Engineers Planners Surveyors Landscape Architects Environmental Scientists

MASER CONSULTING P. A.

FEASIBILITY STUDY FOR

WITTE MEMORIAL FIELD RECREATION COMPLEX IMPROVEMENTS

Borough of Englewood Cliffs, Bergen County, NJ

December 15, 2016

Prepared For

BOROUGH OF ENGLEWOOD CLIFFS
428 Hudson Terrace
Englewood Cliffs, NJ 07632

Prepared By

Maser Consulting P.A.
400 Valley Road, Suite 304
Mt. Arlington, NJ 07856
973.398.3110

ANDREW R. HIPOLIT, P.E., P.P., C.M.E.
License No. 39428

MC Project No. ECB-068

BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY
NEW JERSEY

FEASIBILITY STUDY
WITTE MEMORIAL FIELD RECREATION COMPLEX IMPROVEMENTS

Table of Contents

Description	Page
Table of Contents	i
Feasibility Study Purpose	1
Overview	2
Existing Conditions Assessment	2-3
Sports Usage	3-4
Proposed Concepts	4-8
Cost Estimates	8-9
Permitting	9-10
Proposed Traffic Calming	10-11
Conclusion	11-12

Appendix A: Location Map

Appendix B: Site Photos

Appendix C: Sports Usage Data

Appendix D: Concept Plans

Appendix E: Concept Cost Estimates

Appendix F: Proposed Playground and Amenities Cut Sheets

Appendix G: Permitting

Appendix H: Traffic Calming Study

Appendix I: Lighting Information

Feasibility Study

The Borough of Englewood Cliffs has retained Maser Consulting P.A. (Maser) to investigate the possibility of upgrades to the Witte Memorial Field Recreation Complex (Witte Field) as well as suggest safety improvements to Johnson Avenue within the vicinity of the field. The feasibility study will look at the existing park in its entirety including the existing field layouts, surfaces and safety. The study will evaluate both natural grass and synthetic turf options and cover the following:

1. Existing and proposed field and overall park use;
2. Review of existing field maintenance budget and recommendations;
3. Review of field schedules and participation trends for all sports (schedules and trends to be provided by Borough);
4. Existing and possible field layouts;
5. Traffic calming on Johnson Avenue;
6. Parking options for complex;
7. Existing conditions and topographic site survey;
8. Permitting requirements;
9. Synthetic Turf vs. Natural Grass comparison;
10. Fencing and amenities options;
11. Existing Playground layout and possible layout;
12. Proposed open-air pavilion;
13. Sports lighting options;
14. Lead free synthetic turf specification;
15. Provide preliminary cost estimates;
16. Phasing for all options;
17. ADA compliance review;

Overview

Witte Field is a 4.5 acre borough park with existing sports facilities located along Johnson Avenue between Samford and Willow Drives (see Appendix A). The park is bounded by the Sylvan office complex to the northeast, the CNBC office complexes to the southeast and southwest and Johnson Avenue to the northwest. The park's two (2) main entrances are from Johnson Avenue. The majority of the park is fairly flat in elevation, but there is steeper topography along Johnson Avenue (the park is at a higher elevation with respect to Johnson Avenue). The park contains four (4) existing sports fields: soccer, 90 ft. baseball, 60 ft. softball and 60 ft. Little League baseball. The park's amenities include: a concession/storage building, bleachers, fencing, a children's playground, three (3) electronic scoreboards, memorials for the deceased, a basketball court, a lighted walking path with dog waste stations and five (5) tennis courts and batting cages (the tennis courts and batting cages are located on CNBC property to the southwest, but are accessed from the park). Stormwater runoff enters existing stormwater drainage structures throughout the park that ultimately discharge into the Johnson Avenue storm sewer system.

Existing Conditions Assessment

Fields

The park contains four (4) existing sports fields: soccer, 90 ft. baseball, 60 ft. softball and 60 ft. Little League baseball. Based on Maser's site visit on September 27, 2016, the natural grass on the fields appears to be in poor condition due to wear by overuse and poor drainage. Standing water and soft spots were evident (see Appendix B, Site Photos, specifically images 14 and 20). The site grading and wear spots do not allow water to run off properly and ponding water needs to be addressed. The fields have been redone with natural grass twice in the last 20 years. The fields do not receive proper maintenance and closure to allow the grass to grow and/or regenerate properly.

Irrigation

The irrigation system us currently operation, but due to the age of the system and the Borough's limited recreation maintenance budget, the Borough acknowledges the irrigation system needs repair and, more than likely, new, modern irrigation heads. If the Borough does not move forward with the addition of a sports field, Maser recommends an investigation of the existing system by a qualified irrigation specialist be required to determine the level of operational performance of the existing system. An irrigation cup test should be performed to determine the saturation rate / coverage of the existing heads. The results of this test would enable the Borough to make an informed decision regarding upgradability. The cost of a cup test with report is in the neighborhood of $2,500. A good-quality irrigation head may cost as much as $500 alone.

