

The performance and safety of the field degrades exponentially as the field reaches the end of its' life. Turf degradation and loss of infill affects the overall safety of the playing surface, which is crucial with public users. G-Max testing indicates the firmness of a synthetic turf playing surface. Over time, infill will migrate and/or compact and turf will degrade resulting in less cushion between the athlete and the stone base that lies underneath the turf. This can be dangerous for users and athletes through collisions with the turf as well as impact and stress on joints. The G-Max test is explained in more depth in the Operations and Maintenance section of the report.

A player's footing is negatively affected with worn fibers, loose inlays and inconsistent infill. These impact the interaction between a player's cleat and the turf surface which will cause performance and safety issues during competition. Another concern with an aging field, which we see at NTRP, is the grade differences due to movement of the base. That can influence the way the ball rolls and interacts with the turf and in turn, alter game play.

FACILITY BASELINES: TWO-COURT TENNIS SURFACE

The two court surface was built in 1976 following an informal design process. The courts are striped side-by-side on an approximately 14,500 square-foot asphalt surface. The tennis courts experience no formal programs, tournaments or leagues, but are solely used for pick-up use. NTPUD has expressed interest in converting the two existing tennis courts into pickleball courts, which will be discussed in the recommendations section of the report. Quickly summarized, pickleball courts are designed to be smaller. A pickleball court is approximately half the size of a regulation tennis court.

Lloyd performed a site walk on August 27th to establish facility baselines, which is outlined below and summarized in the following paragraphs:

OBSERVATIONS

1. ADA ACCESS TO THE TENNIS COURTS IS CURRENTLY NON-COMPLIANT
2. SIGNIFICANT CRACKING AND BULGING ACROSS COURTS
3. AREAS OF PONDING ACROSS COURT SURFACE
4. PERIMETER FENCING AND COURT FURNISHINGS IN DISREPAIR



Court Access



Surface Cracking Along Net



Evidence of Ponding on Surface



Court Furnishings in Disrepair

1. ADA ACCESS TO THE TENNIS COURTS IS CURRENTLY NON-COMPLIANT

While the pathway is relatively level, it is comprised entirely of native soils that weave through the indigenous trees of the Tahoe National Forest. The courts are elevated a few inches above the native soil most likely due to the asphalt base and surfacing installed directly on top of the existing grade. An ADA pathway to the courts is feasible but may require the removal of a few trees and possible removal of court lights as well as some minor re-grading.

2. SIGNIFICANT CRACKING AND BULGING ACROSS COURTS

There is significant cracking and bulging visible around the edge of the courts. This damage is likely due to the roots of nearby trees, as well as weather and temperature changes of the North Tahoe region. The entire surface is affected by significant cracking and planarity issues. Some of the existing cracks across the surface have been resealed and/or patched, but they do remain visible. Noticeable cracks exist along the net of both courts from pole to pole. That is rather common among asphalt tennis courts due to the interaction between the asphalt surface and the concrete footings for the net posts. With the net cable constantly under 400-500 lbs of tensile force, it pulls the concrete footings inward if not installed correctly, causing the asphalt between the posts to crack.

3. AREAS OF PONDING ACROSS COURT SURFACE

At the time of the site observation, the courts were dry, but areas of ponding were evident due to sediment build-up on the court. To minimize the effect on play, tennis courts should be built on a single plane with a maximum of 1% slope. A slope from side-to-side is often preferred but can go end-to-end or corner-to-corner, if necessary.

4. PERIMETER FENCING AND COURT FURNISHINGS IN DISREPAIR

The chain link mesh is pushed outward in several locations, most likely due to user interaction and natural forces. While attempting to play the ball, oftentimes users will collide with the fence or lean on the fence causing the mesh to settle outward over time. The individual fence poles are bent and beginning to rust. Hardware is missing in various locations and inconsistencies between the fence mesh and the court can sometimes trap the tennis balls during play.

FACILITY BASELINES: THREE-COURT TENNIS SURFACE

The three court surface was built along with the north courts in 1976 following an informal design process. The courts are striped side-by-side, three across, on an approximately 21,000 square-foot asphalt surface. The tennis courts experience no formal programs, tournaments or leagues, but are solely used for pick-up use. The existing court striping does meet International Tennis Federation rules and regulations with a 78' x 27' singles court inside a 78' x 36' doubles court. Lloyd performed a site walk on August 27th to establish facility baselines, which is outlined below and summarized in the following paragraphs:

OBSERVATIONS

1. NO ADA COURT ACCESS TO TENNIS COURTS
2. ENTIRE TENNIS COURT SURFACE IS IN POOR CONDITION
3. PERIMETER FENCING AND COURT FURNISHINGS IN DISREPAIR
4. BALL WALL AREA IS IN VERY POOR CONDITION



Court Access



Court Surface Cracking



Perimeter Fence and Edge Conditions



Ball Wall Area

1. NO ADA COURT ACCESS TO TENNIS COURTS

The pedestrian access is from the west via a paved path that navigates through the forest down to the existing road and lower restroom, approximately 35 feet below. The existing path is currently ADA compliant, but court entry is not. The lack of ADA access is largely due to an asphalt curb that lines the perimeter of the court. Per discussion with NTPUD, it is assumed that the asphalt curbs were placed to provide an area to intentionally flood in the winter creating an ice skating rink. This type of situation is not advisable on tennis courts.

2. ENTIRE TENNIS COURT SURFACE IS IN POOR CONDITION

On the court itself, there is substantial cracking down the center and noticeable cracks across the entire surface, but a majority of it appeared to be outside the court limits. The out of bounds area is frequently utilized in tennis, thus still causing a serious safety hazard to players. Any cracking along the net line was not prevalent as with the north courts. Differential settling was noticed across the court surface, particularly in the southeast corner. There exists numerous small patches inside the limits of play.

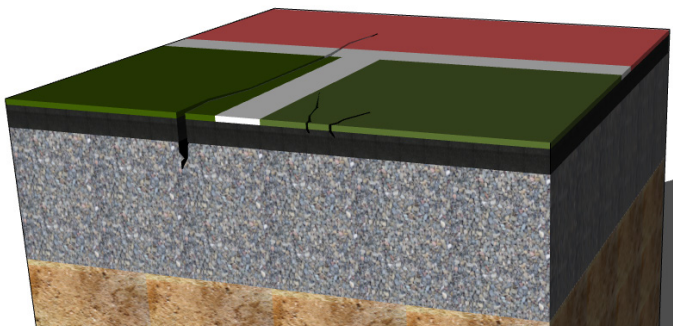
3. PERIMETER FENCING AND COURT FURNISHINGS IN DISREPAIR

At the net posts, concrete foundations are protruding from the surface. The posts, themselves, are rusted and bent. Along the perimeter of the court, fences are noticeably in disrepair, similar to the condition on the north courts. The fence mesh is pushed outward and the fence posts are bent.

4. BALL WALL AREA IS IN VERY POOR CONDITION

The asphaltic concrete is past its useful life and in need of a total resurfacing due to various areas of raveling and peeling. The wood used for the wall is experiencing significant warping and degradation, past the point of repair. Whether to remove or replace will be determined through interview with staff and community user groups.

IMPACT ON DESIGNATED USE



Tennis Court Cross Section

Asphalt is the most common material used in building a hard-type tennis court surface. An asphalt base is topped with an acrylic playing surface. Age is the most common reason asphalt tennis courts crack, largely in fact to the slow curing properties of asphalt. When new, asphalt will stay pliable and soft compared to poured concrete allowing it to withstand the severe winter cold because it can flex with the heave of a frost. As time passes, asphalt becomes harder as it cures thus making it more and more brittle. The oils that give the asphalt its pliability begin to dry out, subsequently shrinking the area. Once it reaches that age, change

in temperature stresses the asphalt and cracks form, growing wider and longer as time goes on. Regions experiencing heavy snowfall such as North Tahoe will experience even more dramatic cracking as moisture inside the crack freezes and expands.

Repairing a crack is oftentimes a perpetual maintenance issue. While it is the most inexpensive method, it is very difficult to permanently repair a crack once it has developed. It is, however, important to maintain these repairs in order to slow the deterioration of the court surface.

Any amount of cracking on the courts can be very dangerous to the users. Tripping on the cracks is the most common result. Tennis is a sport that requires steady footing, whether it be a match, practice, or just recreational use. Strong planting and sharp cuts are a very common occurrence in the fast-moving sport and any imperfections on the court surface amplify with everyday use.

FACILITY BASELINES SUMMARY

FINDINGS OF THE ENGINEER SITE WALK AT NTRP



SYNTHETIC TURF FIELD

1. Significant ponding in the decomposed granite area west of the field limits
2. High wear on the turf throughout the entire field
3. Apparent planarity issues
4. Field expansion was considered and deemed feasible



TWO-COURT TENNIS SURFACE

1. ADA access to the tennis courts is currently non-compliant
2. Significant crack and bulging across courts
3. Areas of ponding across court surface
4. Perimeter fencing and court furnishings in disrepair



THREE-COURT TENNIS SURFACE

1. No ADA court access to tennis courts
2. Entire tennis court surface is in poor condition
3. Perimeter fencing and court furnishings in disrepair
4. Ball Wall area is in very poor condition

PHOTOMETRIC STUDY

A photometric study was performed on September 5, 2019 to study the existing tennis court light fixtures at NTRP. The study focuses on how light leaves the existing fixtures and measures brightness, intensity, and evenness through computer simulation. The results of the site walk are summarized on the following pages.



North Court Lighting



South Court Lighting

RESULTS OF THE SITE WALK

1. The lighting for both court areas is four (4) 40' poles each with three (3) High Intensity Discharge (HID) pole top luminaires. There is a total of eight (8) poles and twenty-four (24) luminaires. Lamp wattage is unknown. (Assumed lamp wattage is 1000-watts).
2. The three-court surface is illuminated by four (4) poles of three (3) luminaires mounted to each pole and appears to be an older installation than the two-court surface also illuminated by four (4) poles of three (3) luminaires mounted to each pole.
3. Each pole mounted luminaire has been aimed to a specific area/region on the courts. This is typical sports lighting design.
4. There is no installed means of lowering the poles or of lowering the luminaires on the poles, for luminaire maintenance. Luminaire maintenance must be provided by lifting personnel to the luminaires themselves on top of the 40' poles.
5. The luminaires appear to be in serviceable condition although they're not up to date on current lamping (HID rather than LED) or fixture (housing, glare control, shields etc.) or control technologies.
6. There are no glare control baffles or shields installed.
7. The luminaries have no obvious method of controlling them on or off nor of dimming.
8. The lighting was not observed while it was in operation nor where light meter readings taken.
9. The lighting calculations showing presumed performance, shows that all courts do not meet the horizontal and vertical recommendations included in the IESNA 10th Edition Table 35.3 | Sports and Recreation Recommendations for tennis. The lowest level of recommendations, for the lowest level of play, is level IV shown here:

IV	
Horizontal - 3' above competition surface	
Avg	Max / Min
50 fc	2
Vertical	
Avg	Max / Min
150	2
Footcandles	
25 < Age < 65	

RECOMMENDATIONS

1. Replace existing luminaires on the existing poles with new LED luminaires to achieve performance and energy efficiencies and control. There are also maintenance benefits of long-life LED that decrease, but not eliminate maintenance. Note: Maintenance of LED luminaires includes cleaning, as there is expected to be significant depreciation on exterior luminaires due to buildup of environmental dirt, insects and birds.
2. New luminaire suggestions would include those designed to limit back-light, up-light and glare.
3. Upgrade lighting controls and possibly dimming of courts separately from each other to allow lower levels of lighting for court surface maintenance and higher light levels during play.
4. Update to current recommendations for lighting levels. Note: The 1976 plans indicate that 20 horizontal foot-candles were the target minimum. Today's minimum target for basic play is 50 horizontal foot candles average and 150 vertical average.

NTPUD TENNIS COURTS LIGHTING LTG-1

The diagram below is a plan view of both courts displaying the measured light intensity in foot-candles (fc). A foot-candle is defined as the amount of illumination the inside surface of a one-foot-radius sphere would be receiving if there were a uniform point source of one candela in the exact center of the sphere.

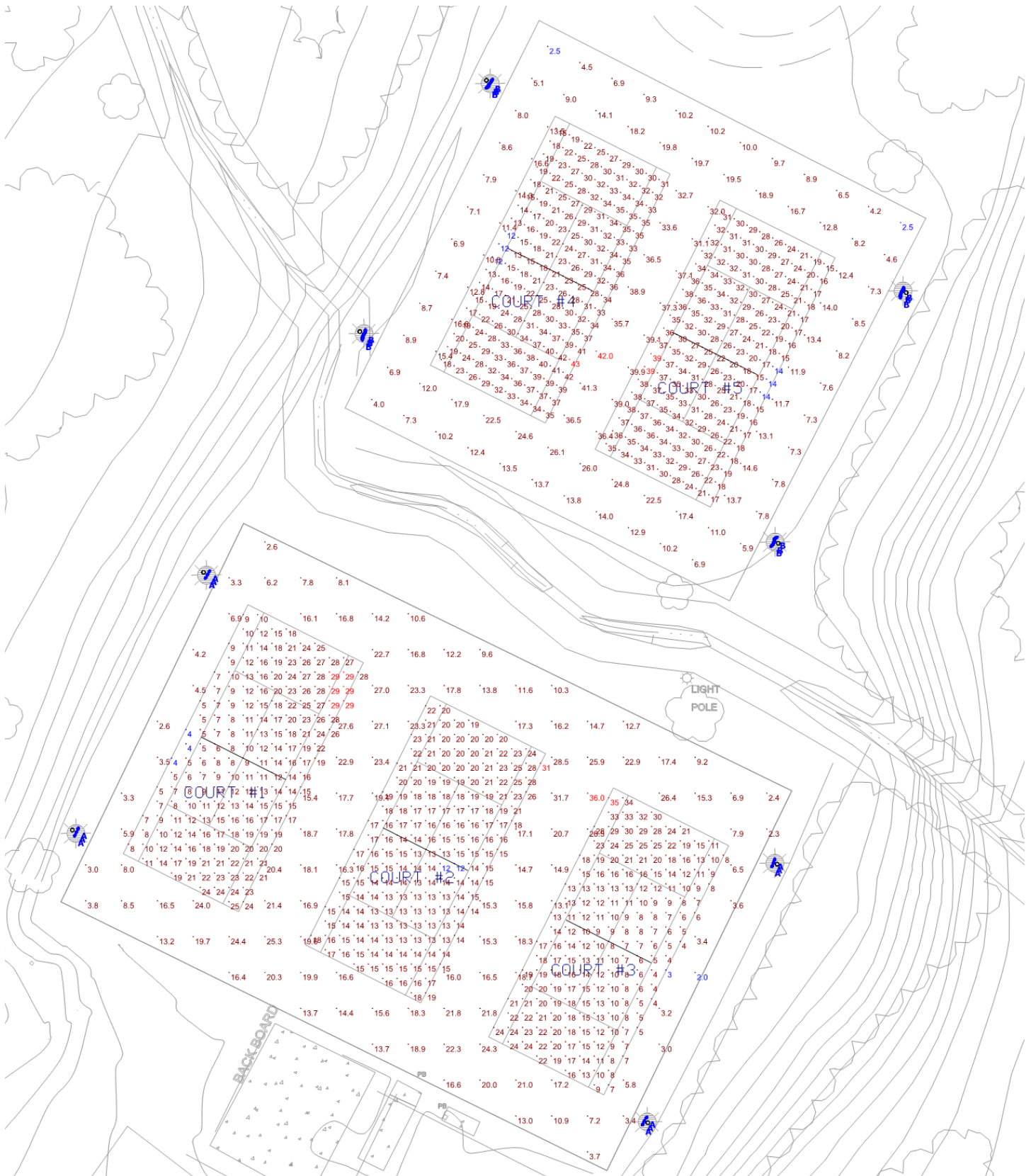


Image 14: Photometric Study Results

PHOTOMETRIC STUDY RECOMMENDATIONS

ASSUMING CURRENT INSTALLATION USES 1000-WATT METAL HALIDE LAMPS



UPGRADE LIGHTING CONTROLS

Upgraded lighting controls and possibly dimming of courts separately from each other to allow lower levels of lighting for court surface maintenance and higher light levels during play.



UPDATE TO CURRENT BEST PRACTICES FOR LIGHTING LEVELS

The 1976 plans indicate that 20 horizontal foot-candles were the target minimum. Today's minimum target for basic play is 50 horizontal foot candles average and 150 vertical average.



REPLACE EXISTING LUMINAIRES ON THE EXISTING POLES WITH NEW LED LUMINAIRE

To achieve performance and energy efficiencies and control, it's recommended to replace the existing lumaires. There are also maintenance benefits of long-life LED that decrease, but not eliminate maintenance.

GEOTECHNICAL INVESTIGATION

Existing conditions are suitable for tennis court renovations. The asphaltic concrete is at end of life. Surface cracking is due to thermal fluctuations, not degradation of the base or subgrade.

SUMMARY OF STRUCTURAL SECTION THICKNESS					
	CORE 1	CORE 2	CORE 3	CORE 4	CORE 5
ASPHALTIC CONCRETE THICKNESS	4.5	4.3	4.5	4.8	5.5
AGGREGATE BASE THICKNESS	8.0	8.0	8.0	6.8	7.0
ESTIMATED DURABILITY OF AGGREGATE BASE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE

A geotechnical investigation was performed by CME, Inc. on the existing tennis courts at NTRP. The results of the investigation are discussed and summarized in this section. The full report prepared by CME, Inc. can be found in the appendix.

The primary objectives of the investigation were to:

1. Determine the approximate thickness of the existing structural section at pavement core locations
2. Determine the index properties of the base and subgrade materials encountered
3. Provide general geotechnical recommendations for design and construction of the new courts.



SITE WALK

A site walk was performed to visually inspect and investigate the existing conditions of the tennis courts. The courts consist of an asphaltic concrete pavement structural section with a colored surface polymer treatment. Due to the age of the existing tennis courts, degradation of the asphaltic concrete pavement has developed/manifested including:

- Shrinkage/thermal cracking present at both tennis court recreation area pads. The crack observed exhibited horizontal separations on the order of 1 to 3 inches. Due to the existing polymer/fabric surface treatment atop the structural section, CME was unable to observe cracking which may be present below the surface treatments. Thermal cracking is common for asphaltic concrete pavement especially where located within freeze/thaw climates.
- Undulations within the pavement surface were observed at various locations across the slab. These undulations are anticipated to be a surface manifestation of underlying subgrade instabilities likely developed due to water intrusion into the underlying subgrade through crack within the pavement section.
- Raveling of the pavement along the exterior edges of the courts was also observed.

SUBSURFACE EXPLORATION

The subsurface exploration was performed on October 2nd, 2019 and included asphalt coring with hand auger excavation at five (5) locations, shown in image on following page. CME's field engineers measured the existing structural section thickness (asphaltic concrete and aggregate base) and collected bulk samples of the underlying base and subgrade material.

Soil testing performed in CME's laboratory was conducted in general accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards. Significant soil types were selected and analyzed to determine index properties. The following laboratory tests were completed as part of this investigation:

- In situ moisture content (ASTM D2216)
- Grain size distribution (ASTM D6913)
- Plasticity index (ASTM D4318)

Geotechnical Testing Locations

The image on the right shows CME's selected auger excavation and testing locations on the north and south tennis courts, as well as the approximate location of significant cracking on both courts.



The total thicknesses of the existing tennis court section varied with asphalt thicknesses ranging from 4 to 5½ inches with base thicknesses on the order of 6½ to 8 inches. It is clear that the asphalt courts have been overlaid as the original tennis court surface treatment remained in place and was visible in some of the cores collected during this investigation. The asphalt aggregate appears to be a finer graded aggregate mix. This type of mix is generally used to produce lower void ratio with a smoother surface. However, the apparent voids visible within the overlay indicate a low level of quality control during placement as compared to the original pavement section.

It appears that the northwestern portion of the court pads are bottomed in cut and the southeastern portion of the court pads are bottomed on fill. Subgrade soils located within the cut side of the court were extremely difficult to excavate due to the abundance of cobble and boulder sized material, which appear to be consistent with the surface geology exposed along the northeastern hillside adjacent to the court pads. Based on the index test results and moisture content of the soil, the subgrade soil should be stable from a construction standpoint provided they are protected from over-saturation.

CORE #1



CORE #2



CORE #3



CORE #4



CORE #5



GEOTECHNICAL RECOMMENDATIONS

DESIGN AND CONSTRUCTION CONSIDERATIONS AND
RECOMMENDATIONS



REMOVE EXISTING ASPHALT

The existing asphaltic concrete pavement should be demolished and removed from the site and disposed of in an approved location.



STOCKPILE AND REUSE EXISTING AGGREGATE BASE

The existing aggregate base should be carefully removed and stockpiled onsite for reuse as subbase where site grading modifications are proposed or for site stabilization where removal and replacement with densified soils may be effectively utilized.



SCARIFY EXPOSED SUBGRADE SOIL

The exposed subgrade soils should be scarified to a depth of at least 12-inches, moisture conditioned to within 2 percent optimum moisture content and densified to at least 90 percent relative compaction with a resulting smooth unyielding surface. Large diameter boulders and cobbles protruding into the prepared subgrade elevation shall be removed prior to densification.



REMOVE AND REPLACE UNSTABLE SOILS

After the densification process, a firm, stable surface should be produced. Unstable soils, where encountered, should be removed and replaced with stabilizing fill. Subgrade preparation shall not be performed on or using frozen materials.

ACCESSIBILITY

Accessibility improvements are a crucial facet of bettering NTRP. It is important for all communities to be accessible to the public – North Tahoe especially. For people with disabilities to be active participants, it is essential for NTRP to accommodate those with disabilities by embracing an accessible park. Having access to parks is essential for health, and that access should not be limited for people with disabilities.

NTPUD aligns with these values and strategies and took the first step to making the park more accessible and inclusive by constructing the paved pathway from the lower parking lot to the three court surface. Now with the planned improvements to the park, there is an opportunity to expand on the park's accessibility and inclusivity, promoting a healthier lifestyle for all.



Existing DG Pathway to Upper Parking



Existing Accessible Pathway to Lower Parking

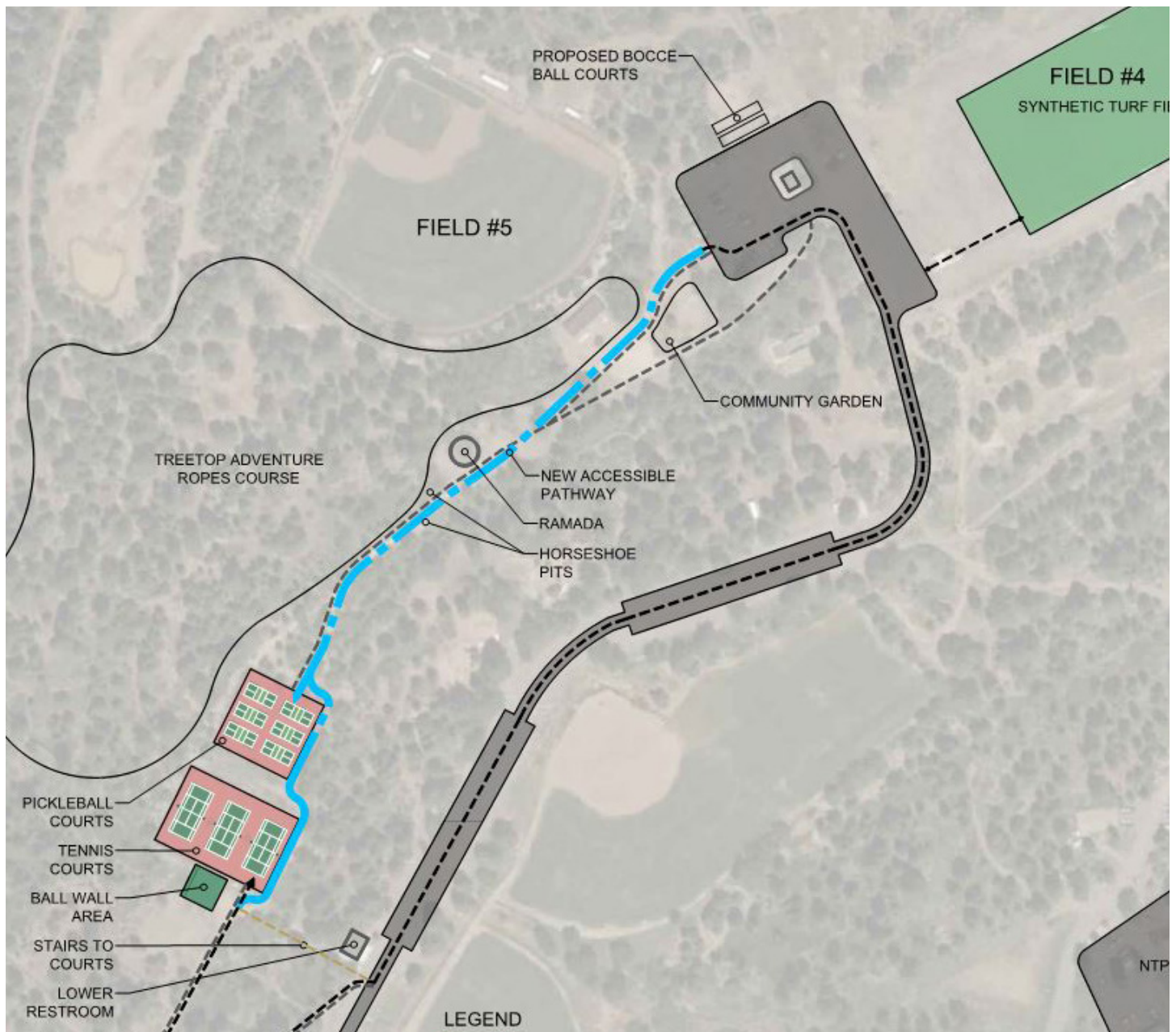
There is an existing paved pathway from the south courts to the lower parking area, but no access from the upper parking lot to the tennis courts other than the dirt trail. Constructing an accessible path along the route of the dirt trail would create an accessible loop connecting all of the amenities NTRP has to offer.

The proposed pathway is shown on the figure below. The existing accessible and inaccessible route is shown in comparison to the proposed accessible loop. The entire pathway does not need to be replaced - work should be limited to the proposed path shown in blue.

The pathway contained a few memorable areas that will be protected, including:

- Betty & Stanley Pretzer plaque (horseshoe pits)
- Stephen Boland Grove
- Knight Grove

ACCESSIBILITY ROUTING



Existing vs. Proposed Accessible Pathway at NTRP

OPERATIONS AND MAINTENANCE

- ROUTINE INSPECTION
- DEBRIS REMOVAL
- ACCESS CONTROLS AND SIGNAGE
- GROOMING AND SWEEPING
- WEAR AREA CARE AND DRESSING
- DECOMPACTION/DEEP CLEANING

While the newer generations of synthetic turf do require a lower level of maintenance and care, as contrasted to a natural grass sports field, they are NOT maintenance free. A few of the turf manufacturers and suppliers would like owners to believe these facilities will be zero maintenance, and with the large capital expenditures necessary to construct these fields, owners are inclined to hope for no maintenance. The reality is that all physical assets require care and monitoring.



Over the past several months, we have compiled an extensive collection of data that has helped us understand the current operations, performance outcomes, and staff activities on the playing surfaces at North Tahoe Regional Park. This has included:

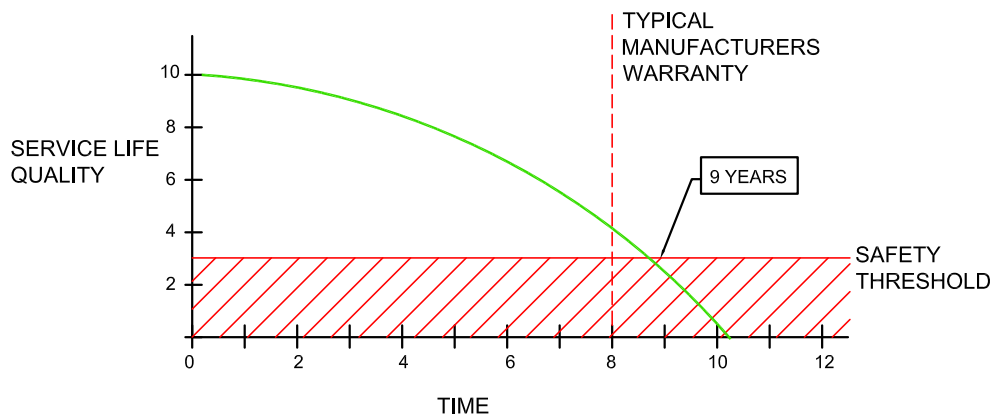
- Staff Interviews and Surveys
- Community Workshops
- Park Data

The current staffing at NTPUD is challenged to keep up with the operational and maintenance requirements of NTRP and the North Tahoe region. While the on-site team demonstrates care and attention to detail as proven by the overall condition of the park and genuine enthusiasm of the individuals, the number of facilities managed by NTPUD is too great for a deeply detailed regime, thus fueling the request for low maintenance facilities.

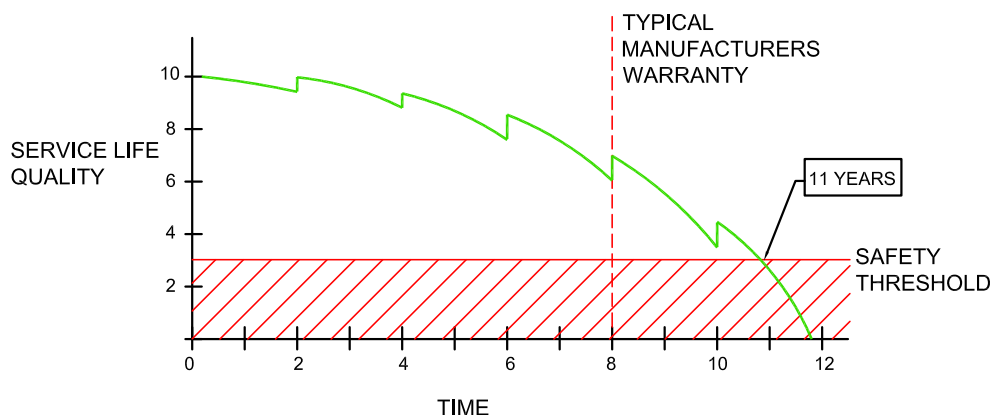
Our data collection yields a consistent and reinforced trend that limited preventative care was completed on the sports surfaces. The primary work was cleaning and grooming of the highest wear areas. As evidenced by district and community feedback, the facilities are intensely used by both local residents and tourists, alike for recreational use, but occasionally to host practices and trainings for the regional institutions.

The overall effectiveness and efficiency of the maintenance activities can be implemented to extend the lifespan of the proposed facilities. A specifically tailored approach for these surfaces will increase the enjoyment for the users and extend the service life of the asset, both key metrics for success.

SYNTHETIC TURF WITH MINIMAL MAINTENANCE



SYNTHETIC TURF WITH IDEAL MAINTENANCE/RENEWAL



In most instances, we recommend and find that owners/operators experience widespread success with these sports surfaces when the following general tasks and frequencies are implemented:

DAILY

- Visually inspect each field and associate fixtures for safety; correct any hazards
- Spot groom, level, refill, and incorporate infill into the turf profile of all high wear ball field areas
- Immediately repair any rips, tear, or loose seams

Daily inspections, spot grooming and repairs can greatly improve the day-to-day look and feel of the synthetic turf fields at NTRP. It's an easy way to ensure safe and consistency for users. By simply walking the field, you can often times identify and correct any hazards, including removing any unsafe objects on the field, or repairing rips or tears. By starting with daily maintenance and inspections, you can lessen the cost of the infrequent, more involved maintenance practices.

WEEKLY

- Clean and remove debris from infields and high wear goal areas
- Spot groom, level, refill infill into the turf profile of all high wear areas (soccer goals, lacrosse crease, etc.)

Cleaning and grooming on a weekly basis will generate the best results in long term maintenance and care of the fields. By cleaning and repairing high wear areas as necessary, the owner can battle field degradation. Flattening of the fibers reduces field performance and increases the degradation rate. Grooming is the best way to combat the overall aging of the field and must not be overlooked or ignored. The process helps to maintain uniform infill levels, keep the grass fibers upright, remove debris, while improving the field's appearance.

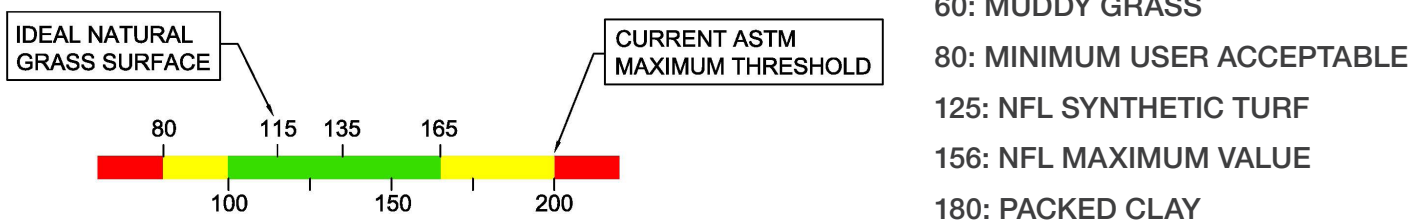
ANNUALLY

- Conduct G-Max and other testing to monitor program performance and identify targets for enhanced maintenance and/or replacement activities.

G-Max value increases are tied to levels of play, environmental conditions, and the frequency and types of maintenance. Among researchers and industry experts, there is a general consensus that an annual test is sufficient to track g-max values for your synthetic turf field. It demonstrates a proactive commitment to safety, but isn't going to bust the annual budget. Fields won't become unsafe overnight, so testing annually provides adequate warning for developing issues.

A typical G-Max scale is shown below. Values in the range of 100-165 are considered safe and acceptable within the turf industry. Between 100-125 is the average G-Max value for NFL playing fields. Higher numbers than that become firm and dangerous to the users, while numbers that fall below that range can be too soft and virtually unplayable.

G-MAX SCALE AND EXAMPLE VALUES





Based upon our data collection efforts and deep engagement with the current staff and operations at NTRP, the following considerations will provide a safe and enjoyable recreation experience for the user and extend the service life of the investment, particularly the synthetic sports surfacing.

- Enhanced maintenance and operations
- Develop, document, and implement a systematic field maintenance plan including activities, frequencies, and sites. This would include daily, weekly, monthly, and annual activities for each facility and anticipated use intensity.

It's crucial that an investment such as what is proposed at NTRP is backed by a maintenance strategy that can support the facilities and provide the best practices to extend the life of the surfaces as long as possible.

KEY OUTCOMES	ADDITIONAL BENEFITS
Maintaining High Quality	<ul style="list-style-type: none"> • Assure a safe playing environment inclusive of synthetic and asphalt surfacing, accessories, sports equipment, and supporting features • Help maintain the sports fields, and in particular the playing surfaces, to provide an enjoyable user experience
Extending Service Life	<ul style="list-style-type: none"> • Preserve the investment in the playing surfaces and extend the life, thus reducing overall cost of ownership • Maintain and enhance the brand of NTRP in the community and the region for community use and as a visitor attraction

DISTRICT COMMENTS AND FEEDBACK



Information provided by the District through staff interviews and meetings stress an informal history of programming and development of the park; specifically with the tennis courts, there was very little formal design and construction. While that approach can be effective for smaller scale parks, one that sees as much traffic and activity as North Tahoe Regional requires more robust and formal design. NTPUD hopes to transition from informal design and construction to professionally engineered facilities.

Through formal and professional design followed by efficient management, NTRP can become the “Tahoe-level destination” that NTPUD strives for. However, it is important to emphasize the additional goal of long wearing, low maintenance facilities. While some of that can be achieved through a well-thought out design, keeping up with the maintenance practices that are required can make it significantly less strenuous on the staff. A potential solution to encourage low maintenance would be to landscape the native area surrounding the synthetic turf. Decomposed granite intrusion was noticeable around the perimeter of the field. To prevent decomposed granite intrusion and keep the synthetic turf clean, it would be wise to landscape the area with native plants and stable landscaping.

With the proposed improvements to the park, NTPUD hopes to start up a formal sports organization program. Currently, the tennis courts are 100% pick-up use while the synthetic turf is used for organized and unorganized practice, training, and pick-up. Through a revamped program, dedicated courts, fields and uses can be established. Organized sports programs are a great solution for not only those trying to become more active, but for drawing people out to the park, as well. It provides regular exercise and the ability to create a community and following with users that share similar interests. Studies have shown that a formal league increases the likelihood of users to get out and participate when compared to pick-up use.

A priority with improvements to any park is the upgrade of accessibility. As the park is currently set up, discussed in the previous sections, there is an accessible pathway from the lower road and parking area up to the existing south courts. However, there is no ADA-compliant access to the north courts or the upper parking lot from the courts. It would be ideal to create a loop that connects the upper parking area with the courts and other attractions that NTRP has to offer. Both tennis courts are inaccessible due to elevation difference from the court surface to the existing grade. A renovated park access pathway would correct those issues.

NTPUD understands the community’s expectations to be a municipal level park with safe, clean playing surfaces. With capital investment, a consistent maintenance plan, and a well-thought out strategy and approach moving forward, NTRP can meet those expectations.

SECTION

2

PROGRAM AND COMMUNITY FEEDBACK

USER GROUP FEEDBACK

WORKSHOP SUMMARY

GOALS, OBJECTIVES AND PARAMETERS

1. UNDERSTAND COMMUNITY INTERESTS
2. ADDRESS COMMUNITY CONCERNS
3. UNDERSTAND PROGRAM DYNAMICS AND INTERACTION

USER GROUP FEEDBACK











VARIOUS STAKEHOLDERS SITE MEETING SEPTEMBER 24, 2019

On site stakeholder meetings were held on September 24, 2019 to discuss the existing conditions and proposed improvements at NTRP.

TENNIS REPRESENTATIVES

A few observations were reported ranging from drainage issues in the northeast corner of the 3 courts to the playability of both surfaces. The community requested that the court lighting be improved and maintained as lighting is occasionally used.

Tennis representatives were open to three tennis courts remaining and the existing two courts to be converted to pickleball. It was requested that tennis courts be improved to include modern fence design and windscreens to reduce wind and increase ball visibility. A popular idea was angled fence corners to aide in ball rebound along with low fence court dividers. A few other ideas discussed among tennis representatives included a structured tennis program with a tennis professional and notifications in the newsletter. Maintenance and cleaning equipment was requested that would be stored in an equipment shed near the courts. A summary of the key points discussed is below:

Wayfinding and Signage			Chamfered Fence Corners
New Ball Wall Area			Staff Person or Tennis Pro
New Courts with Modern Features			Notifications in Newsletter
Improve Court Lighting			Foam Roller/Squeegee
Equipment for User Cleaning			Shed for Equipment

PICKLEBALL REPRESENTATIVES

The public input for pickleball generally echoed the interests of the tennis representatives. Drawing approximately twice as many users as tennis, the proposition for permanent pickleball courts has been well-received by both groups.

Assuming 6 pickleball courts or more would be comfortable in the two-tennis court space, alignment of the courts was not crucial to the users that attended the meeting. There was a general consensus that the more courts, the better. The proposed layout in the recommendation summary shows six pickleball courts side by side with recommended buffers and spacing. A summary of the key points discussed is below:

Dedicated Courts for Pickleball			Low Fence Court Dividers
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NORTH TAHOE HIGH SCHOOL AND SIERRA NEVADA COLLEGE

North Tahoe High School (NTHS) and Sierra Nevada College (SNC) provided input on their respective use of the synthetic turf field including benefits, challenges and preferred upgrades. The possibility of a 400m track was discussed, but the schools do not currently host meets and feel that their facilities support their current track and field program. Therefore, NTHS & SNC expressed little interest in a 400m track. Both would, however, prefer a larger synthetic turf area for drills, multiple team practice, etc. and improved

availability. Ball containment was an issue with ball leaving the field and/or rolling down the hill to the south frequently. A field house at the current site was understood to be a significant investment, but agreed to be of interest to both users. A summary of the key points from the meetings is below:



WORKSHOP SUMMARY

RECREATION AND PARKS COMMISSION MEETING

OCTOBER 24, 2019

The purpose of the workshop was to review the results of the existing condition study and obtain community feedback on the existing improvements. Previous to the workshop, feedback from user groups had already been received. The Placer County Transient Occupancy Tax (TOT) grant was also discussed as the deadline had been revised and was set for this fall. The projects outlined in this report will be presented to the Commission for review and comment. The Commission generally agreed with the projects and also requested a feasibility study for an indoor field house.

The conceptual site plan dated October 22nd, outlines the proposed improvements to the project. Included in the conceptual site plan is renovated tennis and pickleball courts, synthetic turf field, new bocce ball courts and a new accessible path that connects to the existing path and tennis courts. Commissioners and Staff discussed the scope, bid environment, and matching funds. Because the deadline for the grant application was moved to an earlier date, NTPUD views that as an advantage to receive the grant.

In addition to the proposed park improvements, Director Mourelatos spoke about the opportunity of a field house. General Manager Johnson stated a multi-agency partner application would be the best approach and a feasibility study would need to be conducted for the field house.

Ultimately, Staff's recommendation to include the entire project scope when applying to the Placer County Capital Projects Advisory (CAP) Committee was supported. An amended motion was presented to add a feasibility study for a field house to explore the physical requirements.

PROGRAM & COMMUNITY FEEDBACK

PUBLIC INPUT SUMMARY

Before closing the meeting, the community was given the chance to provide input on the improvements at NTRP. Several members of the community expressed interest in Pickleball. With popularity in the sport increasing each year, there is a general sense of excitement and anticipation. Possible grants would accelerate the projects and proposed configurations of pickleball courts. The community members provided a few temporary layout requests until the courts are built and informed the staff about playing times and the general environment of the existing tennis facility. It was noted that the lights are sufficient to some users, but moving forward there is strong interest in improving the lighting and to have the ability to control court lighting individually.

The Commission expressed interest in a concessionaire to rent out equipment for soccer, bocce, tennis, and snacks. The current concessionaire uses the building in the winter and improvements will be considered as recreation and tournaments grow in the park.

The idea of a field house was a strong talking point at the meeting. With belief that between the sports teams and user groups, the money could be raised between public and private entities to construct this field house. Several community members thought the year-round use would allow it to serve as the cornerstone of the community and NTPUD. A field house would extend use of the field, but it was also acknowledged that there would possibly be TRPA limitations and a significant upfront cost to the facility. Finances for a field house need to be explored with private-public partnerships.

Lastly, an all-weather track was identified in the Master Plan; however, North Tahoe High School has provided feedback that additional turf space to allow for more groups and uses would be a higher priority than a formal track.

The results of the user group feedback and community input were presented to the recreation and parks commission December 8, 2019



GOALS, OBJECTIVES AND PARAMETERS

While our experience and technical understanding of the park helps us assemble a plan, it is equally as important to consider program and community feedback when establishing goals, objective and parameters. From the community workshops and public input paired with our expertise, we can create an effective roadmap moving forward that not only addresses the condition of the park, but meets the expectations of the community.



The first step in the process is to gain a full understanding of the existing conditions of the assets. In the earlier section “Existing Conditions Assessment” the park is evaluated from an engineering standpoint with the following conclusions:

1. The synthetic turf is past its’ design life
2. The tennis courts are in disrepair and in need of renovation
3. There is no accessible path to the tennis courts



The geotechnical investigation found the tennis court surface cracking to be primarily due to thermal causes. The subgrade was evaluated and deemed to be in good condition and re-usable for the renovation of the courts. Through onsite observation paired with the soils investigation, this report will provide subgrade options and recommendations for the district and community moving forward. Those findings will be discussed in the “Findings and Recommendations” section.



The third technical goal of this report is to evaluate the surface characteristics and performance of the designated facilities. As stated above, the synthetic turf is past its design life and the tennis courts are in disrepair. This report aims to provide a well-rounded understanding of the expected performance and characteristics of various surfaces and options at each facility. Multiple techniques can be used to resurface a tennis court and will be compared along with the market leaders in the turf industry. The analysis can be found in the “Findings and Recommendations” section.

In addition to the technical goals of the report, community goals and expectations play a role in the District’s strategy and succes moving forward. Ultimately, the action taken, backed by engineered research, is for the users and their enjoyment of NTRP.



SECTION

3

FINDING AND RECOMMENDATIONS

1. TENNIS AND PICKLEBALL
2. BOCCE BALL
3. ACCESSIBILITY
4. SYNTHETIC TURF

TENNIS AND PICKLEBALL

The tennis courts are at the end of their useable life. Minor repairs and renovations would be costly and only a short term solution. A full replacement of the courts re-using the stone base is recommended per the geotechnical data.

	THREE-COURT TENNIS SURFACE	TWO-COURT TENNIS SURFACE	SYNTHETIC TURF FIELD
AREA	21,400	14,600	75,000
ORIENTATION	NE-SW	NE-SW	EAST-WEST
EX. CONDITION	VERY POOR	POOR	POOR
MAJOR DEFICIENCIES	SURFACE CONDITION FENCE CONDITION ASPHALT CURB	SURFACE CONDITION	TURF DEGRADATION FIELD PLANARITY
MINOR DEFICIENCIES	RUSTING/BENT NET POSTS	RUSTING/BENT NET POSTS	DG INTRUSION INCONSISTENT INFILL
TRAIL CONNECTIVITY/ ACCESSIBILITY	NOT ACCESSIBLE	NOT ACCESSIBLE	YES
RECOMMENDATION	FULL RENOVATION REUSING EXISTING STONE BASE	FULL RENOVATION REUSING EXISTING STONE BASE	RESURFACE AND EXPAND EXISTING TURF FIELD

RECOMMENDATION SUMMARY

The recommendations outlined in the matrix above include a full renovation of the three-court tennis court removing, stockpiling, and re-using the existing stone base, as mentioned in the geotechnical results. It is recommended that the area, orientation, and striping of the three-court surface be replaced in-kind to maintain three regulation tennis courts.

Based on the results of the investigation, it is recommended that the two-court tennis courts also undergo a full renovation, removing, stockpiling, and re-using the existing stone base. The surface area should remain unchanged, but orientation and striping be revised to accommodate six new pickleball courts, shown by the layout on the previous page.

As part of the renovation, court lighting should be improved to meet current sport lighting standards. Per the photometric study, it is believed that the poles and foundation can be maintained, but luminaires and controls be upgraded to the newest technology. The ball wall area its dilapidated, as reported in the existing conditions assessment, and should be renovated by replacing the existing surface similar to the courts. The wall itself can be constructed out of wood, concrete or other prefabricated material.