Path

The existing paths surrounding the fields and within the park are in good structural condition, but standing water was evident during Maser's site visit (see Appendix B, specifically images 12 and 13).

Amenities

The park's amenities include: a concession/storage building, bleachers, fencing, a children's playground, three (3) electronic scoreboards, memorials for the deceased, a basketball court, a lighted walking path with dog waste stations and five (5) tennis courts and batting cages. Note: the basketball and tennis courts were resurfaced and repainted earlier this year. There are no anticipated changes to these amenities. Given the age of the park and the overall lack of previous improvements, for the purposes of this study, the following existing amenities are considered to be removed and replaced with new:

- All fencing;
- All children's playground equipment;

- Two (2) older electronic scoreboards (newer Electro-Mech brand electronic scoreboard to remain);
- 90 ft. baseball and softball dugouts;
- All dog waste stations;
- All batting cages;
- All benches;
- All baseball, softball and Little League bases.

Children's playground
The park features a four (4) foot high chain link fenced-in children's playground along Johnson Avenue near the northern property corner (see Appendix B, specifically images 2, 3, 5 and 6). For children, the playground includes such features as a swing set (for toddlers and older children), a tunnel, slides and climbing apparatuses. Several benches within the playground are available for those who prefer to sit while the children play. The playground's surface consists of wood mulch.

Parking

For park visitors, motor vehicle parking is restricted to the south side of Johnson Avenue. There are two (2) existing, striped handicap parking spaces located adjacent to the park's southwestern entrance. Although not striped, motor vehicle parking space is available east of the handicap parking spaces. Including the two (2) handicap parking spaces, a total of approximately 25 motor vehicles are able to park along the south side of Johnson Avenue, along the park's frontage. Due to the width of Johnson Avenue (approximately 40 feet), parking on both sides of the street is not possible.

ADA Compliance

The existing park has one main entrance on the west end of the site. Under the 2010 ADA Standards for Accessible Design, Chapter 4, Section 403.3, "the running slope of walking surfaces shall not be steeper than 1:20". Under existing conditions, the main entrance has an average slope of 1:10, and therefore does not fall under current ADA standards and should be renovated.

Budget
Given the Borough's low recreational maintenance budget of approximately $7,000 per year, this amount is insufficient to maintain the existing fields. Should the Borough move forward with any of the concepts outlined herein, the maintenance budget would need to be increased.

Sports Usage

The Borough's recreation department has provided Maser with Witte Field hourly sports usage data for calendar years 2015 and 2016 (see Appendix C). The Borough's sports usage data contains only soccer and softball games since these are the only outdoor sports contracted-with/scheduled through the Borough. The Borough does not have any baseball usage data (Little League or 90 foot) and as a result, Maser reached out to Mr. Rafi Jafri, President, Englewood Cliffs Little League for this data (see Appendix C).

Note: The use of the tennis and basketball courts and batting cages are on a first-come, first-serve basis and, as a result, there is no usage data.

An analysis of the softball and soccer usage data reveals the following trends:

- The total number of soccer scheduled hours decreased 33 hours (approximately 16%) from 204 in 2015 to 171 in 2016;
- The total number of softball scheduled hours increased 140 hours (over 200%) from 114 in 2015 to 254 in 2016.

In our discussions with Paul Duffy, Borough Recreation Director, Mr. Duffy stated,

> *"The decrease in soccer usage from 2015 has to do with no longer having a contract with Dwight Englewood Middle School where they used our field for practice from September through October of that year."*

With regards to the solid increase in softball usage, Mr. Duffy surmised,

> *"The increase in softball usage for 2016 is probably due to the fact that anyone who wanted to use the premises had to book it through the Recreation department and so it was documented."*

An analysis of the Little League and 90 foot baseball data reveals the following trends:

- The number of Little League games has remained constant from 2014 through 2016 (seventy five (75) each year);
- The number of ninety (90) foot baseball games remained the same in years 2014 and 2015 (seven (7) each) and increased to ten (10) in 2016.

When analyzing the sports usage data as a whole, the following trend is revealed:

- Soccer and softball are the most played sports at the park followed by Little League Baseball. 90 foot baseball, while seeing an increase of almost 150% from 2015 to 2016, remains the least played sport.

Proposed Concepts

Maser has prepared four (4) concept plans for Witte Field based on the following design parameters (see Appendix D):

- Maximize athletic field dimensions to accommodate both soccer and lacrosse;
- Add parking spaces on park grounds to lessen the burden of off-site parking on local streets;
- Maximize the number of simultaneous playable sports.

When reviewing a concept for field orientation, bear in mind that field orientation is an important program element since glare can create visibility issues for athletes, depending on the sun's position in the sky. Ideally, the best orientation for a field would be in a north-south direction in order to reduce the possibility of morning or evening glare for one side of the field.