PROBABLE CONSTRUCTION COST

TENNIS AND PICKLEBALL RENOVATION	\$ 941,831
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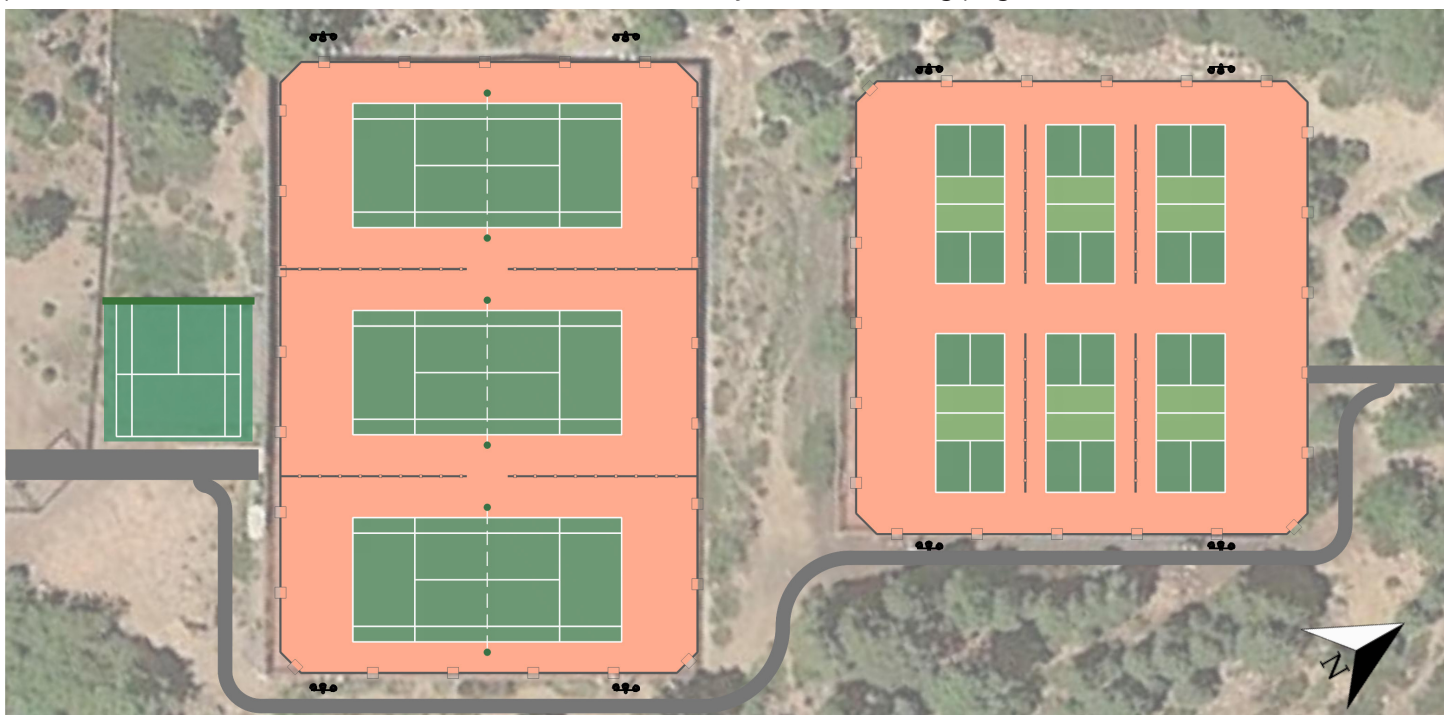
*See appendix for expanded probable construction cost summary

The table below compares the construction of tennis courts, with asphalt courts being the most commonly constructed courts in the industry, today. Post-tensioned concrete courts are often considered because of the service life and lower maintenance costs relative to standard tennis courts, however, NTPUD has a unique opportunity to reuse the existing stone base for the renovation of the asphalt tennis courts.

TENNIS/PICKLEBALL COURT SURFACE		
	POST-TENSIONED CONCRETE	ASPHALT
DESCRIPTION	STRUCTURAL CONCRETE SLAB OVER A PREPARED BASE REINFORCED WITH CABLES TENSIONED AFTER CONCRETE INSTALLATION	TWO-LAYERED ASPHALT OVER A CRUSHED STONE BASE
COST TO INSTALL	✓	✓
CLIMATE RESISTANCE	✓	
MAINTENANCE		✓
SITE REQUIREMENTS		✓
MATERIAL REUSE		

COURT LAYOUT RECOMMENDATION

The following exhibit represents the proposed court layouts and orientation of the tennis and pickleball courts. It is recommended to maintain existing layout of the three courts, but convert the existing two court surface to six pickleball courts as shown. See recommendation summary on the following page for full recommendation.



BOCCE BALL

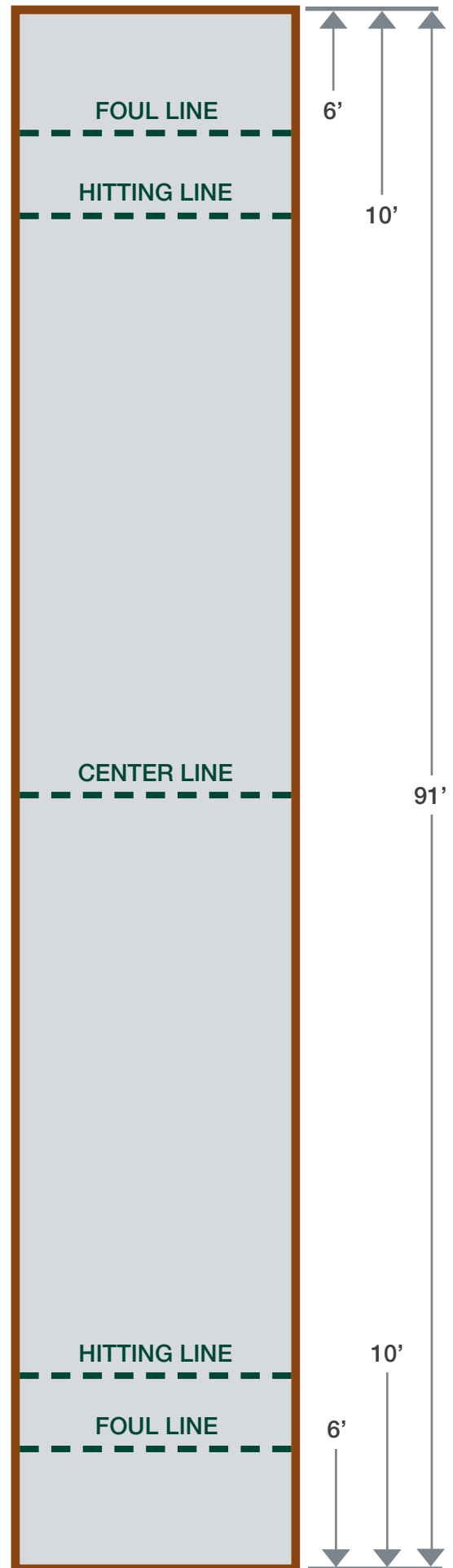
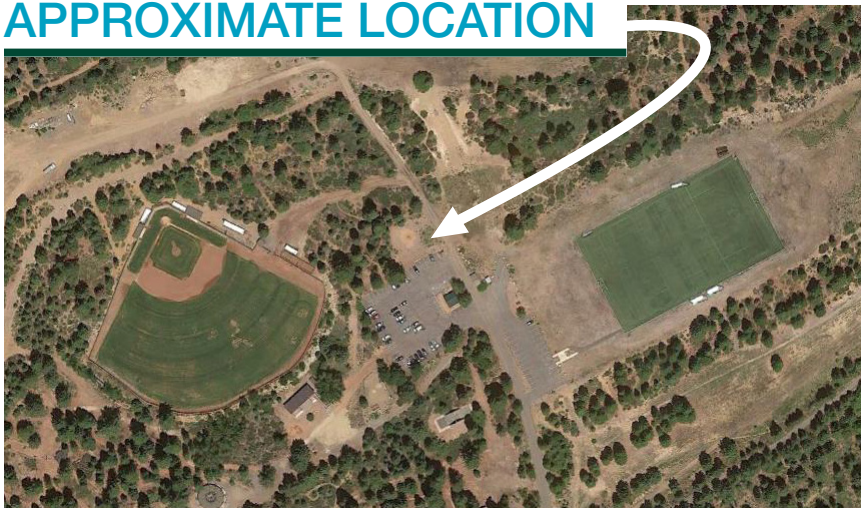
It is recommended that two bocce ball courts be installed at NTRP. Bocce caught on as a popular sport among the Romans and Greeks with players using coconuts, melons, or even bound rags for bocce balls. The game was mostly popular among the social elites, but has stood the test of time and become a popular recreational game today. Bocce court dimensions are standardized and relate to the rules and game play of bocce ball, but exact dimensions of the court varies by region from 60 to 100 feet in length and 10 to 15 feet wide. Official bocce courts measure 91 feet long and 13 feet wide. The playing surface of a bocce ball court is enclosed with sideboards and backboards to contain the balls within play. The boards should rise between 6 and 12 inches above the surface and measure 2 inches or more in thickness. The surface of the sideboards should be covered with hard plastic or rubber so the balls can bank off the boards.

The surface of the court can vary depending on the location of the court and its intended use. Official bocce ball court surfaces are constructed of layers of clay-like material. The Bocce Standards Association recommend layers of the court surface start with a minimum 3 inch concrete base, covered with a minimum of 2 inches of smooth, compacted clay-like materials for a level surface. The top surface is covered with loose materials such as sand, oyster shells, topping clay, or turf depending on the preference of the builder to dictate how easily the balls roll over the surface.

The court is split in half across the width by the center line with each side of the court divided the same way. 6 feet in from either edge of the court is the pointing foul line. Another 8 to 10 feet in from the pointing foul line on both sides is the hitting foul line.

The District along with Lloyd staff has determined the ideal location to be north of the existing parking lot for easy access and to ensure visitors are not carrying the heavy equipment far, however an alternate location may be determined during design.

APPROXIMATE LOCATION



ACCESSIBILITY

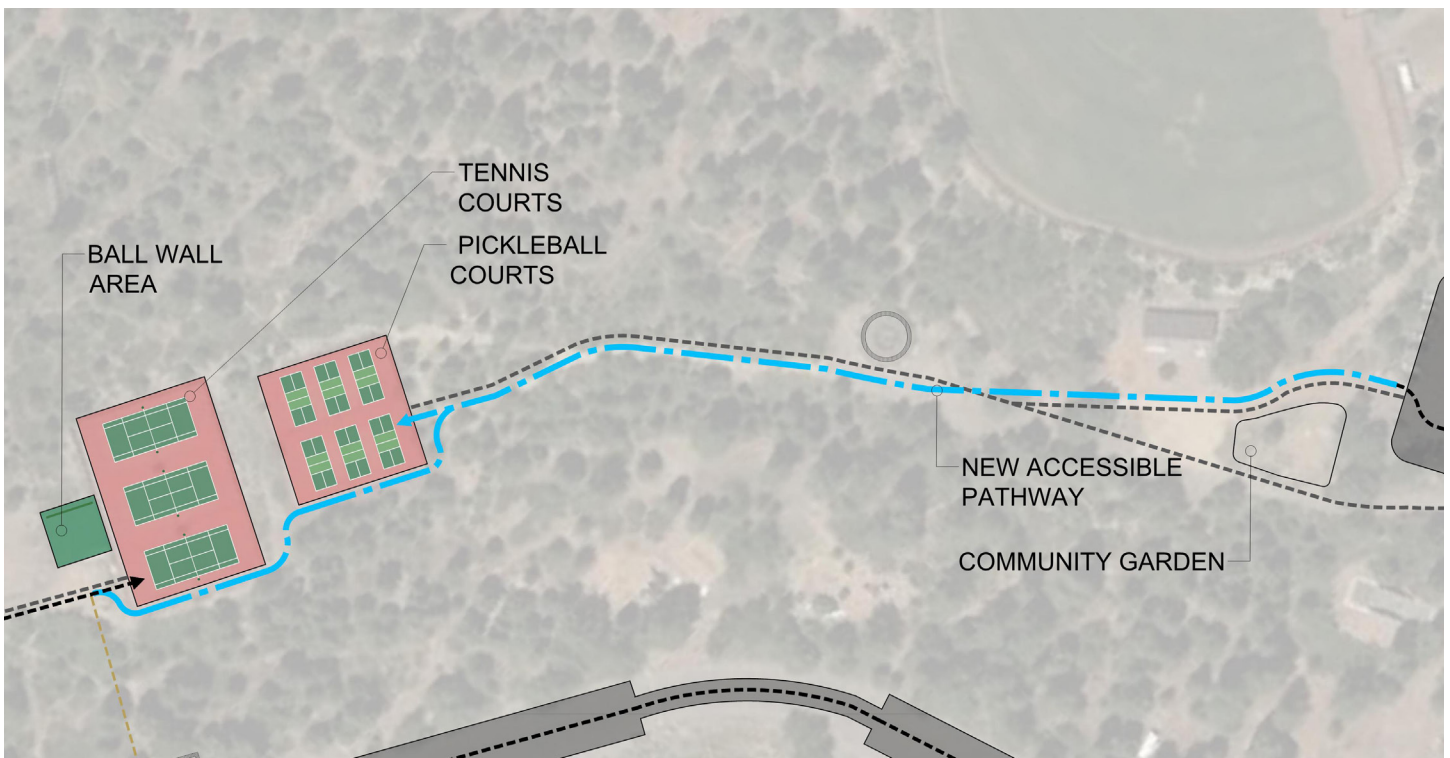
Significant accessibility improvements are recommended at NTRP. As discussed in the existing conditions report, The tennis courts are currently not accessible from the main parking lot, but only through the paved pathway that connects from the lower parking lot. With the planned improvements to the park, there is an opportunity to expand on the park’s accessibility and NTPUD, along with the public, has expressed interest in an accessible loop that connects the main parking lot to the tennis and pickleball courts, then connecting to the existing paved path to the lower parking area.

The proposed pathway is shown on the figure below. The existing accessible and inaccessible routes are shown in comparison to the proposed accessible loop. It is recommended that the work be limited to the proposed path shown in blue.

A few memorable areas along the path that will need to be protected, include:

- Betty & Stanley Pretzer plaque (horseshoe pits)
- Stephen Boland Grove
- Knight Grove

ACCESSIBILITY ROUTING



PROBABLE CONSTRUCTION COST

Bocce Ball Construction (2 Courts)	\$ 148,919
Site Improvements	\$ 125,116
SCOPE TOTAL	\$ 274,035

*See appendix for expanded probable construction cost summary

SYNTHETIC TURF

The synthetic turf is at the end of its useable life. Resurfacing of the field is needed and community feedback requested a larger field which will allow more user groups to practice at one time and will allow for more sports.

	THREE-COURT TENNIS SURFACE	TWO-COURT TENNIS SURFACE	SYNTHETIC TURF FIELD
AREA	21,400	14,600	75,000
ORIENTATION	NE-SW	NE-SW	EAST-WEST
EX. CONDITION	VERY POOR	POOR	POOR
MAJOR DEFICIENCIES	SURFACE CONDITION FENCE CONDITION ASPHALT CURB	SURFACE CONDITION	TURF DEGRADATION FIELD PLANARITY
MINOR DEFICIENCIES	RUSTING/BENT NET POSTS	RUSTING/BENT NET POSTS	DG INTRUSION INCONSISTENT INFILL
TRAIL CONNECTIVITY/ ACCESSIBILITY	NOT ACCESSIBLE	NOT ACCESSIBLE	YES
RECOMMENDATION	FULL RENOVATION REUSING EXISTING STONE BASE	FULL RENOVATION REUSING EXISTING STONE BASE	RESURFACE AND EXPAND EXISTING TURF FIELD

RECOMMENDATION SUMMARY

The recommendations outlined in the matrix above include resurfacing the existing synthetic turf field and expanding by 40,000 SF to accommodate a full size, NCAA soccer field with a 20' safety buffer around the perimeter of the field and additional area for teams to practice. It is recommended to include survey markers in the concrete curb for ease of striping fields during turf installation. Because of the clearing and grading of the area in the past, there is adequate space for the District to expand the field both to the east and north/south of the field. While maintaining the environmental buffer on the north side of the field is important, there is opportunity to expand on both sides and improve drainage features of the field. There is an existing accessible path to the field, but may require some minor work to allow stormwater drainage to the south.

The Lloyd team recommends that the District considers a netting/ball capture system around the field per request by the public and stakeholders. Balls are often leaving the field of play and can roll down the hill to the south making it very difficult to retrieve and maintain the schedule of the game. The final synthetic turf layout and design should consider a future indoor structure given the community interest. Ample room for footings and support facilities should be included in the design.

The major deficiencies of the field are due to age and will be solved with the renovation of the field.

SYNTHETIC TURF EXPANSION

The proposed synthetic turf expansion is shown in the image below. Expansion, as discussed in previous sections, will create an extra 40,000 sq. ft. as a safety buffer for the NCAA soccer field and provide additional room for teams to practice without interfering with the field of play. Additional improvements to consider include perimeter ball netting to capture balls before escaping the field of play and drainage improvements to the field and collection area west of the field. Exact requirements and details should be reviewed in the design stage.



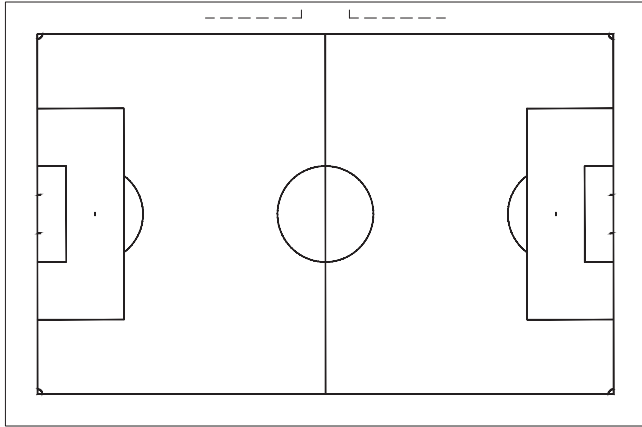
PROBABLE CONSTRUCTION COST

The probable construction cost to resurface and expand the synthetic turf field is below. The full probable construction cost summary can be found in the appendix.

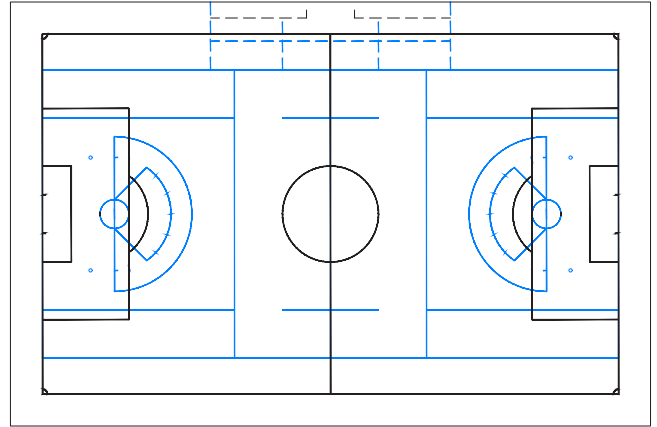
SYNTHETIC TURF RESURFACE AND EXPANSION	\$ 1,563,764
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SYNTHETIC TURF FIELD STRIPING CONFIGURATIONS

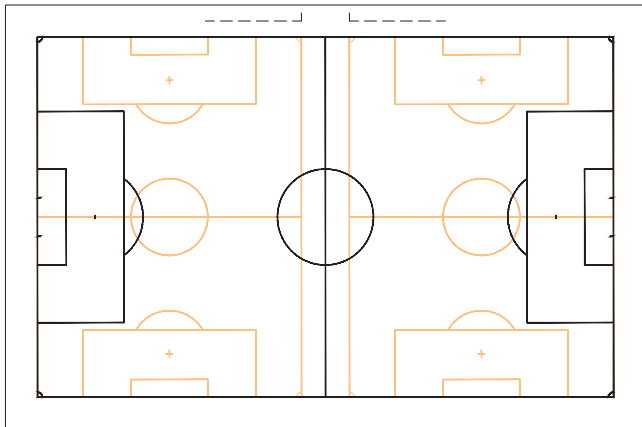
The proposed synthetic turf expansion could support the following configurations. Permanent and temporary striping should be determined during design. Markers for temporary striping should be installed, this may include permanent markers installed in the concrete perimeter curb and/or 4" square turf markers (alternate turf color) tufted in the synthetic turf.



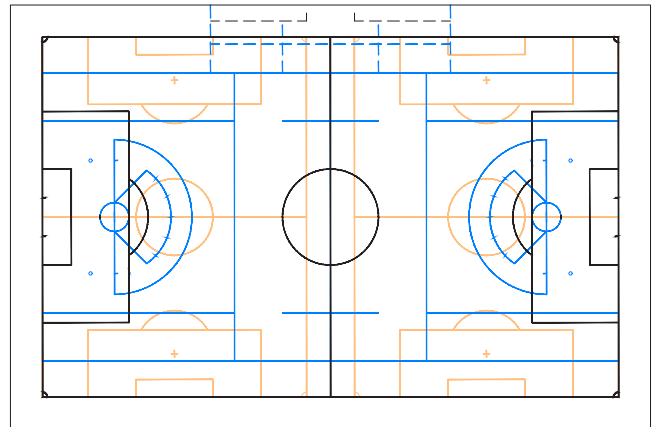
NCAA SOCCER



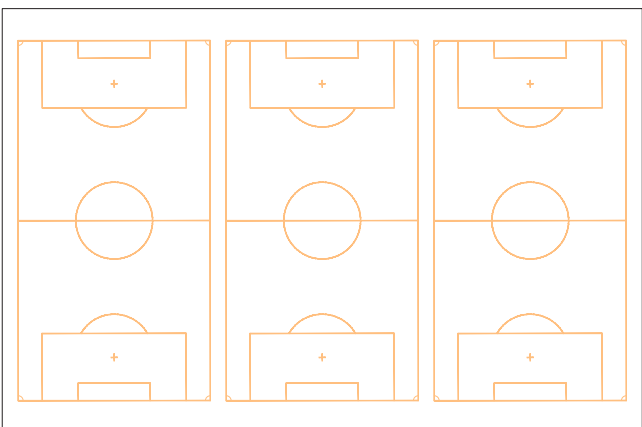
NCAA SOCCER AND LACROSSE



NCAA SOCCER AND AYSO U-12



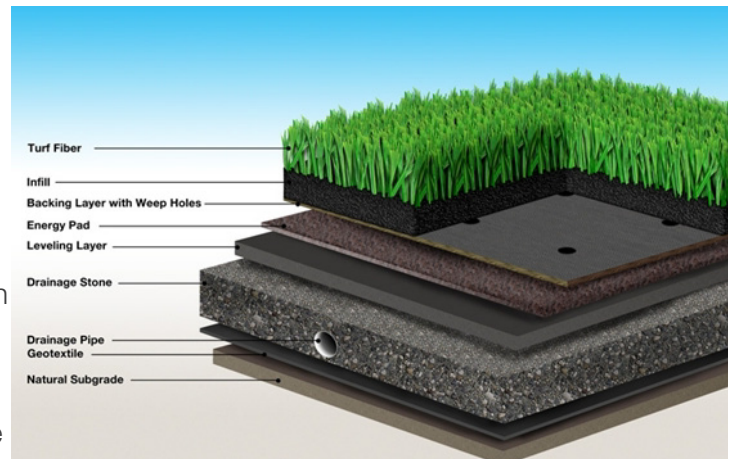
NCAA SOCCER, LACROSSE AND AYSO U-12



AYSO U-10

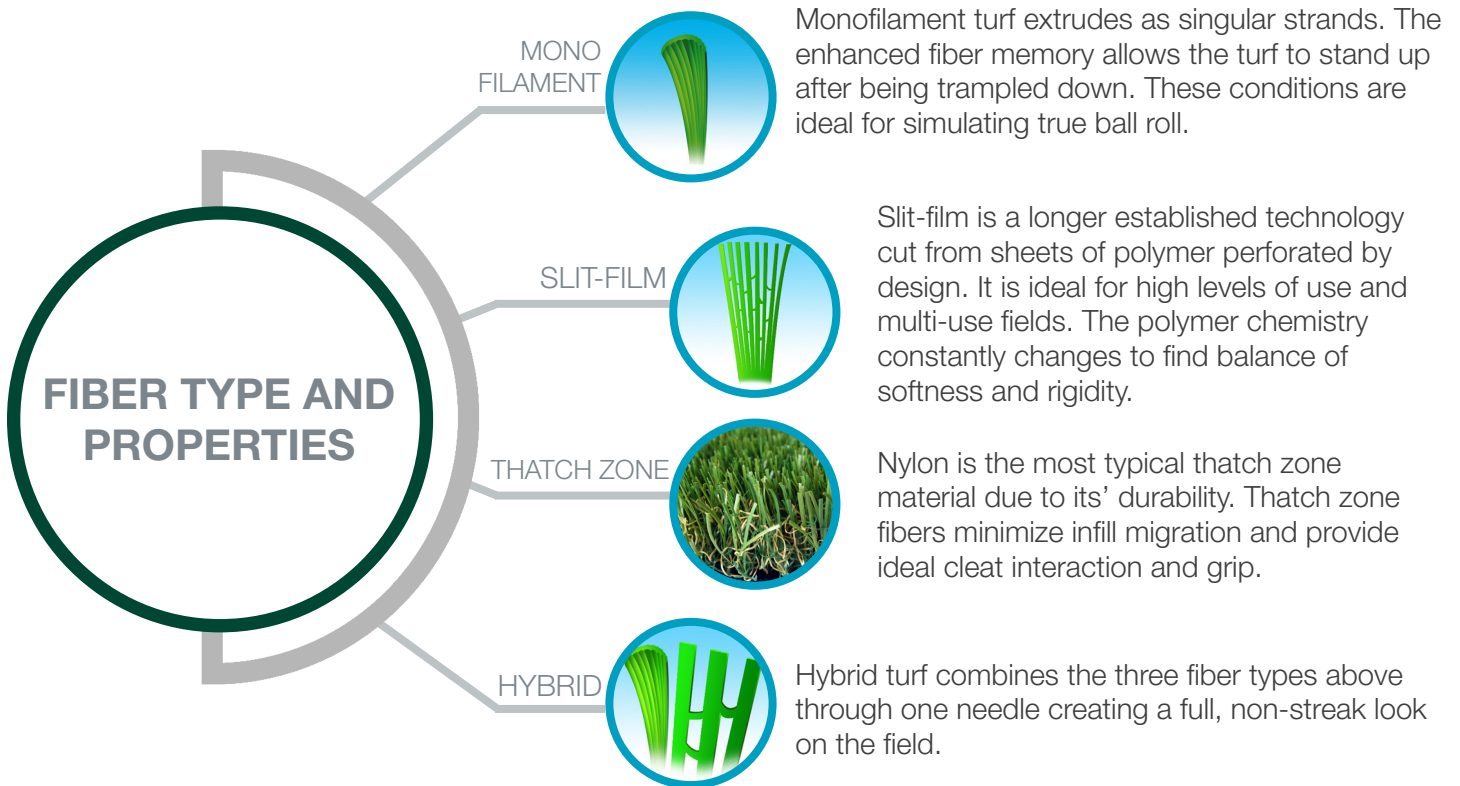
The following is a general overview of current synthetic turf technology. These technologies shall be further evaluated during design.

Synthetic turf fields typically consist of the fiber and infill layer on top of a drain or shock pad that rests on the field's permeable base and natural subgrade as shown in the image on the right. Drain pipes are installed in the permeable base layer and are used to convey water off the field to surrounding collection areas. The exact location of the geotextile fabric can change based on different field section build out and material. Pads are made up of foam and provide an extra layer of protection between the turf and base material. They aren't required with every field, but provide a safer surface and often extend the life of the field. Different base material is used depending on site characteristics that can customize the structural stability of the field vs. its draining efficiency.



FIBER TYPE

Synthetic turf fibers provide the look and feel of a natural grass surface and are an important part of a sports system to help ensure it meets various performance characteristics. The quality of synthetic turf fibers is therefore essential for a quality surface. There are two main types of fibers commonly used for synthetic turf fields, being nylon or poly materials, either polyethylene or polypropylene. The fiber type then varies based on the desired characteristics of the playing surface with the bottom line that most manufacturers can create a fiber combination to fit the desired need of a facility.



INFILL TECHNOLOGY



With natural grass, blades are held up in place by water and nutrients being sent upward from the roots. However, when dealing with synthetic turf, infill must be used to mimic this process and hold the fibers upright. Often made up of the material outlined below, infill is placed over the top of the synthetic turf and lies within the fibers.

The infill facilitates a more plush, natural appearance with the standing position of the blades. With use, pressure is applied to the blades and causes them to bend down under the weight, springing back up into a standing position once pressure is released.

Infill is most commonly created with crushed material from silica sand, rubber, or organic materials. The various infills were created with the same purpose, but there are important differences between each type, outlined in the graphic below.



POST CONSUMER TIRE CRUMB RUBBER (SBR)

- MOST COMMON/AVAILABLE
- LEAST EXPENSIVE




THERMOPLASTIC ELASTOMER (TPE)

- NON-TOXIC
- 100% RECYCLABLE
- RESISTANT TO FADING



COATED SAND

- NON-TOXIC
- SOFT OR RIGID COATING SEALS SAND




CORK

- NATURAL INFILL
- HEAT RESISTANT
- REQUIRES IRRIGATION



ZEOLITE

- USED AS SECONDARY INFILL
- SOFTER/LIGHTER

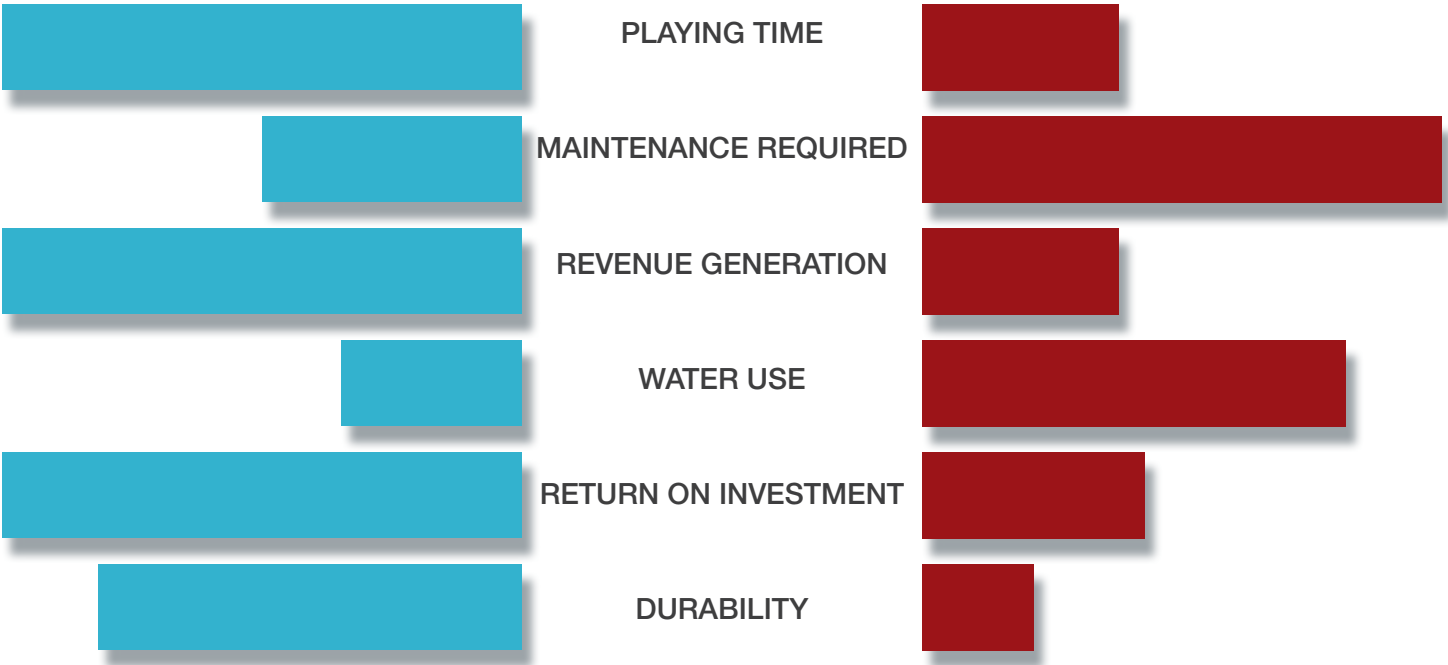


COCONUT FIBERS

- NATURAL INFILL
- HEAT RESISTANT
- REQUIRES IRRIGATION



VS



Synthetic turf and natural grass are compared above to properly maintain the soccer/lacrosse field surface at NTRP. It is unanimously recommended that synthetic being re-installed due to the advantages of synthetic turf in regard to field availability and maintenance with significant use, revenue generation for the district, environmental considerations and return on investment. High-performance natural grass fields require significantly more attention and maintenance when experiencing heavy use. While synthetic turf still requires maintenance, it won't require the time and materials of a full-time staff dedicated to that single field like natural grass would.

The synthetic turf will allow the district year-round use of the field following snow removal in the winter. The impact of that year-round availability benefits both the community and the district with significantly more revenue generation than the seasonal, limited use of a natural grass field. The district will face a larger up-front cost, but in return, will experience a greater return on investment with the increased availability.

Generally, a synthetic turf field will cost fifty percent less per hour to operate than a well-maintained natural grass field. This considers an annual use of approximately 2,000 hours.

SECTION

4

SUMMARY AND CLOSING

North Tahoe Regional Park is the primary recreational park for North Lake Tahoe attracting both members of the community and tourists for year-round recreation. NTPUD owns and operates the park including one synthetic turf field, four natural grass fields and the five asphaltic concrete tennis courts.

This planning study documented the condition of the existing athletic fields and courts, providing recommendations for a capital forecast regarding these assets. Recommendations include resurfacing and expanding the existing synthetic turf soccer field, renovating the asphalt tennis courts and re-stripping the two-court surface to accommodate six pickleball courts, improving accessibility within the park and installing two new bocce courts. The priority of the improvements are ranked on the following page.

The probable construction cost of the recommended renovations is anticipated to be \$2.7 million. Ideally, through grant funding for capital improvement, NTPUD would receive the necessary funding to offset some of the initial investment required for the park improvements.

With the aforementioned improvements and renovations with the park, NTRP can maintain and enhance its reputation as the flagship park of the North Lake Tahoe region allowing community members and the general public to continue enjoying the park for social and recreational activities.

IMPROVEMENT PRIORITY

NTRP RENOVATION PRIORITY PER RECOMMENDATIONS

1

REPLACE SYNTHETIC TURF

Replacing and expanding the synthetic turf is the highest priority for NTPUD at the park. If expansion is not in the budget, replacement should remain prioritized.

2

FULL TENNIS COURT RENOVATION

The tennis courts renovation is the second highest priority for NTPUD at the park. This includes re-stripping the two-court surface to accommodate pickleball. The major cracks should be filled and repaired now unless a full renovation is planned for the immediate future.

3

ACCESSIBILITY IMPROVEMENTS

It is recommended that accessibility improvements be third on the priority list for NTRP. Due to the lack of access to the courts, these improvements are prioritized over construction of the bocce ball courts.

4

CONSTRUCT BOCCE BALL COURT

Last on the priority list is construction of the bocce ball courts. While a nice amenity for the park, the other improvements have been identified as a more immediate need for NTRP and its users.

APPENDIX

List of Documents Referenced in Report

Appendix A - Field Observation Reports

Synthetic Turf (Field #4)

Two-Court Tennis Courts

Three-Court Tennis Courts

Appendix B - Photometric Study

Appendix C - Geotechnical Report

Appendix D - Community Agendas & Minutes

Appendix E - Site Plan and Sketches

Appendix F - Opinion of Probable Construction Cost

DOCUMENTS REFERENCED



1. *NTPUD Tennis Court Lighting LTG-1.pdf* by MSA Engineering Consultants - 09/12/2019
2. *Structural Section Investigation Tennis Court Reconstruction* by CME, INC. - 10/1/2019
3. *Contract Plans for Tennis Courts with Lights (NTPUD)*
4. *North Tahoe Regional Park Soccer Field Project Record Drawings* - 06/05/2007
5. *Bid Documents for North Tahoe Regional Park Soccer Field Facility* - 06/01/2007
6. *Tennis Courts Public Comment* - 10/23/2019
7. *NTPUD User Group Notes - Sierra Nevada College* - 09/17/2019
8. *NTPUD User Group Notes - North Tahoe High School* - 09/24/2019
9. *NTPUD User Group Notes - Tennis Stakeholders* - 09/24/2019
10. *Meeting Minutes of the North Tahoe Public Utility District Recreation and Parks Commission* - 10/24/2019

APPENDIX A

FIELD OBSERVATION REPORTS

FIELD OBSERVATION REPORT: FIELD #4 SYNTHETIC TURF

Location: NTRP
Date: August 27, 2019
Weather: 85° Sunny
Engineer: Anthony Stevenson, PE
Zach Plum, EIT

On August 27th, 2019, a site visit was performed to observe the existing conditions of the synthetic turf field at NTRP. The following items were observed by Anthony Stevenson, PE and Zach Plum, EIT of Lloyd.

Accessibility and General Site Observations

Pedestrian access is from the southwest corner of the field. A backflow device and drinking fountain was located at the pedestrian access connection to the parking lot west of the field. Runoff comes from the northwest via a drainage channel. The west end, off the limits of the field is a low-lying decomposed granite area. Because of the surrounding slopes, significant ponding occurs with snow melt or after significant rainfall. Ponding is mostly evident in the Spring, per discussions with NTPUD staff. A swale and minor re-grading are two possible solutions for the ponding. Spectator seating exists on the south end of the field along with a drinking fountain. Team benches are located on the north side of the field.



Image 1: Field Access



Image 2: Low-lying decomposed granite area west of field

Existing Synthetic Turf Condition

Walking around the perimeter of the field, there was noticeable decomposed granite intrusion around the limits of the turf. It appeared that cleaning efforts are occasionally made to clear off the contaminants, but it is inevitable with that sort of landscaping around the perimeter.

There was significant wear on the turf throughout the entire field. The white and yellow field lines were in poor and very poor condition, respectively. The turf fibers were matted down and easily tore when pulled on. The concrete curb and synthetic turf edge were in decent shape considering the edge of the field. No significant separation or gaps were observed.

The west end of the field had numerous patches due to excessive wear on the turf.

The east end of the field had significant planarity issues around the penalty area. Minor movement of the base was evident across the entire playing surface.



Image 3: Turf degradation



Image 4: Field planarity measurement



Image 5: Decomposed granite intrusion on turf



Image 6: Turf degradation and patching of turf

Field Expansion

Expansion was considered, but runoff issues may be encountered from the slope to the north of the field limits. Currently, there is a decomposed granite buffer of approximately 65' from the toe of the slope to the turf edge.



Image 7: Field expansion area for consideration

FIELD OBSERVATION REPORT: TWO COURT TENNIS SURFACE

Location: NTRP
Date: August 27, 2019
Weather: 85° Sunny
Engineer: Anthony Stevenson, PE
Zach Plum, EIT

On August 27th, 2019, a site visit was performed to observe the existing conditions of the north tennis courts at NTRP. The following items were observed by Anthony Stevenson, PE and Zach Plum, EIT of Lloyd.

Accessibility and General Site Observations

ADA Access to the north tennis courts is currently non-compliant. The court surface as a whole is elevated a few inches due to asphalt base and surfacing placed on top of the existing grade. The photo below displays the elevation difference at the gate entrance to the courts. The pathway to the courts is currently decomposed granite, but is relatively flat with no major area concerns. Converting the trail to an ADA pathway is feasible but will most-likely require the removal of a few trees and some minor re-grading.



Image 1: Court Access



Image 2: Court Access

Existing Asphaltic Concrete Condition

There was significant cracking and bulging visible around the edge of the courts. Certain areas along the fence were more significant than other areas. Some of the bulging, specifically, appeared to be due to roots of nearby trees while others may be impacted by weather and temperature changes of the region. Significant cracking and planarity issues were present across the entire surface. Some cracks had been re-sealed and/or re-patched, but they remain visible. Significant cracks exist along the net of both courts from pole to pole which is typical of older tennis courts. Areas of ponding were noticeable, but no water was present at the time of the investigation.

The perimeter fencing was in disrepair. The fence mesh is pushed outward in several locations. Poles are bent and beginning to rust. The net posts also appeared to be rusted and bent.

See images on next page.



Image 3: Surface bulging and cracking along perimeter



Image 4: Surface planarity measurement



Image 5: Overall court condition near nets



Image 6: Areas of ponding evident on surface



Image 7: Accessibility concerns



Image 8: Perimeter fence conditions

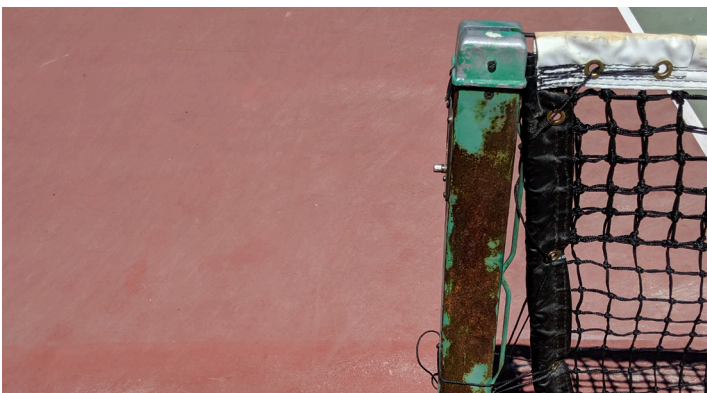


Image 9: Net posts rusting conditions



Image 10: Net posts were rusted and bent

FIELD OBSERVATION REPORT: THREE COURT TENNIS SURFACE

Location: NTRP
Date: August 27, 2019
Weather: 85° Sunny
Engineer: Anthony Stevenson, PE
Zach Plum, EIT

On August 27th, 2019, a site visit was performed to observe the existing conditions of the south tennis courts at NTRP. The following items were observed by Anthony Stevenson, PE and Zach Plum, EIT of Lloyd.

Accessibility and General Site Observations

Pedestrian access is from the west. There is a paved path and stairs from the lower parking lot, but no ADA access exists. A large asphalt curb surrounds the perimeter of the court. Through discussions with NTPUD, it is assumed the curbs were installed to flood the courts in the winter for ice skating rink.



Image 1: Court access from west



Image 2: Court access from west



Image 3: Court access from east



Image 4: Perimeter access curb

Existing Asphaltic Concrete Condition

There is substantial cracking down the center of the court, which were very noticeable and often brought to the attention of NTPUD by the users. Cracking was evident across the entire surface, but more of it seemed to be out of play. Any cracking along the net line was not prevalent as with the north courts.



Image 5: Significant cracking through south tennis courts



Image 6: Significant cracking through south tennis courts

There were numerous small patches inside the play limits. At the net posts, concrete foundations were protruding from the surface. The posts were rusted and bent. Fences were in disrepair, similar to the condition on the north courts. Mesh was pushed outward and fence posts were bent. Differential settling was noticed across the court surface, particularly in the southeast corner. Ball wall area was in poor condition. The surface was past it's useful life and in need of a total resurfacing due



Image 7: Court access from west



Image 8: Court access from west



Image 9: Court access from east



Image 10: Perimeter access curb

Ball Wall Existing Condition

to various areas of cracking and peeling. The wood used for the wall was experiencing significant warping and degradation, past the point of repair. Whether to remove or replace will be determined through interview with staff and community user groups.



Image 11: Ball wall



Image 12: Back of ball wall

APPENDIX B

PHOTOMETRIC STUDY

Please find the attached first pass lighting calculation NTPUD Tennis Courts Lighting LTG-1.pdf and the below commentary "A" & "B". The following notes are the result of the site walk observation starting roughly at **9 AM on September 05, 2019**. The weather was mostly clear, still, and in the 70's F.