Proposed Concept No. 1

Concept No. 1 features a 180 ft. x 330 ft. soccer field (360 ft. x 220 ft. including run-out areas; the smallest allowable high school sized soccer field that can also accommodate lacrosse striping). The existing orientation of the Little League baseball, 90 ft. baseball and softball fields may remain the same.

Concept No. 1 allows for the following sports to be played, either singularly or simultaneously:

- Soccer (if soccer is being played, there are no Little League, softball or 90 ft. baseball games being played);
- Little League baseball (may simultaneously be played with softball or 90 ft. baseball);

- 90 ft. baseball (may simultaneously be played with Little League baseball);
- Softball (may simultaneously be played with Little League baseball).

The following scenarios can be applied for the resurfacing of the fields:

- All fields can utilize synthetic turf;
- All fields can utilize natural grass.

Due to the overlapping of the soccer field and all of the baseball and softball fields, no other breakdown of synthetic turf and natural grass is recommended. If a natural grass field layout is selected, the infield clay from the baseball and softball fields will not have any impact on the soccer field. The layout of the soccer field is favorable due to its north/south orientation. The layout of the fields also allows for a twenty-four (24) space parking lot to be constructed at the northern end of the park. The borough may want to reach out to the owner(s) of the Sylvan office complex to the northeast to ask about leasing parking spaces for the borough's park use.

Proposed Concept No. 2

Concept No. 2 was designed using a 240 ft. x 360 ft. soccer field (380 ft. x 260 ft. including run-out areas; the largest allowable high school soccer field size). The existing orientation of the Little League baseball, 90 ft. baseball and softball fields may remain the same.

Concept No. 2 allows for the following sports to be played, either singularly or simultaneously:

- Soccer (may simultaneously be played with Little League baseball);
- Little League baseball (may simultaneously be played with soccer, or softball or 90 ft. baseball);
- 90 ft. baseball (may simultaneously be played with Little League baseball);
- Softball (may simultaneously be played with Little League baseball).

The following scenarios can be applied for the resurfacing of the fields:

- All fields can utilize synthetic turf;
- The Little League field can utilize natural grass while the other fields are synthetic turf.

An all-natural grass layout cannot be selected because the pitching mound of the 90 ft. baseball field would encroach onto the soccer field. The layout of the soccer field is favorable due to the north/south orientation. The layout of the fields also allows for a twenty-four (24) space parking lot to be constructed at the northern end of the park. The borough may want to reach out to the owner(s) of the Sylvan office complex to the northeast to ask about leasing parking spaces for the borough's park use.

Proposed Concept No. 3

Concept No. 3 was designed using a 240 ft. x 360 ft. soccer field (380 ft. x 260 ft. including run-out areas; the largest allowable high school soccer field size). The existing orientation of the Little League baseball, 90 ft. baseball and softball fields may remain the same.

Concept No. 3 allows for the following sports to be played, either singularly or simultaneously:

- Soccer (if soccer is being played, there are no Little League, softball or 90 ft. baseball games being played);
- Little League baseball (may simultaneously be played with softball or 90 ft. baseball);
- 90 ft. baseball (may simultaneously be played with Little League baseball);
- Softball (may simultaneously be played with Little League baseball).

The following scenarios can be applied for the resurfacing of the fields:

- All fields can utilize synthetic turf;
- All fields can utilize natural grass.

If an all-natural grass field layout is selected, the infield clay from the baseball and softball fields will be impacted by the soccer field. The pitching mound for the baseball and softball fields will not have any impact on the soccer field. The layout of the soccer field is favorable due to the northeast/southwest orientation. The layout of the fields also allows for a twenty-four (24) space parking lot to be constructed at the northern end of the park. The borough may want to reach out to the owner(s) of the Sylvan office complex to the northeast to ask about leasing parking spaces for the borough's park use.

Proposed Concept No. 4

Concept No. 4 features a 180 ft. x 330 ft. soccer field (360 ft. x 220 ft. including run-out areas; the smallest allowable high school sized soccer field that can also accommodate lacrosse striping). The existing orientation of the Little League baseball and softball fields may remain the same, but the 90 ft. baseball field requires re-orientation.

Concept No. 4 allows for the following sports to be played, either singularly or simultaneously:

- Soccer (may simultaneously be played with softball and/or Little League baseball);
- Little League baseball (may simultaneously be played with soccer and/or softball or may simultaneously be played with 90 ft. baseball and/or softball);
- 90 ft. baseball (may simultaneously be played with Little League baseball and/or softball);
- Softball (may simultaneously be played with Little League baseball and/or 90 ft. baseball or may simultaneously be played with Little League baseball and/or soccer).

The following scenarios can be applied for the resurfacing of the fields:

- All fields can utilize synthetic turf;
- The Little League baseball field may utilize natural grass while the other fields are synthetic turf;
- The Little League baseball and softball fields may utilize natural grass while the other fields are synthetic turf;
- The softball field may utilize natural grass while the other fields are synthetic turf.