A. Results of Site Walk

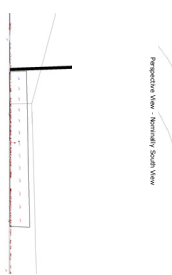
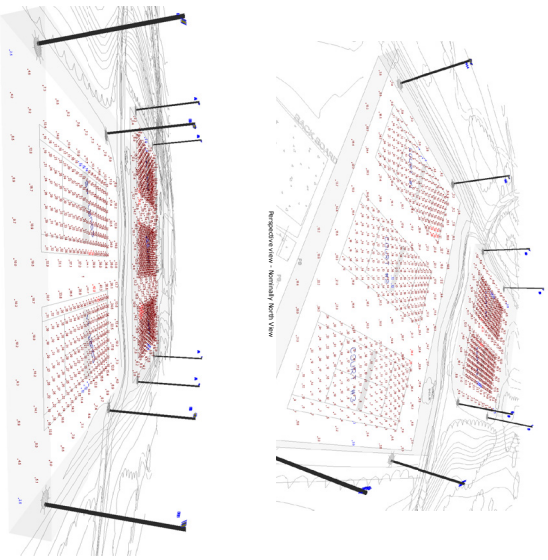
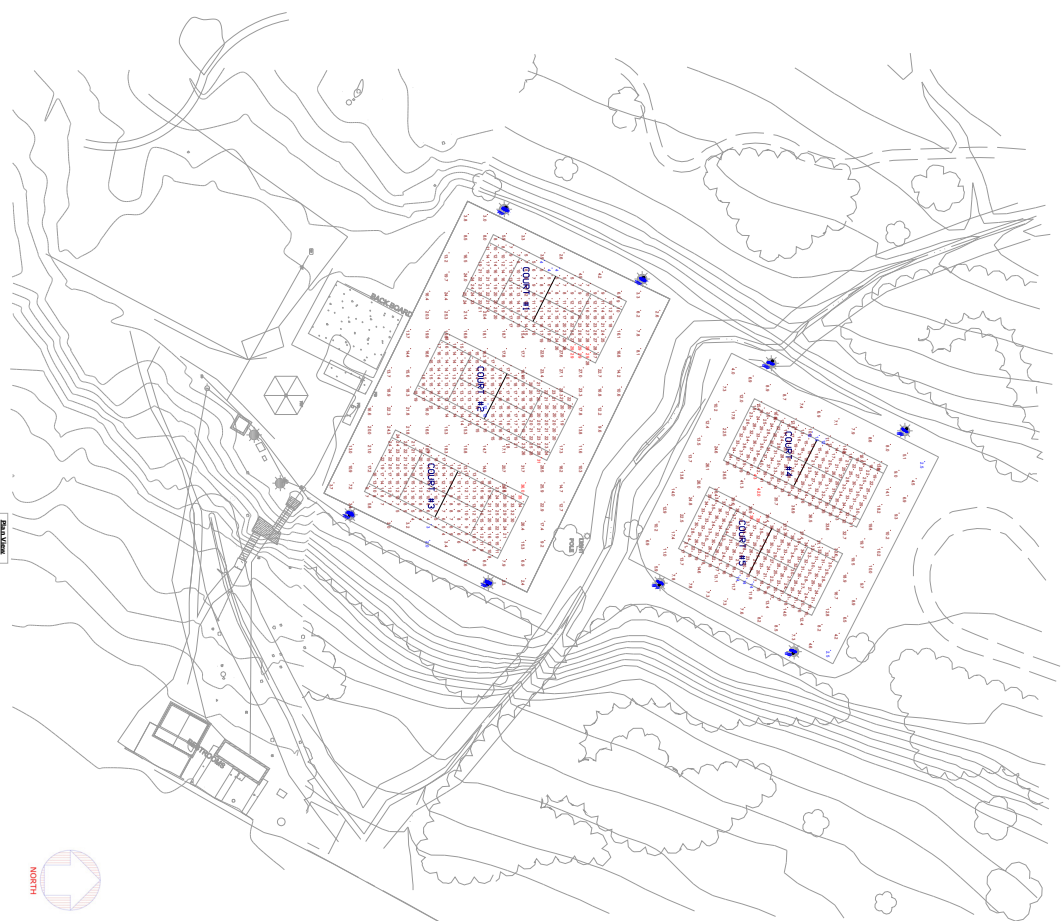
- 1) There are five tennis courts in two fields. Three courts are in southernmost field and two courts are in the other field located ~65' to the north.
- 2) The lighting for both fields is four (4) 40' poles each with three (3) High Intensity Discharge (HID) pole top luminaires. There is a total of eight (8) poles and twenty-four (24) luminaires. Lamp wattage is unknown. (Assumed lamp wattage is below under section B).
- 3) The three-court field (Courts 1, 2, 3 on sheet LTG-1) is illuminated by four (4) poles of three (3) luminaires mounted to each pole and appears to be older installation than the two-court field.
- 4) The two-court field (Courts 4, 5 on LTG-1) is illuminated by four (4) poles of three (3) luminaires mounted to each pole. This two-court field appears to be of newer vintage than the three-court field.
- 5) Each pole mounted luminaire has been aimed to a specific area/region on the playing field. This is typical sports lighting design.
- 6) There is no installed means of lowering the poles or of lowering the luminaires on the poles, for luminaire maintenance. Luminaire maintenance must be provided by lifting personnel to the luminaires themselves on top of the 40' poles.
- 7) The luminaires appear to be in serviceable condition although they not of current lamping (HID rather than LED) or fixture (housing, glare control, shields etc.) or control technologies.
- 8) There are no glare control baffles or shields installed.
- 9) The luminaries have no obvious method of controlling them on or off nor of dimming.
- 10) The lighting was not observed while it was in operation nor where light meter readings taken.
- 11) The lightning calculations showing presumed performance, shows that all play fields do not meet the horizontal and vertical recommendations included in the IESNA 10th Edition Table 35.3 | Sports and Recreation Recommendations for tennis. The lowest level of recommendations, for the lowest level of play, is level IV shown here:

IV	
Horizontal - 3' above competition surface	
Avg	Max / Min
50 fc	2
Vertical	
Avg	Max / Min
150	2
	Footcandles
	25 < Age < 65

Lowest level of play (level IV) IESNA 10th Edition Table 35.3

B. Post site walk and lighting calculations NTPUD Tennis Courts Lighting LTG-1.pdf (showing presumed performance), the following notes are the current recommendations:

- 1) It is assumed this installation uses 1000-watt metal halide lamps.
- 2) Replace existing luminaires on the existing poles with new LED luminaires to achieve performance and energy efficiencies and control. There are also maintenance benefits of long-life LED that decrease, but not eliminate maintenance. Note: Maintenance of LED luminaires is important for cleaning as there is expected to be significant luminaire dirt depreciation on exterior luminaires due to buildup of dirt from environmental dirt and from insects and birds.
- 3) New luminaire suggestions would include those designed to limit back-light, up-light and glare.
- 4) Recommendations include ungraded lighting controls and possibly dimming of courts separately from each other to allow lower levels of lighting for court surface maintenance and higher light levels during play.
- 5) Recommendations include updating to current recommendations for lighting levels. Note: The 1976 plans indicate that 20 horizontal foot-candles were the target minimum. Today's minimum target for basic play is 50 horizontal foot candles average and 150 vertical average.



Schedule	Class	Quantity	Approved Manufacturer	Approved Catalog Number	Photometric Data	Approved Fixture	Approved Light Source	Approved Voltage
A	12	12	Quantum Structures	TV 3000-0100	12000	12000	0.3	3000
B	12	12	Quantum Structures	TV 3000-0100	12000	12000	0.3	3000

Statistics	Symbol	Avg	Min	Max	Max/Min Avg/Min
Court #1	+	171.6	31.6	121.6	2.61
Court #2	+	141.6	31.6	117.1	4.71
Court #3	+	281.6	31.6	141.6	2.61
Percentage of 3 court	+	169.6	32.08	123.6	16.81
Percentage of 2 court	+	149.6	32.08	123.6	18.01
Min					2.51

NOTES:
 1. THIS PLAN DRAWING IS NOT TO SCALE. LIGHTING TO MAINTAIN THESE STANDARDS. SOME DIFFERENCES MAY OCCUR DUE TO VARIOUS CALCULATION METHODS AND APPROXIMATE DIMENSIONS AND TOLERANCES. THESE CALCULATIONS ARE APPROXIMATE.

APPENDIX C

GEO TECHNICAL REPORT

***DRAFT* STRUCTURAL SECTION
INVESTIGATION
NTPUD TENNIS COURT
RECONSTRUCTION
PLACER COUNTY, CALIFORNIA**



**CONSTRUCTION
MATERIALS
ENGINEERS, INC.**



PREPARED FOR:

LLOYD SPORTS AND ENGINEERING

**OCTOBER 2019
FILE: 2444**



300 Sierra Manor Drive, Suite 1
Reno, NV 89511

October 11, 2019
File: 2439

Attn: Anthony Stevenson, P.E., Principal
Lloyd Sports and Engineering
astevenson@lloydengineers.com

RE: DRAFT FOR REVIEW ONLY
NTPUD Tennis Courts Reconstruction
Structural Section Investigation
Placer County, California

Dear Mr. Stevenson:

Construction Materials Engineers, Inc. (CME) is pleased to submit our structural section investigation for the North Tahoe Public Utility District Tennis Court Reconstruction, to be completed at the North Tahoe Regional Park, in Placer County, California.

The following report includes the results of our field and laboratory investigations and presents our recommendations for the design and construction of the project. We appreciate the opportunity to work with you on this project.

Please contact the undersigned if you have any questions.

Sincerely,

CONSTRUCTION MATERIALS ENGINEERS, INC.

Stella A. Hardy, PE
Project Manager
RE No. C88848
Exp. 06/30/2020
shardy@cmenv.com
Direct: 775-737-7569

Nicholas Anderson, PE
Project Manager
nanderson@cmenv.com

NRA: AH:sah
Enclosures
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APPENDICES

APPENDIX A

Plate A-1 – Exploration Location Map
Pavement Core Logs
Plate A-3 – Soil Classification Chart

APPENDIX B

Plate B-1 – Grain Size Analysis
Plate B-2 – Plasticity Index Testing

DRAFT STRUCTURAL SECTION AND SUBGRADE INVESTIGATION

North Tahoe Public Utility District (NTPUD) – Tennis Court Reconstruction
Tahoe Vista, Placer County, California

1.0 INTRODUCTION

This report presents the results of our structural section investigation completed for the NTPUD Tennis Court Reconstruction. The tennis courts are located in the North Lake Tahoe Regional Park, 6600 Donner Lake Road, Tahoe Vista, Placer County, California (APN: 112-010-015-000). The general project vicinity is included on Plate A-1 and Figure 1 (Project Vicinity).



Figure 1: Project Vicinity Map (N.T.S)
(Reference: Base Map Google Earth Image, June 2018)

The primary objectives of this investigation are to determine the approximate thickness of the existing structural section at pavement core locations, determine the index properties of the base and subgrade materials encountered, and provide general geotechnical recommendations for design and construction of the project.

2.0 SITE DESCRIPTION



The existing courts are located in the western portion of the existing North Lake Tahoe Regional Park. There are two (2) fenced tennis recreation areas containing a total of five (5) courts (refer to Figure 2 Existing Tennis Courts). The southern recreation area includes a 180 by 120 foot asphalt concrete pad, broken up into three (3) adjacent tennis courts. Based on information provided by Lloyd Engineering, this pad was constructed circa 1960. The northern recreation area includes an asphalt concrete pavement pad with dimensions of approximately 130 by 120 feet. The northern recreation area includes two (2) adjacent tennis courts and was constructed in 1976.

Tower lighting fixtures are present along the perimeter boundaries of the tennis court enclosures.

Original site grading was not available at the time of this report; however, based on surrounding topography, it appears the tennis court pads may be constructed on a cut-fill transition.

Figure 2: Existing Tennis Courts

The existing court finished grade elevations are on the order of 30 feet higher than the nearest parking lot for the facility, located approximately 160 feet southwest of the subject site. Access to the site is via stairs or narrow walking paths from the lower parking and access road. There is an asphalt berm which surrounds the southern court pad. Drainage is channelized between the northern and southern tennis court pads through ditches and discharged downslope of the site.

Tennis courts consist of an asphalt concrete pavement structural section with a colored surface polymer treatment. Due to the age of the existing tennis courts degradation of the asphalt concrete pavement has developed/manifested including:

- Shrinkage/thermal cracking is present at both tennis court recreation area pads (refer to Plate A-1 (Exploration Location Map) for approximate locations/crack paths). The crack observed exhibited horizontal separations on the order of 1 to 3 inches. Due to the existing polymer/fabric surface treatment atop the structural section, we were not able to observe cracking which may be present below these surface treatments. Thermal cracking is common for asphalt concrete pavement especially where located within freeze/thaw climates;
- Undulations within the pavement surface were observed at various locations across the slab. These undulations are anticipated to be a surface manifestation of underlying subgrade instabilities likely developed due to water intrusion into the underlying subgrade through crack within the pavement section.
- Raveling of the pavement along the exterior edges of the courts was also observed.



Photograph 1: Previously patched large shrinkage crack, note vegetation growing through the center.

Based on the age of the existing pavement structural section, each of the tennis court pads have reached the end the useful design life.

3.0 FIELD EXPLORATION

The subsurface exploration was performed on October 2nd, 2019 and included asphalt coring with hand auger excavation at five (5) locations (three on the Southern Courts and two on the Northern Courts). Our field engineers measured the existing structural section thickness (asphalt concrete and aggregate base) and collected bulk samples of the underlying base and subgrade material. The approximate pavement core locations are presented on the Plate A-1 (Exploration Location Map).

A summary of the structural section thicknesses encountered are described in Table 1 (Summary of Structural Section Thickness) in Section 5.0 (Existing Tennis Court Structural Section). Core logs including, photographs of the pavement cores collected, are attached in Appendix A.

Core locations were backfilled with gravel tamped into place, and capped with rapid set concrete dyed red. Bulk base and subgrade samples were classified in general accordance with ASTM D2488 and ASTM D2487 if applicable. A description of the USCS is presented on Plate A-3 (Soil Classification Chart).

4.0 LABORATORY TESTING

Soil testing performed in CME's laboratory was conducted in general accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards. Significant soil types were selected and analyzed to determine index properties. The following laboratory tests were completed as part of this investigation:

- In situ moisture content (ASTM D2216) (Appendix B);
- Grain size distribution (ASTM D6913) (Appendix B); and
- Plasticity index (ASTM D4318) (Appendix B).

Laboratory test results for the subsurface exploration are presented included as Appendix B.

5.0 EXISTING TENNIS COURT STRUCTURAL SECTION

5.1 STRUCTURAL SECTION THICKNESS

The total thicknesses of the existing tennis court section varied with asphalt thicknesses ranging from 4 to 5½ inches with base thicknesses on the order of 6½ to 8 inches. A summary of the tennis court structural section thicknesses and subgrade soil types encountered are presented on Table 1 (Summary of Core Logs).

Table 1: Summary of Structural Section Thickness						
Core ID	Asphalt Concrete Thickness (in)			Aggregate Base		Subgrade USCS Classification
	Overlay	Original	Total	Thickness (in)	Estimated Durability of Aggregate Base	
Northern Court Pad						
C-1	2.0	2.5	4.5	8.0	Moderate to Poor	Decomposed Boulder Exposed (unable to excavate)
C-2	2.0	2.3	4.3	8.0	Moderate to Poor	Silty Clayey Sand with Gravel SC-SM
<i>Average Thickness</i>	2.0	2.4	4.4	8.0		
Southern Court Pad						
C-3	2.0	2.5	4.5	8.0	Moderate to High	Silty Sand with Gravel (SM)
C-4	2.5	2.3	4.8	6.8	Moderate to High	Cobble Exposed (unable to excavate)
C-5	2.5	3.0	5.5	7.0	Moderate to High	Silty Sand with Gravel (SM)
<i>Average Thickness</i>	2.3	2.6	4.9	7.3		
NOTES:						
1. Refer to Core Logs for additional information.						
2. Laboratory index test results are attached as Appendix B.						

5.2 EXISTING ASPHALT CONCRETE PAVEMENT

Based on a visual examination of the asphalt cores obtained, it is clear that the asphalt courts have been overlaid as the original tennis court surface treatment remained in place and was visible in some of the core collected during this investigation. The asphalt aggregate appears to be a finer graded aggregate mix. This type of mix is generally used to produce lower void ratio with a smoother surface. However, the apparent voids visible within the overlay indicate a low level of quality control during placement as compared to the original pavement section (i.e. lower lift).

5.3 EXISTING BASE COURSE

The aggregate base composition and quality varied between the northern and southern courts. The base material encountered at the northern court pad consists of vesicular rock generally having low to moderate durability. The aggregate base encountered at the southern court pad consists of low porosity base aggregate and is anticipated to have a moderate to high durability.

A representative bulk sample of aggregate base from the southern court pad was tested for index properties including gradation and plasticity. Table 2 (Aggregate Base Index Testing Qualifications) summarizes these results alongside two common aggregate base specifications for the area.

Table 2: Aggregate Base Index Testing Qualifications			
Specification	C-4 Sample 4A	SSPWC (Orange Book) 2012 Rev. 8 Type 1, Class A Aggregate Base Specification	Caltrans 2018 Standard Specifications, 1½ inch Maximum Class 2 Aggregate Base Specification
Gradation			
2 in.	97	100	100
1½ in.	96	90 – 100	90 – 100
1 in.	78	80 – 90	-
¾ in.	71	-	50 – 90
No. 4	53	30 – 65	25 – 60
No. 16	37	15 – 40	-
No. 30	29	-	10 – 35
No. 40	25	-	-
No. 200	12	2 – 12	3 – 15
Plasticity			
Liquid Limit (LL)	NP	35 Maximum	-
Plasticity Index (PI)	NP	10 Maximum	-
NOTES:			
1. Red indicates out of specification.			
2. Additional specifications apply. See referenced document for complete requirements.			
3. It should be noted that R-Value and/or durability testing was not performed			

Based on laboratory test results, with the exception of 2-inch screen, the existing base at the southern court pad appears to meet the general index test requirements for Caltrans 1½ inch minus Class 2 and SSPWC Type 1, Class A aggregate base.

5.4 SUBGRADE SOIL

Based on the material encountered at the subgrade elevation within the core locations, the adjacent site grading, it appears the existing courts were constructed using a cut/fill pad. It appears that the northwestern portion of the court pads are bottomed in cut and the southeastern portion of the court pads are bottomed on fill. Subgrade soils located within the cut side of the court were extremely difficult to excavate due to the abundance of cobble and boulder sized material, which appear to be consistent with the surface geology exposed along the northeastern hillside adjacent to the court pads. Subgrade soil encountered on the southeaster portion of the court pads appear to consist of fill soil classifying as silty, clayey sand with gravel (**SC-SM**) to silty sand (**SM**).

Plasticity index testing and moisture content determination was performed to determine subgrade plasticity and indication of stability. Table 3 summarizes these results.

Table 3: Subgrade Soil Summary							
Sample	% Passing No. 200	Natural Water Content (%)	Liquid Limit (LL) (%)	Plastic Limit (PL) (%)	Plasticity Index (PI) (%)	Liquidity Index (LI)	USCS
C-2 2B	30	16.6	27	22	5	-1.1	SC-SM
C-3 3B	29	19.1	30	26	4	-1.7	SM
C-5 5B	36	41.4	42	35	7	0.9	SM
Notes: Liquidity index is an indication of soil stability: LI<0 A negative liquidity index (percent moisture of the soil is less than the plastic index) indicates the material is in a "solid or semi-solid" state; 0<LI<1 Indicates the soil moisture content is near the plastic limit and material is near the plastic state.							

Based on the index test results and moisture content of the soil, the subgrade soil should be stable from a construction standpoint provided they are protected from oversaturation.

It should be noted that our subsurface exploration was performed during the "dry" months. Moisture migration through cracks in the structural section due to perception, snow exposure, or during spring runoff may result in moisture contents over optimum and lead to isolated zones of subgrade instability (i.e. pumping).

6.0 DISCUSSION AND GENERAL INFORMATION

The existing tennis court pad structural sections have reached the end of their useful design life. This is apparent based on the age of the asphalt concrete pavement and manifestation of the pavement distress, most notably the thermal cracking. The thermal cracks presented on Plate A-1 (Exploration Location Map) exhibit horizontal offsets of 1 to 3 inches and conventional patch repair methods are no longer effective.

Based on conversations with Lloyd Engineering reconstruction of the tennis court pads will be performed. For outdoor recreational tennis courts two primary construction methods are available:

Post-Tension Concrete Slab (PT Slab)	Asphalt Concrete Pavement
<p>This construction method typically is:</p> <ul style="list-style-type: none"> ○ More expensive; ○ A useful design life of 50 years; ○ Has lower overall associated maintenance costs; ○ Is resistant to cracking and/or heaving; ○ Results in a better drainage surface; ○ Has a smoother surface resistant to puddling or undulations; ○ May require a specialty contractor to install/tension cables, and requires joints/multiple slabs. 	<p>This construction method is typically</p> <ul style="list-style-type: none"> ○ Less expensive than PT Slab installation, has a useful design life on the order of 20-years¹, ○ Requires regular maintenance due to the freeze thaw climate, ○ Does not require a specialty contractor to install, ○ Can be easily overlaid, patched or repaired; ○ Surface undulations, thermal cracking, or low spots may develop due to improper pavement maintenance.

It is understood that due to the exorbitant costs associated with PT Slab construction, the method of reconstruction for this project will include removal of the existing tennis court pads and replacement will include the installation of a new asphalt concrete pavement structural section.

6.1 POTENTIAL CONSTRUCTION CONCERNS

The following presents a general summary potential construction concerns based on the information collected during this investigation:

- Due to the limited site access, existing tennis courts surface treatments, and potential coarse-grained gravel to boulder sized particles anticipated at the subgrade elevation, pulverization and reuse of the structural section is not recommended.
- Approximately 4 to 5 ½ inches of existing asphalt will be demolished and/or removed from the site. It is unlikely that milling of the asphalt for reuse as either subbase or stabilizing fill will be achievable due to the presence of the surface treatment at the base and top of the existing overlay, as well as existing site access limitations. If the contractor would like to salvage this material for reuse, the resulting stockpiles of milled materials will require visual observation and laboratory index testing to determine the suitability for reuse.

¹ This is a typical design life and assumes that proper maintenance has been maintained throughout the design life. It should be noted that asphalt concrete construction is subject to deterioration due to the substantial fluctuations in temperatures causing the asphalt binder to expand and contract causing deformations and/or cracking.

- The existing subgrade material generally anticipated provide a stable surface for densification and site preparation. The subgrade soils on the northwestern portion of the courts may contain large diameter particles that will need to be handpicked/removed during scarification and site preparation operations of the subgrade soils. Refer to Section 7.1 (Site Preparation) for site preparation recommendations.
- The subgrade soils on the southeastern portion of the tennis court pad consist of granular soils with a percent passing the #200 sieve on the order of 30 to 40 percent. Where moisture migrates through the existing asphalt, subgrade instability including pumping during construction vehicle loading. Recommendations for stabilization of isolated pumping zones are included as Section 7.3 (Stabilization).

6.2 GENERAL DEFINITIONS

The following definitions shall apply for recommendation sections provided in this report:

- **Fine-grained soil** is defined as soil with more than 40 percent by weight passing the number 200 sieve and a plasticity index lower than 15;
- **Granular soil** is defined as a soil not meeting the requirement for a fine-grained and having a particle size of 6-inches or less and may be used as a structural fill;
- **Structural areas** referred to in this report include all areas that will be used for the support of pavement or flat work;
- **Subgrade** is defined as the elevation directly below the aggregate base layer;
- All compaction requirements presented in this report are relative to ASTM D1557; and
- Unless otherwise stated in this report, all related construction should be in general accordance with the Standard Specifications of Public Works Construction (SSPWC).

7.0 DESIGN AND CONSTRUCTION RECOMMENDATIONS

7.1 SITE PREPARATION

The existing asphalt concrete pavement should be demolished and removed from the site and disposed of in an approved location.

The existing aggregate base should be carefully removed and stockpiled onsite for reuse as subbase where site grading modifications are proposed or for site stabilization where removal and replacement with densified soils may be effectively utilized.

The exposed subgrade soils should be scarified to a depth of at least 12-inches, moisture conditioned to within 2 percent optimum moisture content and densified to at least 90 percent relative compaction with a resulting smooth unyielding surface. Large diameter boulders and cobbles protruding into the prepared subgrade elevation shall be removed prior to densification.

After the densification process, a firm, stable surface should be produced. Unstable soils, where encountered, should be removed and replaced with stabilizing fill. Subgrade preparation shall not be performed on or using frozen materials.

7.2 STRUCTURAL SECTION DESIGN

The recommended minimum structural section is provided in Table 4 (Asphalt Concrete Pavement Minimum Structural Section Thickness).

Material Description	Minimum Thickness (in)
Asphalt Concrete Pavement	3
Aggregate Base	6
Notes: 1. The recommended minimum structural section is based on local engineering standard of practice for lightly loaded asphalt. Unlike roadway design, structural loading atop tennis courts generally consists of very lightweight equipment and foot traffic. 2. A pavement maintenance plan should be developed by the designer and owner to prolong the life of the pavement and combat pavement distress related to moisture migration through cracks within the pavement section.	

7.2.1 ASPHALTIC PAVEMENT CONSTRUCTION

Type 3 Plantmix Aggregate (Section 200.02, SSPWC) may be used for project design. This finer grained aggregate mix is recommended to allow the contractor product a smoother surface with lower air voids.

It is recommended that an asphalt cement (i.e. binder) such as performance grade PG64-28NV. The recommended asphalt cement is intended for climates where large temperature fluctuations are apparent.

Asphalt pavement compaction requirements should be in accordance with the SSPWC, 2012. A pavement mix design should be submitted to the owner by the Contractor at least five working days prior to construction for approval.

7.2.2 ASPHALT DESIGN LIFE

Maintenance is mandatory to long-term pavement performance. Maintenance refers to any activity performed on the pavement that is intended to preserve its original service life. Examples of maintenance activities include patching, crack or joint sealing, overlays, and seal coats. If these maintenance activities are ignored or deferred, premature failure of the pavement will occur.

The cost associated with proper maintenance is generally much less than the cost for reconstruction due to premature failure of the pavement. Therefore, since pavement quality is an integral consideration in the formulation of our design recommendations, we strongly recommend the owner/project manager implement a pavement management program.

A long-term capital improvement fund allocation plan should be considered by the owner to perform routine maintenance for the tennis courts.

7.2.3 AGGREGATE BASE MATERIAL

Aggregate base material shall consist of Caltrans Class 2 aggregate base (Section 26-1.02B, 2018 CSS) or Type 2 Class B aggregate base (refer to Section 200.01 of the SSPWC, 2012). Aggregate base material shall be densified to at least 95 percent relative compaction.

7.3 STABILIZATION

Subgrade stabilization may be required during construction for pockets of soils with over optimum moisture content. Depending on condition of the underlying soil type and season of construction, stabilization of this material may require:

- a. Scarifying the existing oversaturated materials with constant raking to promote even drying could be performed in the summer months or during dry/warm weather. This method may be effective where saturated granular materials are present, construction time constraints allow, and staging areas are sufficiently large to permit drying.
- b. Alternatively, stabilization could be achieved by removing the oversaturated soils and replacing them with either densified structural fill or stabilizing fill. The depth of soil removal will be determined during construction, but is anticipated to be 18 inches or less.

The contractor should avoid excessive densification efforts or construction equipment travel on subgrade soils that could cause instability in otherwise stable subgrade. It will be the contractor's responsibility to limit/prevent damage to otherwise firm site soils.

7.3.1 STABILIZING FILL

Stabilization may be required where densification of the subgrade soils is not possible due to instabilities (i.e. pumping) during construction loading and densification efforts. Stabilization consists of removing unstable or "pumping" soils and replacing them with a stabilizing fill overlying a geotextile.

The actual depth of subgrade soil removal shall be determined during construction. However, unless a firmer surface is encountered at a shallower depth, the recommended minimum thickness of the stabilizing fill shall be 18-inches.

A high-performance geotextile shall encapsulate the stabilizing fill to provide separation and stabilization. The geotextile shall be a Class 1 (AASHTO M288) woven fabric such as a Mirafi HP570, Terra Tex HPG-57, or approved equal.

A minimum densified thickness of 12 inches shall be placed over the geotextile. Additional thicknesses may be required to ensure stabilization. It is recommended that prior to densification, the stabilizing fill be uniformly moisture conditioned to plus or minus 2 percent of optimum moisture² and densified to at least 90 percent relative compaction. Stabilizing fill material should meet the requirements of Table 5 (Stabilizing Fill Specification).

Gradation	
4-inch	100
¾-inch	70 – 100
No. 4	20 – 70
No. 200	0 – 15
Plasticity	
Liquid Limit	35 Maximum
Plasticity Index	5 Maximum
R-value	
R-value	30 Minimum

² Higher moisture contents are acceptable if the soil lift is stable and required relative compaction can be attained in the soil lift and succeeding soil lifts.

7.4 DRAINAGE AND OTHER CONSTRUCTION CONSIDERATIONS

Proper drainage is an integral part of the construction and general performance of an asphalt concrete pavement tennis court. The surface of the tennis court should be designed and graded such that ponding water is not permitted across the surface. The finished court should have a minimum slope of 1 percent allowing runoff to be collected along a perimeter drainage system and conveyed to a discharge point away from the existing structural section.

An edge treatment should be considered around the entire perimeter of the tennis court. This treatment typically consists of brick, concrete curbing, valley gutter apron, or other media to prevent vegetation intrusion and/or moisture migration along the edge of the asphalt concrete pavement structural section. The top elevation of the edge treatment should be on the order of $\frac{1}{4}$ to $\frac{1}{2}$ inches below the finished grade elevation of the court. Care should be taken when using curbing or other edge treatments such that runoff flows from the court pad flood the court due to temporary damming effect at discharge points along the edge of the slab.

8.0 TESTING AND DOCUMENTATION

The recommendations presented in this report are based on the assumption that the owner/project manager provides sufficient field testing and construction review during all phases of construction. These construction observations and testing services should include but not be limited to:

- Site preparation and grading;
- Subgrade preparation and aggregate base placement.
- Asphalt paving.

CME employs a large staff of certified inspectors and testers to provide these services. Prior to construction, the owner/project manager should schedule a preconstruction conference to include, but not be limited to: owner/project manager, project engineer, general contractor, earthwork and materials subcontractors, and geotechnical engineer. It is the owner's/project manager's responsibility to set-up this meeting and contact all responsible parties. The conference will allow parties to review the project plans, specifications, and recommendations presented in this report, and discuss applicable material quality and mix design requirements. All quality control reports should be submitted to the owner/project manager for review and distributed to the appropriate parties.

Additionally, all plans and specifications should be reviewed by the engineer responsible for this geotechnical report to determine if they have been completed in accordance with the recommendations contained herein. It is the owner's/project manager's responsibility to provide the plans and specifications to the geotechnical engineer.

9.0 LIMITATIONS

This report has been prepared in accordance with generally accepted local geotechnical practices. The conclusions and recommendations of this report are provided for the design and construction of the proposed project as described in this report. The analyses and recommendations contained herein are based upon field exploration locations included on Plate A-1. Exploration locations included as part of this report should be considered accurate only to the degree implied by the methods used. This report does not reflect soil, rock, or groundwater variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary.

The intent of this report is to provide geotechnical information related to construction and design of the project. The owner/project manager is responsible for distribution of this report to all designers and contractors whose work is affected by geotechnical recommendations provided. In the event of changes in

the design, location, or ownership of the project prior to construction, our recommendations should be reviewed by our geotechnical representative. If our engineer is not accorded the privilege of making this recommended review, CME can assume no responsibility for misinterpretation or misapplication of recommendations or their validity in the event changes have been made in the original design concept without our prior review. CME makes no other warranties, either expressed or implied, as to the professional advice provided under the terms of this agreement and included in this report. Any use, reliance on, or decisions which a third party makes based upon the information contained in this report are the sole responsibility of such third parties. CME accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Clay soils may be present in discontinuous areas below the proposed improvements. Clay soils may potentially shrink or swell (volume changes) in response to changes in the moisture content of the soil. Moisture changes in these soils can occur as a result of seasonal variations in precipitation, poor site drainage, landscape irrigation, leaking underground pipes, capillary action, or from other sources. Volume changes in clay soils can cause differential movements in structural elements constructed in the sphere of influence or bearing on the clay soil. The project geotechnical engineer shall be notified where questionable soils are encountered.

All structures are subjected to deterioration from environmental and manmade exposures. As a result, all structures require frequent monitoring and regular maintenance to prevent damage and/or deterioration. Such monitoring and maintenance are the sole responsibility of the Owner. CME, Inc. shall have no responsibility for such issues or resulting damages.

Any evaluation of the site for the presence of surface or subsurface hazardous substances is beyond the scope of this study. When suspected hazardous substances are encountered during routine geotechnical investigations, they are noted in the exploration logs and reported to the client.

10.0 REFERENCES

American Society for Testing and Materials (ASTM), 2014, *Soil and Rock; Dimension Stone; Geosynthetics*, Volume 4.08.

Caltrans Standard Specifications, 2018;

Standard Specifications for Public Works Construction, Revision 8, 2012 (Washoe County, Sparks-Reno, Carson City, Yerington, Nevada).

APPENDIX A



CME
CONSTRUCTION
MATERIALS
ENGINEERS INC.

300 Sierra Manor Drive, Suite 1
 Reno, NV 89511

LLOYD CONSULTING GROUP
 NTPUD - TENNIS COURTS RECONSTRUCTION
 EXPLORATION LOCATION MAP
 TAHOE VISTA, CALIFORNIA
 PROJECT NO.: 2444
 DATE: 10/20/2019

LEGEND
 ⬢ APPROXIMATE CORE LOCATION

--- APPROXIMATE LARGE (>3') CRACKS

PLATE

A-1

PROJECT/LOCATION

Project No. 2444 Client LLOYD
Project Name NTPUD-TENNIS COURT GEO INVESTIGATION Date 10/2/2019
Location Northern Enclosure - Northern Core Logger ANH/NRA

CORE INFORMATION

Surface Material A.C.
Surface Distress Type at Rutting N/A
Core Location Thermal Transverse Block
Stripping " thick N/A Alligator

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-1	Asphalt Concrete	Overlay	2.0
C-1	Asphalt Concrete	Type 3	2.25
Total Core Thickness			4.25

BASE/SUBBASE DATA

Sample No.	Layer Description	Layer Thickness (in)
C-1 1A	SILTY GRAVEL WITH SAND: mostly fine to coarse sub-angular gravel, some fine to coarse sand, low plasticity fines, dark grey, slightly moist.	8.0

SUBGRADE INFORMATION

Sample No. _____ Layer Description _____
No subgrade sample recovery, decomposed rock with difficult digging

OTHER OBSERVATIONS

Porous Basalt like aggregate present in base.

TOP



PROJECT/LOCATION

Project No. 2444 Client LLOYD
Project Name NTPUD-TENNIS COURT GEO INVESTIGATION Date 10/2/2019
Location Northern Enclosure - Southern Core Logger ANH/NRA

CORE INFORMATION

Surface Material A.C.
Surface Distress Type at Rutting N/A
Core Location Thermal Transverse Block
Stripping " thick N/A Alligator

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-2	Asphalt Concrete	Overlay	2.0
C-2	Asphalt Concrete	Type 3	2.25
Total Core Thickness			4.3

BASE/SUBBASE DATA

Sample No.	Layer Description	Layer Thickness (in)
C-2 2A	SILTY GRAVEL WITH SAND: mostly fine to coarse sub-angular gravel, some fine to coarse sand, low plasticity fines, dark grey, moist.	8.0

SUBGRADE INFORMATION

Sample No.	Layer Description
C-2 2B	SILTY CLAYEY SAND WITH GRAVEL, some fine to coarse sand, little fine subangular gravel, low plasticity fines, dark brown, moist

OTHER OBSERVATIONS

Porous Basalt like aggregate present in base.

TOP



PROJECT/LOCATION

Project No. 2444 Client LLOYD
Project Name NTPUD-TENNIS COURT GEO INVESTIGATION Date 10/2/2019
Location Southern Enclosure - Western Core Logger ANH/NRA

CORE INFORMATION

Surface Material A.C.
Surface Distress Type at Raveling Rutting N/A
Core Location Thermal Transverse Block Alligator
Stripping Stripping ___ " thick N/A

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-3	Asphalt Concrete	Overlay	2.0
C-3	Asphalt Concrete	Type 3	2.5

Total Core Thickness #REF!

BASE/SUBBASE DATA

Sample No.	Layer Description	Layer Thickness (in)
C-3 3A	POORLY GRADED GRAVEL WITH SILT; some coarse to fine subangular gravel up to 2-inches; some coarse to fine sand; nonplastic fines; grayish brown; moist.	8.0

SUBGRADE INFORMATION

Sample No.	Layer Description
C-3 3B	SILTY SAND WITH GRAVEL: mostly fine to coarse sand, little fine subangular gravel, low plasticity fines, dark brown, moist.

OTHER OBSERVATIONS

Red Surface Treatment visible between Asphalt Layers

TOP



300 Sierra Manor Drive, Suite 1
Reno, Nevada 89511

LLOYD CONSULTING GROUP
NTPUD TENNIS COURTS STRUCTURAL
SECTION AND SUBGRADE INVESTIGATION

CORE

C-3

PROJECT/LOCATION

Project No. 2444 Client LLOYD
Project Name NTPUD-TENNIS COURT GEO INVESTIGATION Date 10/2/2019
Location Southern Enclosure - Center Core Logger ANH/NRA

CORE INFORMATION

Surface Material A.C.
Surface Distress Type at Rutting N/A
Core Location Thermal Block
 Stripping " thick N/A
 Alligator

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-4	Asphalt Concrete	Overlay	2.5
C-4	Asphalt Concrete	Type 3	2.25
Total Core Thickness			4.75

BASE/SUBBASE DATA

Sample No.	Layer Description	Layer Thickness (in)
C-4 4A	POORLY GRADED GRAVEL WITH SILT; some coarse to fine subangular gravel up to 2-inches; some coarse to fine sand; nonplastic fines; grayish brown; moist.	6.75

SUBGRADE INFORMATION

Sample No. Layer Description
No Subgrade Recovery Due to Large Cobble beneath Aggregate Base at Core Hole Location

OTHER OBSERVATIONS

Red Surface Treatment visible between Asphalt Layers

TOP



PROJECT/LOCATION

Project No. 2444 Client LLOYD
Project Name NTPUD-TENNIS COURT GEO INVESTIGATION Date 10/2/2019
Location Southern Enclosure - Southern Core Logger ANH/NRA

CORE INFORMATION

Surface Material A.C.
Surface Distress Type at Rutting N/A
Core Location Thermal Transverse Block
 Stripping " thick N/A
 Alligator

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-5	Asphalt Concrete	Overlay	2.5
C-5	Asphalt Concrete	Type 3	3.0
Total Core Thickness			5.5

BASE/SUBBASE DATA

Sample No.	Layer Description	Layer Thickness (in)
C-5 5A	POORLY GRADED GRAVEL WITH SILT; some coarse to fine subangular gravel up to 2-inches; some coarse to fine sand; nonplastic fines; grayish brown; moist.	7.0

SUBGRADE INFORMATION

Sample No.	Layer Description
C-5 5B	SILTY SAND: mostly fine to coarse sand, few fine subangular gravel, low plasticity fines, brown, moist.

OTHER OBSERVATIONS

Few Pieces of Decomposed Gravel Present in Sub Grade Material

TOP



SOIL CLASSIFICATION CHART						
MAJOR DIVISIONS			SYMBOLS		TYPICAL CLASSIFICATION NAMES	
			GRAPH	LETTER		
Course grained soils More than 50% of the material is larger than No. 200 sieve size	Gravel and gravelly soils	Clean gravels		GW	Well-graded gravels, gravel-sand mixtures, few or no fines	
				GP	Poorly-graded gravels, gravel-sand mixtures, few or no fines	
		Gravels with fines		GM	Silty gravels, gravel-sand-silt mixtures	
				GC	Clayey gravels, gravel-sand-clay mixtures	
	Sand and sandy soils	Clean sands		SW	Well-graded sands, gravelly sands, few or no fines	
		Sands with fines		SP	Poorly-graded sands, gravelly sands, few or no fines	
Fine grained soils More than 50% of the material is smaller than No. 200 sieve size	Silty sands			SM	Silty sands, sand-silt mixtures	
				SC	Clayey sands, sand-clay mixtures	
		Liquid Limit less than 50			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
					CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	Sils and clays	Liquid Limit less than 50			OL	Organic silts and organic silt-clays of low plasticity
					MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		Liquid Limit greater than 50			CH	Inorganic clays of medium to high plasticity
					OH	Organic clays of medium to high plasticity
			PT	Peat or other highly organic soils		

NOTES:
1. Dual classifications may occur (e.g. SP-SM, CL-ML, GP-GC)

PARTICLE ANGULARITY	
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular, but have rounded edges
Subrounded	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

PARTICLE SHAPE	
Flat	Particles with width/thickness > 3
Elongated	Particles with length/width > 3
Flat and Elongated	Particles meet criteria for both flat and elongated

MOISTURE	
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION	
Weak	Crumbles or breaks with handling or light finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

PARTICLE SIZE, Ps	
Boulders	Ps > 12"
Cobbles	3" < Ps ≤ 12"
Gravel	coarse 3/4" < Ps ≤ 3"
	fine 1/4" < Ps ≤ 3/4"
Sand	coarse 1/16" < Ps ≤ 1/4"
	medium 1/64" < Ps ≤ 1/16"
	fine 1/300" < Ps ≤ 1/64"
Fines	Ps ≤ 1/300"

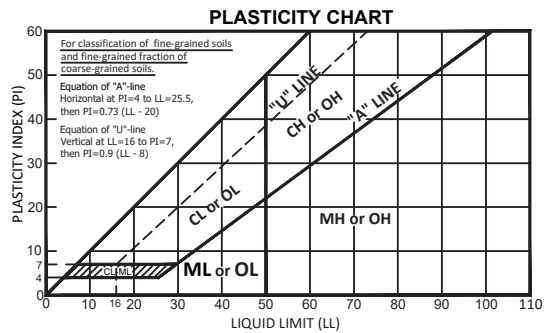
PERCENT OF SOIL, Pp	
Trace	Pp < 5%
Few	5 ≤ Pp ≤ 15%
Little	15 ≤ Pp ≤ 30%
Some	30 ≤ Pp ≤ 50%
Mostly	50 ≤ Pp ≤ 100%

SOIL SAMPLE TYPES

- B Bulk Sample
- S Standard Penetration Test (2.0" OD, 1.42" ID)
- U California Modified Sampler (3.0" OD, 2.42" ID)
- T Thin walled Shelby Tube (3.0" OD)
- R Rock Core

GROUNDWATER SYMBOLS

- Water level during drilling
- Water level after drilling



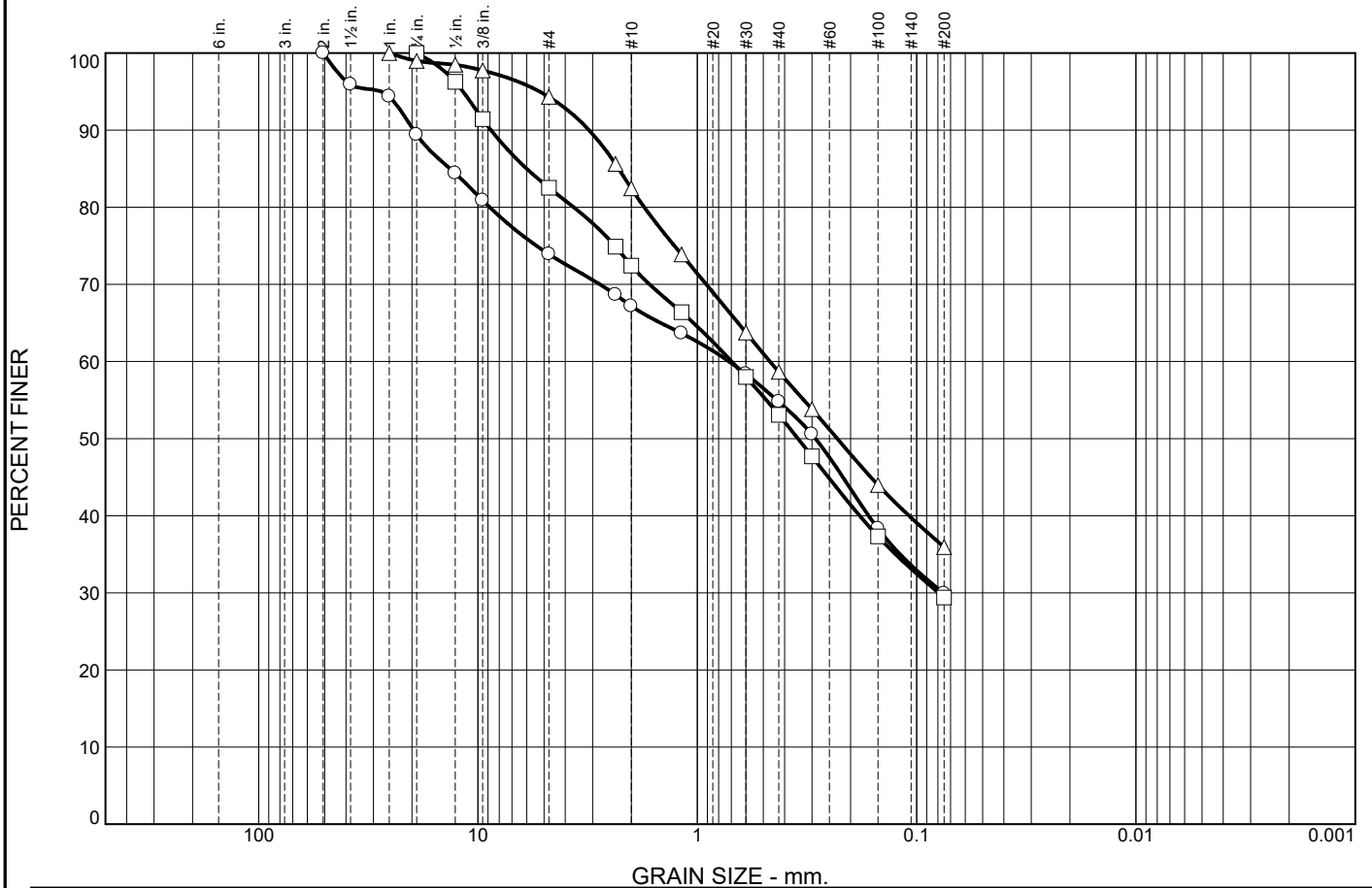
APPARENT DENSITY OF COHESIONLESS SOIL	
	SPT (1.4" ID) N ₆₀
Very Loose	< 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

Based on 60% energy ratio (ER). $N_{60} = N_{measured} * (ER/60)$
California Modified Sampler can be corrected to SPT by multiplying by 0.62

CONSISTENCY OF COHESIVE SOIL			
	SPT (1.4" ID) N ₆₀	Unconfined Compressive Strength (psf)	Pocket Penetrometer (tsf)
Very Soft	0 - 1	< 500	< 0.25
Soft	2 - 4	500 - 1,000	0.25 - 0.5
Medium Stiff	5 - 8	1,000 - 2,000	0.5 - 1.0
Stiff	9 - 15	2,000 - 4,000	1.0 - 2.0
Very Stiff	16 - 30	4,000 - 8,000	2.0 - 4.0
Hard	31 - 60	8,000 - 16,000	> 4.0
Very Hard	> 60	> 16,000	

APPENDIX B

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	10.6	15.5	6.7	12.4	24.9	29.9			
□	0.0	0.0	17.5	10.1	19.3	23.7	29.4			
△	0.0	1.0	4.7	11.9	23.8	22.7	35.9			
	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	27	22	13.4036	0.7164	0.2891	0.0758				
□	30	26	5.9965	0.6968	0.3474	0.0794				
△	42	35	2.2838	0.4666	0.2301					

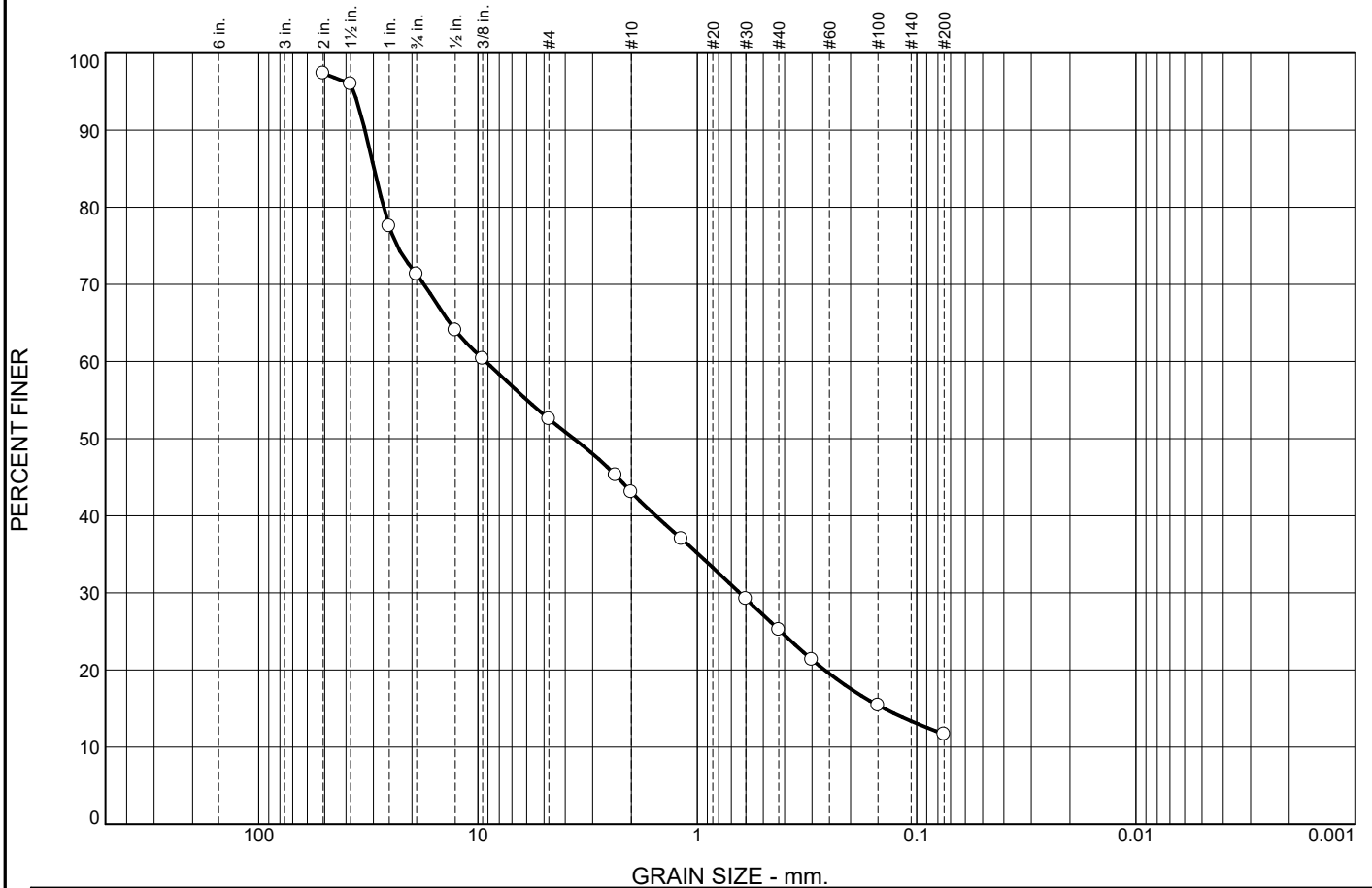
MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ SILTY, CLAYEY SAND WITH GRAVEL	10/7/19	SC-SM	16.6
□ SILTY SAND WITH GRAVEL	10/7/19	SM	19.1
△ SILTY SAND WITH GRAVEL	10/7/19	SM	41.4