Due to the overlapping of the soccer field and 90 ft. baseball field, these fields have to be synthetic turf. The layout of the soccer field is not favorable due to the northeast/southeast orientation and no additional parking can be provided. The soccer and 90 ft. baseball fields also encroach onto neighboring property to the northeast and into the Johnson Avenue Right-of-Way thereby creating a necessity for easements. The layout of the fields does not allow for any in-park parking lot to be constructed. The borough may want to reach out to the owner(s) of the Sylvan office complex to the northeast to ask about leasing parking spaces for the borough's park use.

Preferred Concept Selection

In terms of field orientation, number of simultaneous playable sports and potential for parking spaces on park grounds, Concept 2 is the preferred layout.

Proposed ADA compliance

If concept plans 1-3 are ultimately selected, a handicap parking space can be added to the northern proposed parking lot. Also, for each concept, a handicap drop-off / pick-up area may be added along the

south side of Johnson Avenue. The main entrance of the park will need to be modified to meet current ADA regulations (i.e. slope).

Synthetic Turf Infill - Rubber versus Cork

Synthetic turf infill is put in-between the blades of the artificial grass. Infill for turf is used to allow the artificial turf blades to stand up and look like a natural standing athletic field, as well as, provide cushion for athletic players on the field. The less expensive infill option is black colored crumb rubber. Black colored crumb rubber infill is a synthetic material (usually made out of recycled tires). Cork infill is another infill option that is made from trees. Cork infill is 100% environmentally friendly and non-toxic. Due to Cork infill's low thermal conductivity, it will keep the playing surface cooler. From a cost perspective, cork infill is more expensive than black colored crumb rubber infill by approximately two-to-one. Whether rubber or cork infill is used, both meet environmental standards and are considered lead-free.

Synthetic turf versus Natural Grass

When comparing the benefits of synthetic turf versus natural grass, the following positive aspects of synthetic turf emerge:

- Over a long period of time (i.e. ten (10) years), the cost per hour of use may be as much as ½ of that of natural grass;
- The additional hours of usage per year are typically greater than natural grass;
- Water savings – no need to water synthetic turf;
- Tires saved – on average, 20,000 recycled tires provide infill per field;
- The elimination of pesticides;
- Reduction in annual maintenance costs
- Longer life
- Phasing: Can be utilized shortly after installation. With natural grass, the existing grass needs to be removed, the site regraded and new sod placed. The field will need to be closed for two growing seasons (6 to 9 months) to allow adequate growth of the root zone to handle wear.

Irrigation

If the Borough does move forward with the installation of a new sports field, the existing irrigation system will be disrupter and should be removed. The cost of a new irrigation system will largely depend on the amount of natural grass (if such option is chosen) and whether or not the water service main line, irrigation controllers and backflow preventer may be reused. For an irrigation system servicing all natural grass fields, the cost of the system may be in the area of $30,000. For an irrigation system servicing a combination of natural grass fields / synthetic turf field, the cost of the system may be in the area of $20,000. If an all synthetic turf option is chosen, the cost of the irrigation system would be greatly reduced as there may be little grass to water.

Lighting

The two typical light source options for sports field lighting applications are metal halide (high intensity discharge) and light-emitting diode (LED). In general, the capital cost of LED lighting is higher than that of metal halide, but the operating costs of LED are much lower than that of metal halide (cost savings around 50%). Neighborhood impact is a factor in outdoor sports lighting. Witte Field is within a residential neighborhood. LED light sources are known for their potential for extreme cut-off (light spillage), reduced glare and light control (precision aiming). With respect to routine maintenance, for

metal halide light sources, it is more efficient to group relamp rather than replace lamps as they burn out. Group lamp replacements should be scheduled prior to the end of lamp life to ensure target light levels on the field are maintained. Typical relamping costs include: lamps (on average $75 / lamp), equipment rental to get to the top of the pole (up to $150 / hour) and labor (on average $100 / hour). LEDs used for sports lighting should not burn out before the end of system life thereby they avoid any routine maintenance cost.

Cost Estimates

Cost estimates were prepared for each concept plan (see Appendix E). The number of cost estimates per concept plan is dependent on the number of viable playing surface options (i.e. all synthetic turf, all natural grass, natural grass and synthetic turf). Common features amongst the cost estimates for each concept are:

- A new children's playground area that features an enhanced swing set and separate play structures for 2-5 year olds and 5-12 year olds. Optional playground surfaces include: engineered wood fiber (least expensive – on average $3 per sq. ft. installed), loose rubber mulch (more expensive than wood fiber - on average $5.50 per sq. ft. installed for colored mulch) and poured-in-place rubber (most expensive – on average $13 per sq. ft. installed);
- A memorial area consisting of personalized Brick Markers USA brand pavers that are weather-resistant. The intent of this memorial area is to provide a central location for the memorials as the existing memorials are located throughout the park in various shapes and sizes. Benches would allow people to spend time and reflect;
- ADA and pet accessible water fountains;
- ADA accessible bleachers;
- Soccer goals;
- Solar charging poles (solar powered charging stations built to provide access to electrical outlets for the purpose of charging personal electronic devices such as cell pho nes, tablets and laptops);
- Trash receptacles;
- Benches;
- Bike racks;
- Outdoor fitness equipment;
- Shelters (to provide shade);
- Break-away ball safety netting;
- Removable foul poles;
- Team benches;
- Soccer corner flags;
- Dog waste stations;
- Dugouts (to replace the existing non-Little League dugouts – two (2) for softball and two (2) for 90 ft. baseball);
- Rehabilitation of existing Little League dugouts;
- Batting tunnels (to replace the existing batting cages);
- Up to 2,000 linear feet of black vinyl chain link fencing (same fencing to be used along the perimeter of the park, children's playground, for backstops, for dugout areas) in four (4) foot and eight (8) foot heights;
- A 20 ft. x 40 ft. storage shed (to be installed on the existing concrete pad near the basketball court);
- Asphalt path layout changes;
- Sports field lighting;
- 90 ft. baseball, softball and Little League baseball bases;

- Electro-Mech brand Series LX1130 electronic scoreboards (to replace the two (2) older scoreboards).

Note: Please refer to Appendix F for proposed playground images / layout and cut sheets of the above items.

SUMMARY OF ESTIMATED CONCEPT COSTS

Concept No.	Playing Surface	Construction Cost
One	All Turf Fields	$3,586,625.00
One	All Natural Grass Fields	$2,340,375.00
Two	All Turf Fields	$3,496,625.00
Two	Little League Natural Grass And Remaining Fields Are Turf	$3,330,125.00
Three	All Turf Fields	$3,619,875.00
Three	All Natural Grass Fields	$2,510,375.00
Four	All Turf Fields	$3,662,750.00
Four	Softball Natural Grass And Remaining Fields Are Turf	$3,465,875.00
Four	Little League Natural Grass And Remaining Fields Are Turf	$3,441,250.00
Four	Little League Baseball And Softball Natural Grass And Remaining Fields Are Turf	$3,234,875.00

Permitting

New Jersey Department of Environmental Protection
The two predominant forms of New Jersey Department of Environmental Protection (NJDEP) land development related permitting are Wetlands and Flood Hazard Area (associated with streams). Maser utilized the NJDEP, Bureau of GIS's NJ-GeoWeb mapping application to determine if there is a potential for wetlands or streams to exist within/in-the-vicinity-of the park. Given the park's location, an inquiry of existing wetlands and streams resulted in the aerial image depicted in Appendix G. Per the NJDEP's database, there appears to be no existing wetlands or streams within the park or in its immediate vicinity. The database does indicate there may be existing wetlands on the Sylvan property to the north, but they will not impact any proposed improvements to the park. Maser's topographic survey confirms the absence of any streams within the park or in its immediate vicinity. A wetlands investigation would be required to confirm the absence/presence of wetlands.

Bergen County Soil Conservation District
A Soil Erosion and Sediment Control Plan Certification is required prior to the start of any project that disturbs more than 5,000 square feet including clearing or grading of any land for other than agricultural or horticultural purposes. Should the Borough move forward with the decision to make major improvements to the park, the submission of a Soil Erosion and Sediment Control Plan Certification Application will be required (see Appendix G).

Bergen County Planning and Engineering
Maser reached out to Mr. Alan Camlet of the Bergen County Department of Engineering and Planning to determine if the county has any jurisdiction over any proposed improvements to the park. When Maser described the potential proposed improvements to the park to Mr. Camlet, he offered that a site plan application must be submitted and any proposed synthetic turf field would more than likely be exempt from county jurisdiction. If the county determines that it does have jurisdiction over the proposed improvements to the park, it will be basing this determination on the stormwater runoff from a synthetic

turf field ultimately being conveyed in a county storm sewer. Due to its storm water management program regulations as they pertain to proposed additional impervious area (one (1) acre or more) and/or proposed development area (two (2) gross acres or more). For county site plan application, fee schedule and stormwater management program, see Appendix G.

Borough of Englewood Cliffs
Should the Borough move forward with the decision to make major improvements to the park, construction plans will be required and the project will go out to public bid. The contractor awarded the project shall be required to obtain all Borough required permits and approvals.

Proposed Traffic Calming

A Traffic Calming Study has been prepared by Maser Consulting P.A. for the Borough of Englewood Cliffs to outline potential traffic calming measures along Johnson Avenue in the vicinity of Witte Field (see Appendix H). This study provides an evaluation of the operating and speed characteristics along Johnson Avenue and recommends Traffic Calming Measures.

Johnson Avenue is an east-west oriented urban major collector under the jurisdiction of the Borough of Englewood Cliffs. The roadway contains one travel lane in each direction with on-street parking. The posted speed limit is 25 MPH. There are two existing crosswalks across Johnson Avenue providing pedestrian connectivity to Witte Field. The western crosswalk is located at the intersection of Johnson Avenue & Samford Drive. The eastern crosswalk is located mid-block between Samford Drive and Willow Drive. Both crosswalks are supported by in-road stop for pedestrian signs. There is a speed feedback sign along Johnson Avenue eastbound located approximately 75' west of Samford Drive. The speed feedback sign is electronic and is installed on the same assembly as a 25 MPH posted speed limit sign.

Speed and traffic volume data were collected along Johnson Avenue from Monday, November 14, 2016 to Monday, November 21, 2016 at the following locations:

- Between Willow Drive and Samford Drive; and
- Between Samford Drive and Neal Drive.

The existing posted speed limit on the eastbound and westbound approaches is 25 MPH. The 85th percentile speed (prevailing speed) was determined to be 33 MPH (eastbound) and 34 MPH (westbound). Based on The Manual of Uniform Traffic Control Devices, 2009 Edition ("MUTCD"), the 85th percentile speed should typically be within 5 MPH of the posted speed limits. Due to the close proximity to the park and the locations of the crosswalks along Johnson Avenue, traffic calming measures are recommended in both directions to reduce the 85th percentile speed within 5 MPH of the 25 MPH posted speed limit.

Short-Term Potential Traffic Calming

The following Short-Term Traffic Calming improvements are anticipated to enhance pedestrian and bicyclist safety and potentially reduce vehicular speeds with less cost and construction efforts than the Long-Term improvements (see Appendix H, Exhibit 1). These improvements should also be incorporated into any Long-Term improvements constructed at a later time:

- Pedestrian Crossing signs and Pedestrian Crossing Advanced Warning signs at the two existing crosswalks along Johnson Avenue eastbound and westbound.
    - Order of Magnitude Cost (without design costs) - $2,000 to $3,000;

- A new speed feedback sign along Johnson Avenue westbound between the two existing crosswalks across Johnson Avenue.
    - Order of Magnitude Cost (without design costs) - $5,000 to $6,000;

- Designate Johnson Avenue in the vicinity of Witte Field as a "shared roadway" and implement bicycle sharrows and share the road signs.
    - Order of Magnitude Cost (without design costs) - $2,000 to $3,000;

Three potential Long-Term traffic calming options were established and are outlined below:

- Option A (see Appendix H, Exhibit 2)
    - Curb extensions and ADA curb ramps at both crosswalks crossing Johnson Avenue. Please note the north side of this existing mid-block crosswalk terminates at a residential driveway. It is recommended to relocate this crosswalk and pedestrian access route from the driveway to an acceptable location for an ADA curb ramp.
        - Order of Magnitude Cost (without design or drainage costs) - $40,000 to $60,000;

    - The installation of raised crosswalks at the two existing crosswalks across Johnson Avenue could also be implemented with Option A to increase the traffic calming effectiveness.
        - Order of Magnitude Cost (without design or drainage costs) - $10,000 to $20,000;

- Option B (see Appendix H, Exhibit 3)
    - Two speed humps along Johnson Avenue. Speed humps are permitted as per NJSA Title 39 at these locations as Johnson Avenue has a posted speed limit of 25 MPH and has an ADT of 1,500 veh. The appropriate pavement markings, signs and advanced warning signs shall be provided as per the MUTCD and in accordance with NJAC Title 39.
        - Order of Magnitude Cost (without design costs) - $6,000 to $8,000;

Only one of the Long-Term Options A or B should be selected. Speed humps should not be combined with raised crosswalks and curb extensions.

In summary, the Johnson Avenue study area is a location that will benefit from traffic calming measures.

Conclusion

Based on the following three conceptual design traits and a preferred north-south orientation of the field, it is Maser's opinion that Concept No. 2 is the preferred layout:

- Maximize athletic field dimensions to accommodate both soccer and lacrosse;
- Add parking spaces on park grounds to lessen the burden of off-site parking on local streets;
- Maximize the number of simultaneous playable sports.

Concept No. 2 was designed using a 240 ft. x 360 ft. soccer field (380 ft. x 260 ft. including run-out areas; the largest allowable high school soccer field size). Concept No. 2 allows for the following sports to be played, either singularly or simultaneously:

- Soccer (may simultaneously be played with Little League baseball);
- Little League baseball (may simultaneously be played with soccer, or softball or 90 ft. baseball);

- 90 ft. baseball (may simultaneously be played with Little League baseball);
- Softball (may simultaneously be played with Little League baseball).

Additional parking is possible by constructing a parking lot at the northern end of the park.