Project No. 2444 Project: NTPUD - TENNIS COURTS RECONSTRUCTION PROJECT	Client: LLOYD CONSULTING GROUP, LLC Sample Number: C2 2B SUBGRADE Sample Number: C3 3B SUBGRADE Sample Number: C5 5B SUBGRADE	Remarks: <div style="text-align: right;"> PLATE B-1a </div>
---	--	---



Tested By: V. GONZALEZ **Checked By:** A. HAMPEL

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
<input type="radio"/>		18.8	9.4	17.9	13.6	11.6				
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>	NP	NP	29.7705	9.2202	3.6602	0.6417	0.1407			

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
<input type="radio"/> POORLY GRADED GRAVEL WITH SILT AND SAND	10/7/19	GP-GM	6.9

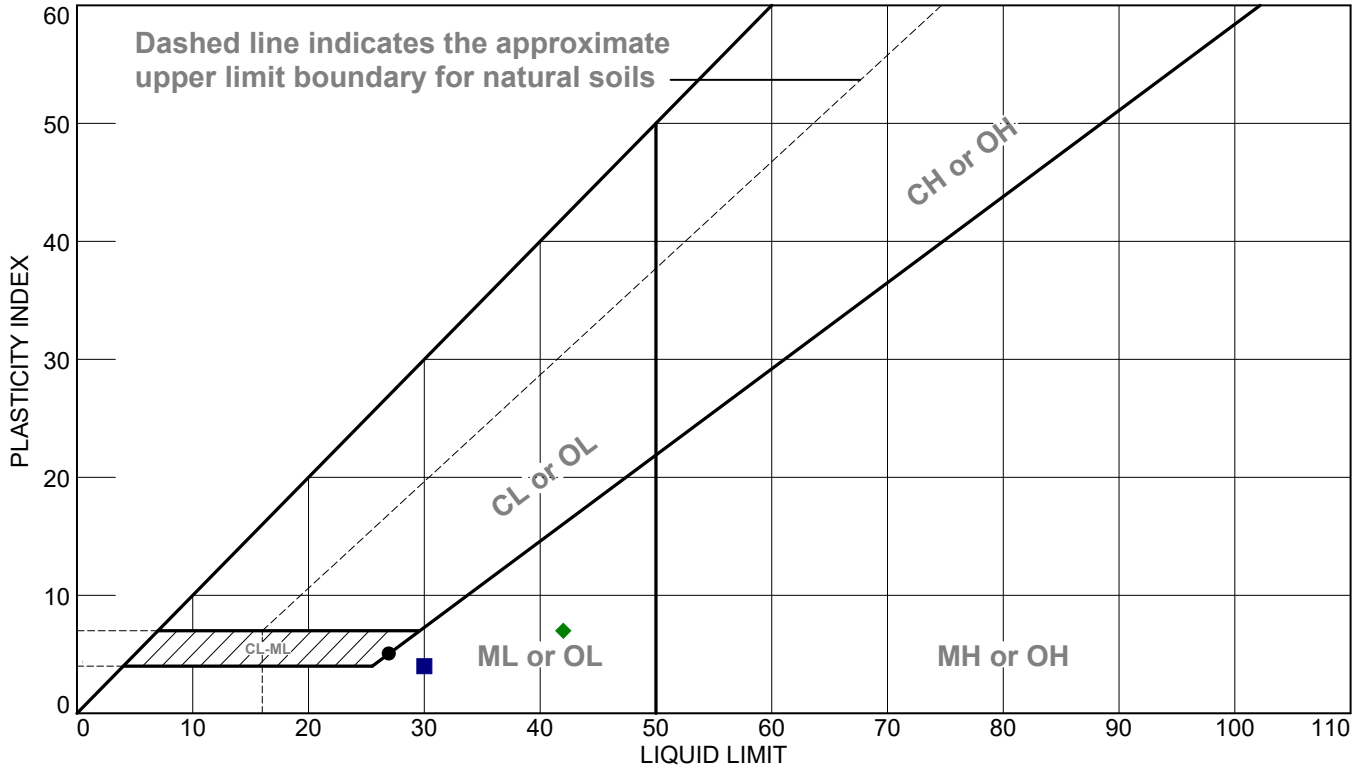
Project No. 2444 Client: LLOYD CONSULTING GROUP, LLC Project: NTPUD - TENNIS COURTS RECONSTRUCTION PROJECT <input type="radio"/> Location: C4 Sample Number: C4 4A AGGREGATE BASE	Remarks:
--	-----------------



PLATE B-1b

Tested By: V. GONZALEZ **Checked By:** A. HAMPEL

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C2 2B		16.6	22	27	5	-1.1	SC-SM
■	C3 3B		19.1	26	30	4	-1.7	SM
▲	C4 4A		6.9	NP	NP	NP		GP-GM
◆	C5 5B		41.4	35	42	7	0.9	SM



Client: LLOYD CONSULTING GROUP, LLC
Project: NTPUD - TENNIS COURTS RECONSTRUCTION PROJECT

Project No.: 2444

PLATE B-2

Tested By: C. JONES **Checked By:** A. HAMPEL

APPENDIX D

COMMUNITY AGENDAS & MINUTES

NTPUD User Group Notes – Sierra Nevada College

September 17, 2019

Attendees (via phone call):

Christian DeLeon, Sierra Nevada College (SNC)

Anthony Stevenson, Lloyd Consulting Group

Purpose:

Discuss the Colleges use of the synthetic turf field including benefits, challenges and preferred upgrades.

Notes:

1. SNC currently uses the fields for soccer and men's lacrosse. The college may add future programs such as women's lacrosse, flag football and ultimate frisbee. Ultimate frisbee uses a full size soccer field.
2. The college is NAIA and adheres to NCAA and FIFA rules.
3. The field access and parking were fine, no complaints.
4. The soccer field is relatively small for collegiate play, would prefer a regulation field (120yd x 80yd).
5. The quality of the turf is poor and they often receive complaints from visiting teams. There are some localized low spots and damaged seams as well.
6. The current drinking fountain/water fill station (south side of field) works but it would be nice to have this amenity improved as trainers fill water jugs, etc at this location.
7. Would prefer low fencing around the field and sports netting behind the goals to capture balls. Fetching balls, especially at the lower basin south of the field, can be problematic and time consuming.
8. A roof or indoor field would be preferred if there was an opportunity.
9. An indoor shower room would be preferred if there was an opportunity. Lockers would also be nice to have. Visiting teams often rent hotel rooms just for showering after the game.
10. SNC appreciates the opportunity to use the field at NTRP and there is a good relationship between the two entities. SNC donates equipment from time to time to help maintain the field.

End notes

NTPUD User Group Notes – Tahoe Truckee Unified School District (TTUSD)

September 25, 2019

Attendees (via phone call):

Laura Deslauriers, North Tahoe High School

Anthony Stevenson, Lloyd Consulting Group

Purpose:

Discuss North Tahoe High School's use of the synthetic turf field including benefits, challenges and preferred upgrades.

Notes:

1. The possibility of a 400m track was discussed. The school does not host meets as their track is not long enough, also they aren't able to guarantee it would be useable due to snow removal. Their current facilities work fine and support their current track and field program.
2. A 400m track would be nice to have but low on their list of priorities. School would prefer more field use over a track. A field house and indoor batting cages was higher on their list of priorities.
3. The school would prefer a larger synthetic turf area for drills, multiple team practice, etc. They would also prefer more field availability.
4. Ball containment was an issue, with ball leaving the field and/or rolling down the hill to the south.
5. The existing high school field has drainage problems and does not do well during soccer season (possibly because grass is still dormant). Snow removal is also difficult to perform on the field.

End notes

NTPUD User Group Notes – Tennis Stakeholders

September 24, 2019

Attendees:

Mary Cushing

Joe & Barb (San Diego)

Anthony Stevenson, Lloyd Consulting Group

Brett Long, Lloyd Consulting Group

Purpose:

Discuss NTRP tennis courts including benefits, challenges and preferred upgrades.

Notes:

- There are about 10 regulars playing tennis at the courts that were identified. Others appear to be season.
- Pickleball is drawing twice as many people
- Would like temporary/movable nets for flexibility
- Doesn't see people playing both tennis and pickleball
- Dogs and little kids on the courts are sometimes an issue, but understand the need for space for both.
- George Glante was an advocate for tennis and really created a popular tennis club with a high use of the courts.
- Courts are not currently congested except for busiest days.
- Would like to keep the three courts for tennis and pickleball on the other two for noise and separation.
- There is a drainage issue with puddling particularly in the northeast corner of the 3 courts.
- The courts have a rough texture that eats up balls quickly
- The backboard was well used and important to practice and people waiting, but is totally unusable. People use the hand ball courts below.
- There is no need for spectator seating.
- New colors of the courts are not important and thinks the red and green is fine. Yellow pickleball secondary lines make it hard to see the ball so no yellow lines.
- Things advertising could help fund the maintenance.
- They love the new gazebo, path and shade structures.

- The wind screens are important and should be kept/improved.
- Lighting is not used by regulars but should be kept and improved if possible.
- Water fountains are great.
- Balls get stuck in fence because of the aging conditions.

Mary's wish list

- Reconstruct all new courts.
- New backboard court kept outside the competition courts.
- A staff person, pro for lessons and coordination of matches etc.
- Notifications of tennis in the NTPUD newsletters and brochure.
- Better wayfinding signage and notification that the courts are there.
- Foam roller squeegee
- Ability to clean the courts as they get dusty.
- Shed for ball machine and cleaning equipment.
- Court divider low fencing with breaks between would be really good.
- 45 degree corners to keep balls out of the corners.

Pickleball Stakeholders

Jeff & Barb from San Diego

- Tennis players are becoming pickleball players as they get older. It is very popular.
- Dedicated courts would be great and they that 6 pickleball courts or more could be very comfortable in the two-tennis court space. Some players are more advanced so giving enough space for beginners is important thought.
- Didn't really matter which way the courts align
- Signage would be good.
- The more courts the better.
- The lights are great if they work.

End notes

Fwd: FW: tennis courts

1 message

Anthony Stevenson <astevenson@lloydengineers.com>
To: Zach Plum <zplum@lloydengineers.com>
Cc: Brett Long <blong@lloydengineers.com>

Wed, Oct 23, 2019 at 11:54 AM

Fyi - will need to eventually incorporate into public comment.

Anthony

----- Forwarded message -----

From: **Loren Holt** <LHolt@ntpud.org>

Date: Wed, Oct 23, 2019, 9:53 AM

Subject: FW: tennis courts

To: Anthony Stevenson <astevenson@lloydengineers.com>, Brett Long <blong@lloydengineers.com>

Cc: Brad Johnson <bjohnson@ntpud.org>, Misty Moga <mmoga@ntpud.org>

Anthony and Brett,

I wanted to pass on the following email from Mary Cushing (attended the meeting at the tennis courts) with her comments on the needs at the tennis courts. I believe they reflect what she shared with us at the meeting.

Loren R. Holt

Administrative Manager

North Tahoe PUD

 PMLB-logo-1-inch-72dpi

 NTPUD_Logo_Final_Small

From: Misty Moga <mmoga@ntpud.org>
Sent: Wednesday, October 23, 2019 8:53 AM
To: Loren Holt <LHolt@ntpud.org>
Cc: Pam Emmerich <pemmerich@ntpud.org>
Subject: FW: tennis courts

FYI

From: Mary Cushing <mhakala@aol.com>
Sent: Monday, October 21, 2019 8:20 PM
To: NTPUD <ntpud@ntpud.org>; Charles Teran <cteran@ntpud.org>
Subject: tennis courts

I will be out of town on October 24 and unable to attend the Rec & Parks Commission Meeting.

The flyer says "What Improvements Do you Envision for the Tennis Courts, Pickle Ball Courts....".

Here are my thoughts about the tennis courts, which were expressed to Lloyd Sports last month:

- The surface of the courts are in bad shape because of the lumps, especially at the back of the courts where players would be waiting to receive a serve.
- The net posts are pulling from the surface, making it impossible to put the net at the correct height of 36".
- It would be nice if the courts could be cleaned periodically. The balls get extremely dirty and last only a set.
- Also, the surface of the court is so rough that the balls' surfaces are worn down quickly.
- Wind screens are helpful not only for wind but to block out the back drop to a serve which get lost in the scenery behind the server.
- The gazebo is great !!! And the table and chairs that Bob Croke bought and placed under the gazebo are nice to have. Perhaps a recognition in the newsletter would be appropriate?
- The gutters along the fence are so deep that balls are not easily seen from the courts.
- There are several spots on the courts that are low and hold water after rain.
- A real tennis court squeegee would be nice to have to soak up the puddles.
- The shed could be used to contain supplies. There could be a combination lock that the players could know the combination for.
- The backboard and ground surface in front of it need much repair. It's nice to have right there by the court because it is easier for someone looking for a game to hit against the board while waiting.
- Our group goes pretty much every Sunday in the summer and fall. We haven't seen a whole lot of players there, so just the three courts are, I feel, sufficient.
- A question was raised about the lights. They are nice to have in the summer. It would be a shame to take them out. Maybe they could just be turned on at the courts. Having to call during the day to request, and pay, for them is a deterrent.

PICKLE BALL -

- The TCPUD supplies a cabinet at the Kilner Park courts to hold supplies, i.e. balls, chairs, etc. Pickle Ball has an 'Ambassador' at each set of courts. (S)he would have the combination to the lock on the cabinet.
- Chairs are handy for people waiting for a game.

Thank you,

Mary Cushing



**MEETING MINTUES
OF THE NORTH TAHOE PUBLIC UTILITY DISTRICT
RECREATION AND PARKS COMMISSION**

Thursday, October 24, 2019 at 6:00 P.M.

**North Tahoe Event Center
8318 North Lake Boulevard
Kings Beach, CA 96143**

Call to Order/Establish Quorum/Pledge of Allegiance

Chairperson Slack-Cruz called the meeting of Recreation and Parks Commission to order on Thursday, October 24, 2019 at 6:00 P.M. Roll call was taken. Present were Recreation and Parks Commission, Chairperson Linda Slack-Cruz, Commissioners Nathan Chorey, Charles Teran, Kristen Pepin, Michael Stoltzman, and Alternate Commissioner Jo Ann Cobb. Alternate Commissioner Heggen was not present. Directors Daniels and Mourelatos of the District's Recreation Committee were present. NTPUD Staff present included General Manager Johnson, Administrative Manager Holt, and Administrative Liaison Moga. 13 members of the public were also present.

Public Comment and Questions –

Eric Strecker, Vice President of United Futbol Club, stated he was excited to hear about the turf field update and wanted to show support. He noted he has players from Truckee and Incline, and weather is an issue. He spoke about hosting tournaments, and how having a turf field on the lake side is a big deal. He stated they are making progress on the club side, and this fills a void in the area. He supports synthetic turf versus natural grass.

There were no further requests for public comment. Chair Slack-Cruz closed the Public Comment and Questions item.

Approve Minutes from Recreation and Parks Commission Meeting held on September 26, 2019 - The minutes of the meetings of the Recreation and Parks Commission held on **September 26, 2019** were presented and approved by the following motion.

MOTION: Upon motion by Commissioner Teran and second by Commissioner Chorey, the Commission voted to approve the minutes of September 26, 2019. Commissioner Stoltzman and Pepin abstained. The motion carried.

Recreation & Parks Department Report

Administrative Manager (AM) Loren Holt highlighted items from his report. He provided a status update regarding the fuel reduction progress in the Park.

He noted the restrooms in the park had hydronic heating issues which was under warrantee.

He provided an update regarding boat launch and NETC. In response to Commissioner Chorey's inquiry regarding revenue and usage, AM Holt noted season pass holders were the primary launchers after Labor Day. Commissioner Chorey noted the commercial rate structure. AM Holt stated commercial rate structure can be agendized for a future meeting if there is a desire to review and provide a recommendation to change the rates.

Public Information Officer Recreation Outreach Update - GM Johnson referenced the PIO report is included in the packet, and items will be discussed in-depth later in the meeting.

Monthly Review of Recreation and Parks Department Financial Statement for Month ending August 31, 2019 - AM Holt reviewed the Financial Statement for August. He noted new budget formatting to reflect actuals. He noted they are working on cleaning up the event center finances. GM Johnson noted there was no revenue from motorized concessionaire at TVRA this year.

Director Mourelatos and Staff discussed about grant revenues timing. AM Holt reminded the commission that the revenue will come in once the project is completed and billed.

General Commission Business

Review and Selection of Resident Benefit and Park Supporter Sticker Artwork for 2020-2021 - AM Holt presented the item and provided background information. The Boys & Girls Club participants submitted art work for 2020-2021 stickers. First place will be on the 2-year Resident Sticker; the second and third place will on the Parks Supporter for one year.

The Commission ranked 6 drawings: Top Score is the Eagle drawing; 2nd place is 'Parks Make Me Happy' drawing. 3rd place is 'I love Lake Tahoe' drawing.

MOTION: Commissioner Teran moved to recommend these three drawings for the Resident Benefit and Park Support Sticker Artwork for 2020-2021. Commissioner Stoltzman seconded the motion. The motion carried unanimously.

Discuss and Provide Recommendation to Staff for Winter Movies at the North Tahoe Event Center - AM Holt noted Staff is seeking direction and recommendation regarding winter movies to follow the success of July's movies in the Park. GM Johnson noted this was a goal of the North Tahoe Event Center Advisory Group to host more activities here.

The Commission and Staff discussed the following ideas:

- Ski films
- Conducting a survey to gauge the community interests
- Avoid hosting movies during holiday weeks, Snowfest, ski/skate week, Christmas, New Year's.
- Host movies with dinner.
- Host a series in one month like we did in July and extended it if it goes well.
- Host a movie for Snowfest the Friday night before the pancake breakfast.
- Show a Warren Miller film, partner with a promoter, and serve alcohol during ski films.
- Host movies on a regular schedule to help people plan like 'Theater Thursdays.'
- Avoid hosting family movies on school nights. Friday nights would be good for families. Hosting kids' movies on Friday, all other movies on Thursday nights.
- Older demographics may enjoy documentaries, special interest, and ski films.
- Partner with the School District.
- Host 'Family Fridays' at the Event Center and alternate with game night.
- Host 'Theater Thursdays' or 'Family Fridays' in mid-January or mid-February.

Discuss and Provide Recommendation to Staff for Submittal of Capital Projects (TOT) Grant - Staff spoke about the application deadline and the record amount of funds available for Fall applications. Lloyd Sport + Engineering adjusted their schedule, scope and concept of the plan to go after significant amount of funds. Staff reviewed the proposed site improvements including turf, drainage improvements, and tennis/pickleball court project. AM Holt noted additional funds available from the Per Capita grant funds for renovation. Commissioner Pepin recommended the accessibility path as part of the application.

Anthony Stevenson, Lloyd Sport + Engineering, reviewed specific projects with a conceptual site plan and cost summary. He spoke about existing conditions at the synthetic field including an expansion to allow for more uses, tennis/pickleball courts, potential bocce courts, and lighting upgrades.

Commissioners and Staff discussed the scope, bid environment, and matching funds. They discussed improvements for the local community and tourists. GM Johnson spoke about design, permitting, and construction timing.

Director Mourelatos spoke about the opportunity of a field house. He noted the CAP Committee already heard about it and was excited. GM Johnson stated a multi-agency partner application would be the best approach and a feasibility study would need to be conducted for the field house.

The Commission and Staff discussed the lifespan of the current synthetic field and alternative approach if CAP Committee doesn't approve the grant application.

MOTION: Commissioner Pepin moved to support Staff's recommendation to include the entire project scope when applying to the Placer County Capital

Projects Advisory (CAP) Committee. Commissioner Teran seconded the motion to support Staff's recommendation. Commissioner Chorey amended the motion to add a feasibility study for a phased two for a field house. During a brief discussion, Commissioner Chorey and Director Mourelatos expressed they would like the opportunity to explore the physical requirements for a field house. Commissioner Pepin and Teran accepted the amendment to the motion. The motion carried unanimously.

Discuss and Provide Recommendation to Board of Directors Regarding Recreation and Community Event Supervisor Position - AM Holt introduced the item and noted the NTEC Working Advisory Committee recommended a Recreation and Community Event Supervisor position to support the Event Center Manager. Additionally, this position would take over the activities for Parks Make Life Better Month and Winter movies. The Commission and Staff discussed additional responsibilities such as recreation programming, community events, coordinate programs, partnership and collaboration with community agencies such as scouts, softball leagues, community garden, Boys & Girls Club, School District and neighboring Utility Districts.

MOTION: Commissioner Stoltzman moved to recommend Recreation and Community Event Supervisor position. The motion, which was seconded by Commissioner Chorey, carried unanimously.

North Tahoe Regional Park Planning Study Workshop (Time certain – 6:30 p.m.) – Review, Discuss, and Receive Community Input on Tennis/Pickleball Courts and the Synthetic Turf Field (Field #4) moderated by Lloyd Sports + Engineering

Lloyd Sports + Engineering representative Anthony Stevenson and Zach Plum provided a comprehensive study report.

Staff spoke about lighting standards and accessibility into the courts.

Mr. Stevenson spoke about use, maintenance, and ROI of synthetic fields versus natural grass.

Staff, Commissioners, and Directors discussed the industry standards and the benefits of higher performing fields.

Public Comment:

Pat Dillon, Tahoe Vista resident, stated he and his friends are interested in Pickleball. He noted he appreciated the painted courts and is excited that pickleball is being taken seriously. He spoke about how Pickleball is increasing in popularity every year. He inquired about the project timeline. GM Johnson stated possible grants would accelerate the projects and spoke about possible configurations of pickleball courts. Mr. Dillon noted he would like the striping to be changed to a different color and temporary nets like Carnelian. He stated he is excited and will work to encourage the community to get involved. Mr. Dillon noted he plays Wednesday after work, 5-9 p.m. in height of summer, and Saturdays or Sundays

mornings. He added there hasn't been any user conflicts with Tennis and Pickleball groups, and no wait times to play at this facility. He expressed the desire for tournaments.