Although the estimated installation cost for the all turf fields option is higher than the option for all natural grass fields, the Borough would be able to recoup those costs by:

- Reduced maintenance costs (no need to resod)
- Reduced water usage (no need to water turf fields)
- Longer life of fields
- More use hours

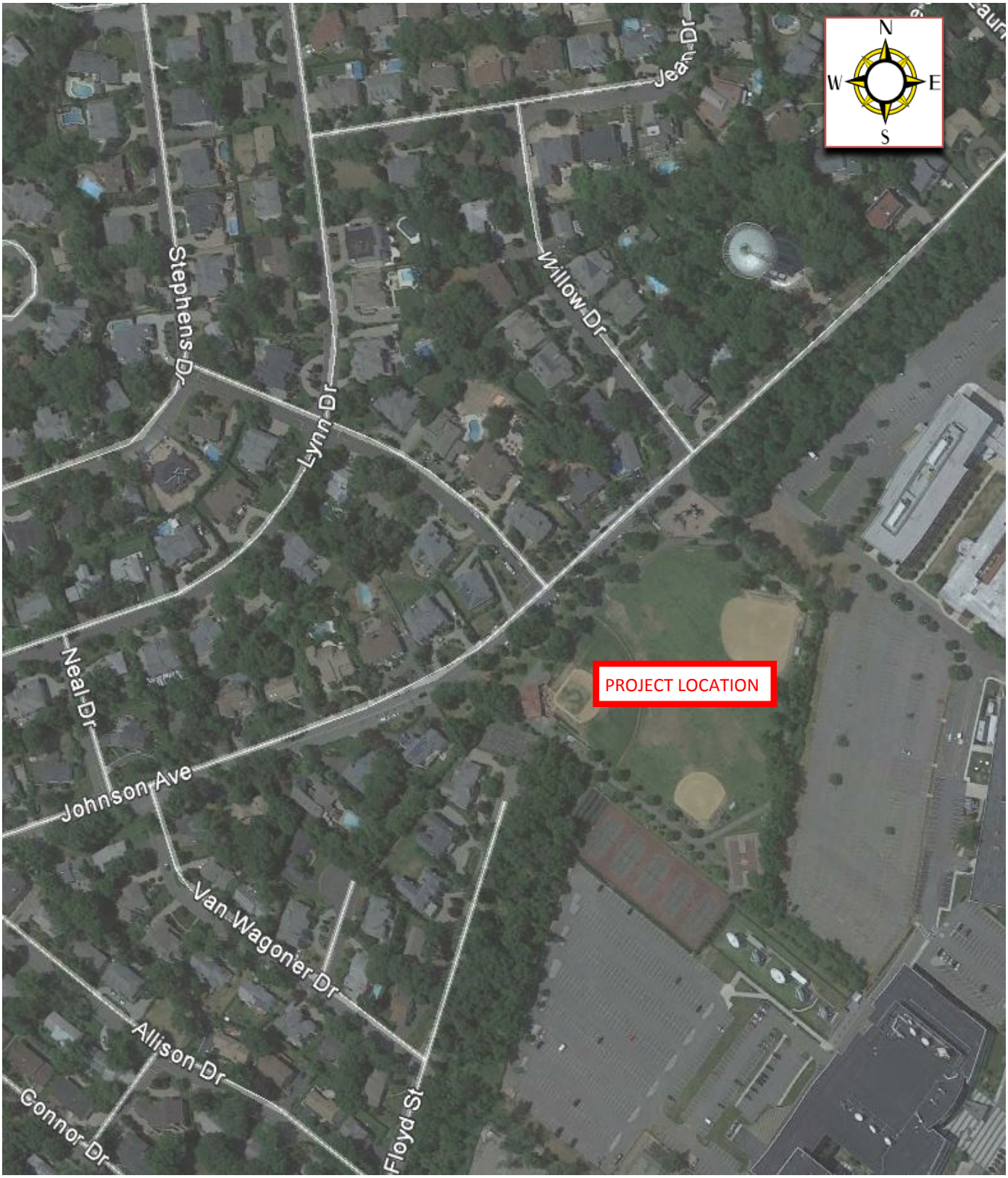
With regards to Traffic Calming Measures, it is Maser's opinion that the Borough, at a minimum, move forward with the short-term options below:

- Pedestrian Crossing signs and Pedestrian Crossing Advanced Warning signs at the two existing crosswalks along Johnson Avenue eastbound and westbound
- A new speed feedback sign along Johnson Avenue westbound between the two existing crosswalks across Johnson Avenue
- Designate Johnson Avenue in the vicinity of Witte Field as a "shared roadway" and implement bicycle sharrows and share the road signs

Once the short-term options are installed and after some time, the Borough should evaluate the need for a long-term solution.