John Wood spoke about lighting on the tennis courts. He noted the lights light up everything. He said moving forward, it would be nice to divide the lights, so it doesn't light up all the courts.

Andrew Kojane, President of North Tahoe Little League, stated he works with NTPUD year-round on fields and maintenance along with Katerina Smolen. He spoke about an AYSO field house. He added the field needs to be replaced but would love to see it covered. It's a large undertaking with a large price tag. He stated between the sports teams and user groups, the money could be raised between public and private entities to construct this field house. He stated a field house with year-round use would be the cornerstone of the community and NTPUD. He added that Katrina has been researching the field house for Squaw Valley and presented to the CAP committee last year. She has a lot of experience and can speak to the project.

Katrina Smolen, lacrosse board member, stated they prepared a TOT feasibility study, and a sports pavilion was a high priority. She spoke about the costs of a steel pavilion. She stated she spoke with California State Parks about funding opportunities for indoor use facilities. She added lacrosse has raised funds. She spoke about the popularity of lacrosse and how teams come here for lacrosse tournaments which bring in a lot of visitors to the area. She stated the Truckee River Federation is spending \$40,000 a year on renting Reno sports dome for training. She added a field house would extend use of the field. She noted she has a lengthy PowerPoint slideshow. She spoke about TRPA limitations with the fields. She asked the Commission to consider a field house. She stated there isn't a facility to host a Google event. She added a field house would allow multipurpose activities with revenue opportunities. She stated Lacrosse begins March 1. Lacrosse players are showing up to the field with only having practice in the gym.

Eric Strecker stated the Reno Sports Dome is a converted hanger. He stated they send their players down there. This is the direction of soccer and other indoor sports. Reno Sports Dome is maxed out and are looking to open another facility in South Reno. He stated creating a similar field house is cutting edge and well received. He added his tournament brings in 96 teams and the desire to come to the area to play is significant. To host it year-round would change dynamic of sports in this area.

The Commissioners discussed the study and public input. Director (Recreation Committee member?) Mourelatos expressed the need to look at a field house to draw sports teams and create a year-round venue. GM Johnson spoke about the immediate needs of the field and tennis courts. He added finances for a field house need to be explored with private-public partnerships. Commissioner Teran agreed with the General Manager. He spoke about the Master Plan and added this is the proper direction. Chair Slack-Cruz stated due to end of life and safety issues, these assets need to be fixed. She added she appreciates the community support on this first step. Director Mourelatos thanked the public members for attending. He spoke about the best use of our facility, and revenue opportunities for the District.

Commissioner Pepin stated it would be nice to have a concessionaire in the Park to rent out equipment for soccer, bocce, tennis, and snacks. GM Johnson noted the current concessionaire uses the building in the winter but can be considered as recreation and tournaments grow in the Park. The first step is to improve infrastructure and build services around it.

In response to Commissioner Chorey's question, GM Johnson noted an all-weather track was identified in Master Plan; however, the School District has provided feedback that additional turf space to allow for more groups and uses would be a higher priority than a formal track.

Jen Regan, involved with AYSO, stated she was on the TTUSD Committee for later school start times. She said later start times got shot down because of athletics. If school starts later, then there isn't enough time for practices. She added that Governor Newsom just passed a bill for later school start times. She spoke about the benefit of the field house.

Long Range Calendar

The Commissioners discussed the Commissioner's report schedule for the Board of Directors meetings. Commissioner Stoltzman will present at December 10 and Commissioner Chorey will report at the January Board meeting. GM Johnson noted Commissioner applications are due November 8. December 12 is the next Commission meeting. GM Johnson announced December 14 is the District's holiday dinner; RSVP to Misty if you need childcare.

Commissioner Comments and Questions

Commissioner Teran announced he is selling Passport to Dining event tickets.

GM Johnson noted the RFP for NTEC architectural study is being finalized and will keep the Commissioners posted.

Community Garden Update – Alternate Commissioner Cobb reported that she met with Commissioner Teran and Topher Marlatt, an interested resident, at the garden. She spoke about Forest Hill Community Garden. She reported she received community interest from the e-Newsletter. Staff and Commissioners discussed charging for the garden. GM Johnson recommended gathering comparisons of the other community gardens in the area. Alternate Commissioner Cobb noted she would like to host a community garden meeting in March. She added the Truckee nursery is donating daffodil bulbs. Commissioner Teran requested a report of reserves for the garden. He suggested contacting contractors for free scraps to build boxes. Director Daniels recommending using tires or horse troughs for tomatoes.

Adjournment - There being no further business to come before the Commission, the meeting was adjourned at 9:20 p.m.

APPENDIX E
SITE PLAN AND SKETCHES

CONCEPTUAL SITE PLAN

NORTH TAHOE
REGIONAL PARK
1500 W. WARDEN RD.
TAHOE VISTA, CA

DATE: 10/22/2019
PROJ.: 19-153

SHEET
1 OF 4



CONCEPTUAL SITE PLAN

NORTH TAHOE
REGIONAL PARK
6900 DONNER RD
TAHOE VISTA, CA

DATE: 10/22/2019
PROJ.: 19-133

SHEET
2 OF 4



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CONCEPTUAL SITE PLAN

NORTHTAHO
REGIONAL PARK
15000 W. WILSON AVENUE
TAHOE VIEW, CA

DATE: 10/22/2019
PROJ: 19-133

SHEET
3 OF 4



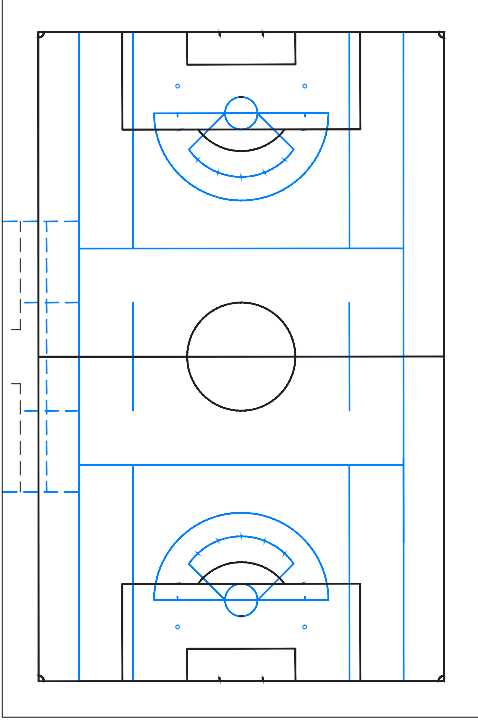


CONCEPTUAL SITE PLAN

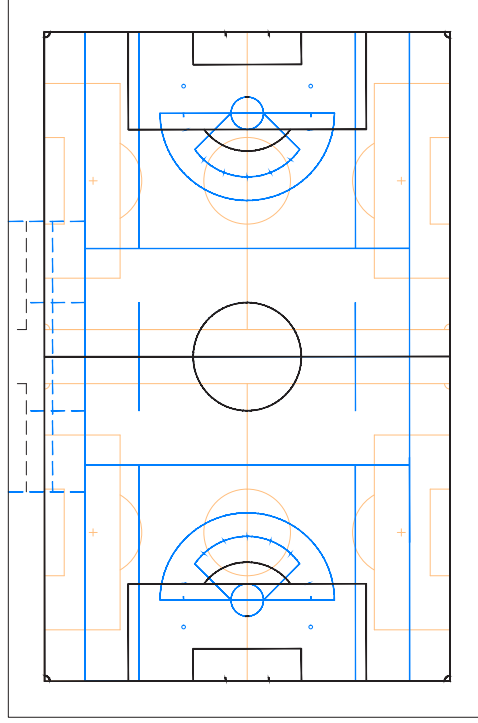
**NORTH TAHOE
REGIONAL PARK**
5600 DOWNER RD
TAHOE, NV 96141, CA

DATE: 10/22/2019
PROJ: 19-153

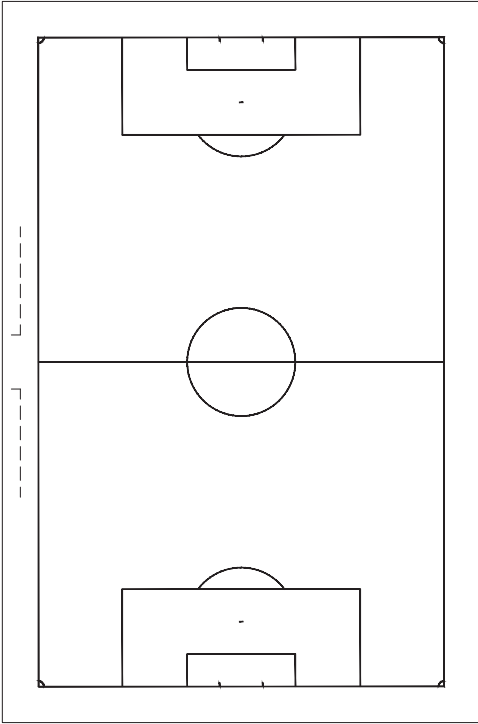
SHEET
4 OF 4



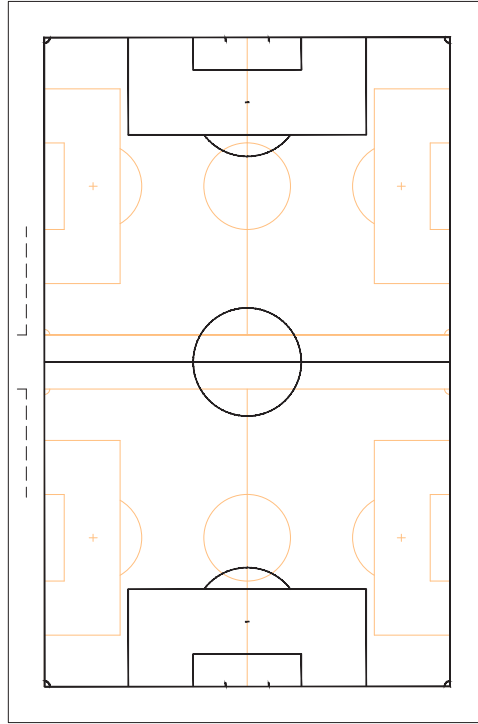
NCAA SOCCER AND LACROSSE



NCAA SOCCER, LACROSSE AND AYSO U-12



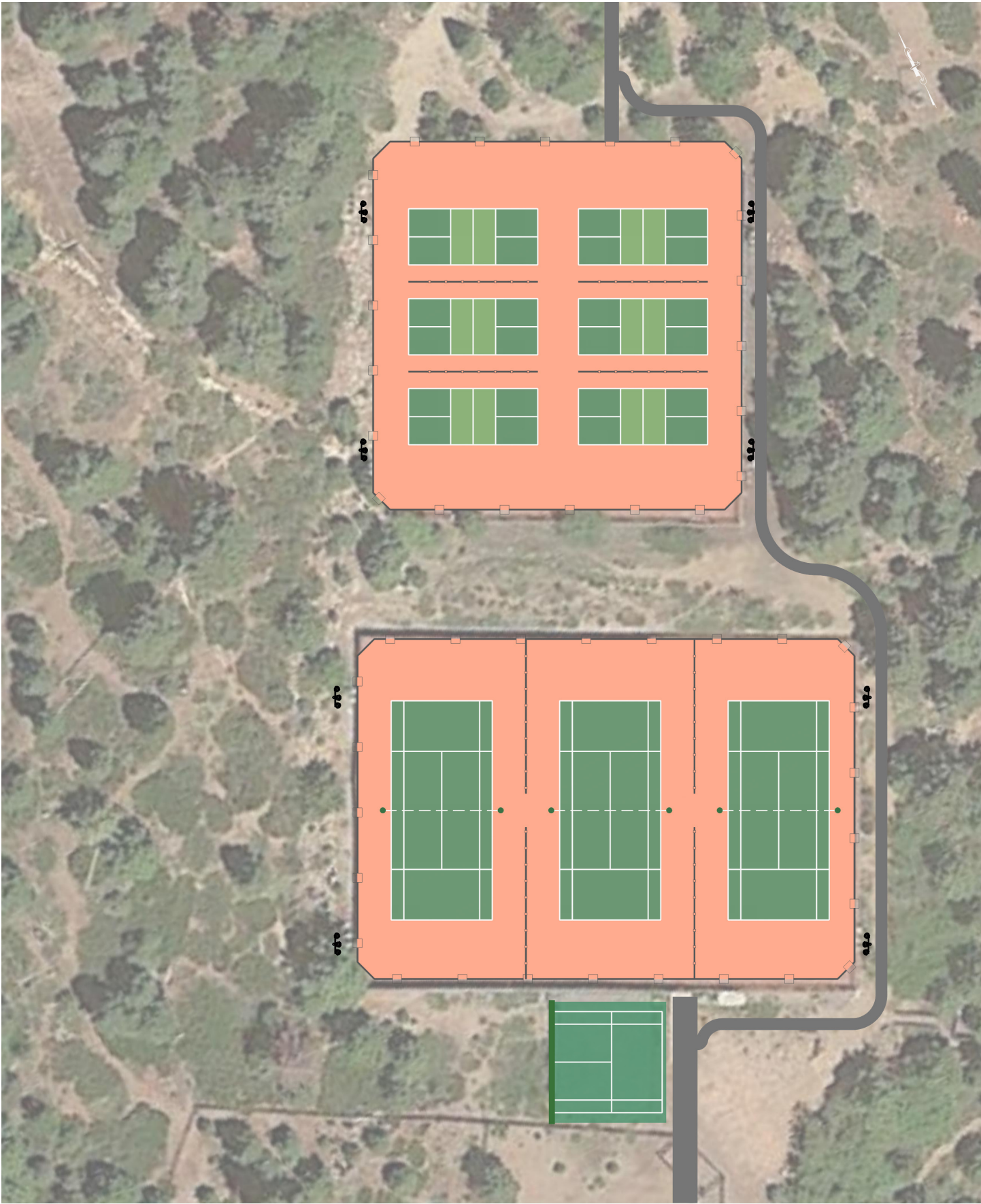
NCAA SOCCER



NCAA SOCCER AND AYSO U-12

This plan document and the site plan are the sole property of Lloyd Consulting Group, LLC. No alterations to these plans are allowed without the written consent of Lloyd Consulting Group, LLC.

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APPENDIX F

OPINION OF PROBABLE CONSTRUCTION COST

DRAFT



Date **January 31, 2020**
 Project **North Tahoe Regional Park**
 Proj No **19-133**
 Plans **Conceptual Site Plan**

Opinion of Probable Construction Cost

Synthetic Turf Field, Asphalt Concrete Tennis/Pickleball Courts, Bocce Ball

Synthetic Turf Field Resurfacing	Qty	Unit	Unit Cost	Total Cost
Existing Turf Removal & Disposal	75,000	SF \$	1.00 \$	75,000
Subgrade Preparation	37,000	SF \$	0.65 \$	24,050
Subgrade Rough Grading	37,000	SF \$	0.50 \$	18,500
Subgrade Fine Grading	37,000	SF \$	0.75 \$	27,750
Install New Stone Base	37,000	SF \$	2.00 \$	74,000
Fine Grade New Stone Base	37,000	SF \$	0.75 \$	27,750
Fine Grade Existing Stone Base	75,000	SF \$	0.50 \$	37,500
Concrete Perimeter Curb	1,330	LF \$	22.50 \$	29,925
Nailer Board Installation	1,200	LF \$	5.00 \$	6,000
Install Base Pad	112,000	SF \$	2.00 \$	224,000
New Synthetic Turf Installation	112,000	SF \$	6.00 \$	672,000
Field Drainage Allowance	1	EA \$	50,000.00 \$	50,000
				\$ 1,266,475
Additional Cost				
General Conditions	10%		\$	126,648
SWPPP	2%		\$	25,330
BMP's	3%		\$	37,994
TRPA Filing Fee	1	LS \$	6,000.00 \$	6,000
Design Fee	8%		\$	101,318
				\$ 297,289
				\$ 1,563,764

Tennis/Pickleball Court Renovation	Qty	Unit	Unit Cost	Total Cost
Remove and Dispose of Existing CL Fence & Gates	1,080	LF \$	6.00 \$	6,480
Remove and Dispose of Existing Tennis Posts & Netting	18	LF \$	6.00 \$	108
Remove and Offhaul AC Pavement	555	CY \$	100.00 \$	55,500
Stockpile Existing AC Base	890	CY \$	15.00 \$	13,350
Subgrade Preparation	36,000	SF \$	0.75 \$	27,000
Grading Tennis/Pickleball Court Area	36,000	SF \$	0.50 \$	18,000
Fine Grade Base	36,000	SF \$	1.00 \$	36,000
Concrete Ribbon Curb	1,080	LF \$	22.50 \$	24,300
Asphaltic Concrete Installation	36,000	SF \$	6.00 \$	216,000
Acrylic Surfacing	36,000	SF \$	3.00 \$	108,000
Tennis/Pickleball Netting	9	EA \$	3,000.00 \$	27,000
Court Furnishings	9	EA \$	1,000.00 \$	9,000
New 12' Chainlink Fencing & Gates	1,080	LF \$	120.00 \$	129,600
Lighting Improvements	8	EA \$	1,500.00 \$	12,000
Remove and Offhaul AC Pavement (Ball Wall Court)	25	CY \$	100.00 \$	2,500
Fine Grade Base (Ball Wall Court)	2,650	SF \$	1.00 \$	2,650
Concrete Ribbon Curb (Ball Wall Court)	200	LF \$	22.50 \$	4,500
Asphaltic Concrete Installation (Ball Wall Court)	2,650	SF \$	6.00 \$	15,900
Acrylic Surfacing (Ball Wall Court)	2,650	SF \$	3.00 \$	7,950
Install Wall (Ball Wall Court)	450	SF \$	100.00 \$	45,000
				\$ 760,838
Additional Cost				
General Conditions	10%		\$	76,084
SWPPP	2%		\$	15,217
BMP's	3%		\$	22,825
TRPA Filing Fee	1	LS \$	6,000.00 \$	6,000
Design Fee	8%		\$	60,867
				\$ 180,993
				\$ 941,831

Bocce Ball Construction (Each Court)	Qty	Unit	Unit Cost	Total Cost
Excavate (Depth of 13")	988	SF \$	4.00 \$	3,952
Offhaul	36	CY \$	60.00 \$	2,160
Grading Bocce Ball Area	988	SF \$	2.00 \$	1,976
Drainage	988	SF \$	7.50 \$	7,410
Concrete Perimeter Curb with Bumper and Accessible Gate	180	LF \$	80.00 \$	14,400
Install Filter Fabric	988	SF \$	1.00 \$	988
Install 4" Compacted Class II Base Rock	988	SF \$	3.00 \$	2,964
Install 1" Decomposed Granite	988	SF \$	4.00 \$	3,952
Install Pacific Pearl Bocce Blend	988	SF \$	12.00 \$	11,856

Shade Trellis	2	EA	\$	3,000.00	\$	6,000
					\$	55,658

Additional Cost

General Conditions	10%				\$	5,566
SWPPP	2%				\$	1,113
BMP's	3%				\$	1,670
TRPA Filing Fee	1	LS	\$	6,000.00	\$	6,000
Design Fee	8%				\$	4,453

Subtotal (2 Courts) \$ 148,919

Site Improvements

Remove and Dispose of Trees	15	EA	\$	700.00	\$	10,500
Remove and Dispose of Pathway DG (Top 12")	315	CY	\$	40.00	\$	12,593
Asphalt Sidewalk	8,500	SF	\$	6.00	\$	51,000
Grading Hardscapes	8,500	SF	\$	1.50	\$	12,750
Allowance for Entry Improvements	1	EA	\$	10,000.00	\$	10,000

\$ 96,843

Additional Cost

General Conditions	10%				\$	9,684
SWPPP	2%				\$	1,937
BMP's	3%				\$	2,905
TRPA Filing Fee	1	LS	\$	6,000.00	\$	6,000
Design Fee	8%				\$	7,747

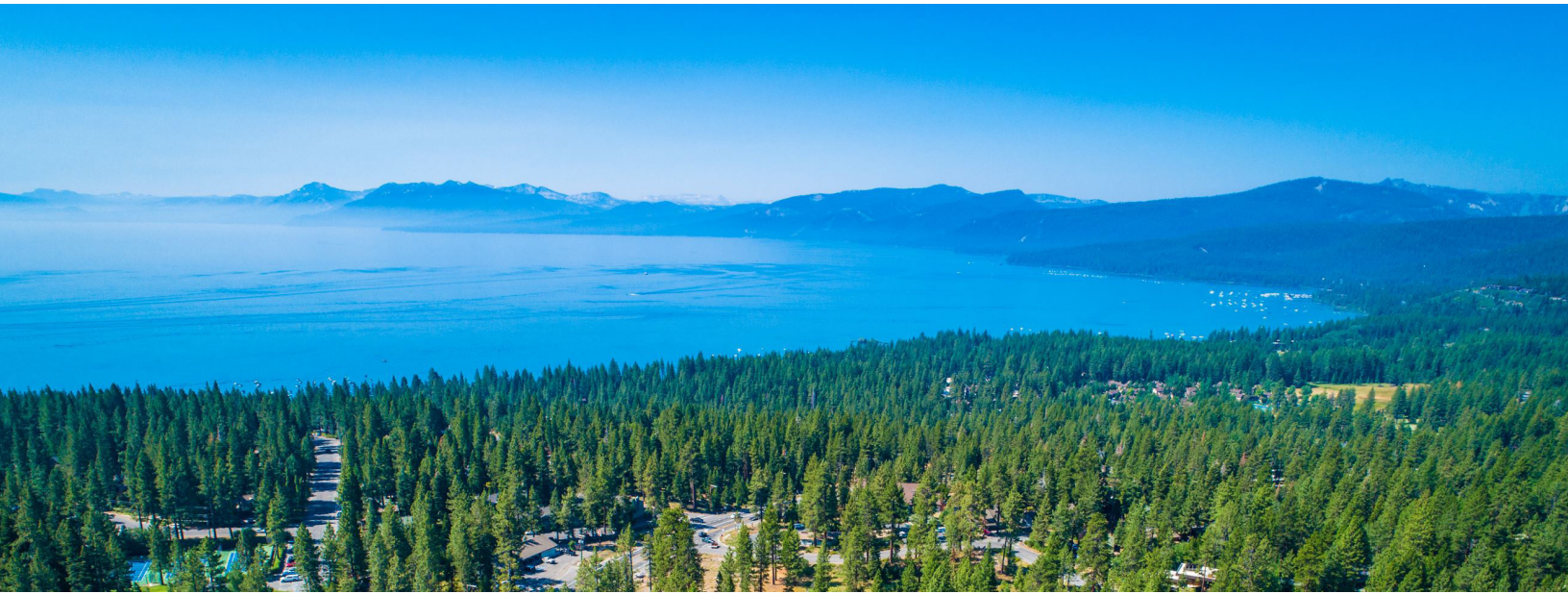
\$ 28,274

Subtotal \$ 125,116

Scope Summary

Synthetic Turf Field Resurfacing					\$	1,563,764
Tennis/Pickleball Renovation					\$	941,831
Bocce Ball Construction (2 Courts)					\$	148,919
Site Improvements					\$	125,116

SCOPE TOTAL 2,779,630



January 31, 2020

Prepared by: Lloyd Consulting Group, LLC

lloydengineers.com