APPENDIX A

LOCATION MAP



MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 07856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Location Map
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

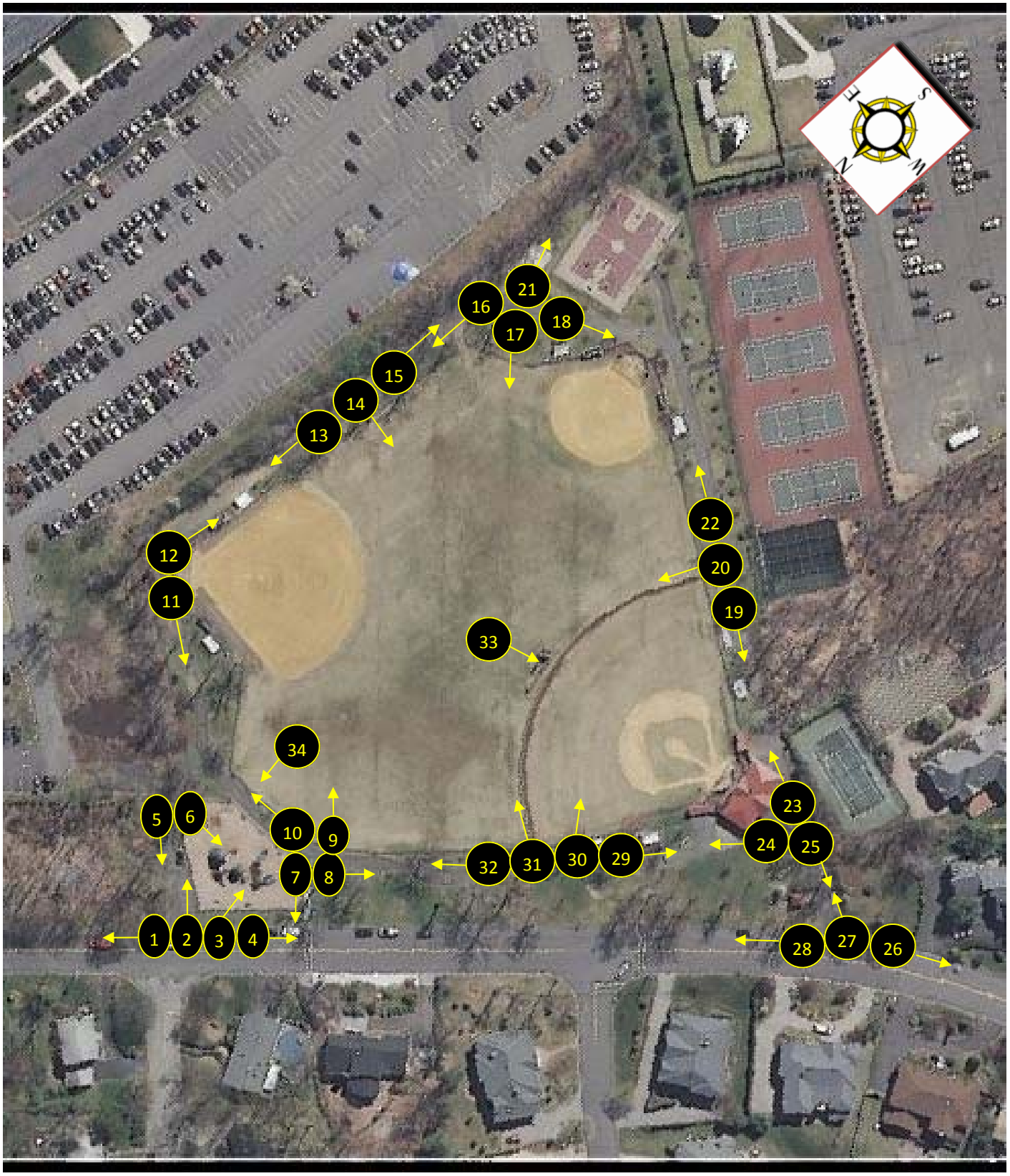
Scale: Not to Scale

Date: December 7, 2016

MC Project No. ECB068

APPENDIX B

PHOTOLOG



MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 23, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 007856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Photo Locations
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: September 28, 2016

MC Project No. ECB068

APPENDIX C

SPORTS USAGE DATA

2015 / 2016 SOCCER AND SOFTBALL DATA

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

2015	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	TOTAL
SOCCER	8	8	8	8	8	63	83	18	204
SOFTBALL	20	42	16	22	10	4	0	0	114

2016	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	TOTAL
SOCCER	9	13	13	8	8	28	52	40	171
SOFTBALL	6	30	24	32	20	66	64	12	254

NOTES:

1. ALL HOURS AND INFORMATION WAS PROVIDED VIA EMAIL BY PAUL DUFFY OF THE ENGLEWOOD CLIFFS RECREATION DEPARTMENT ON NOVEMBER 6, 2016.
2. ALL BASEBALL RELATED ACTIVITIES ARE NOT SCHEDULED THROUGH THE BOROUGH OF ENGLEWOOD CLIFFS AND THEREFORE THE ABOVE NUMBERS DO NOT REFLECT BASEBALL FIELD USAGE.

2014 THROUGH 2016 LITTLE LEAGUE BASEBALL NUMBER OF SCHEDULED GAMES

YEAR	NO. OF GAMES
2014	75
2015	75
2016	75

NOTES:

1. DATA PROVIDED BY MR. RAFI JAFRI, PRESIDENT, ENGLEWOOD CLIFFS LITTLE LEAGUE

2014 THROUGH 2016 90 FT. BASEBALL GAMES PLAYED

YEAR	NO. OF GAMES
2014	7
2015	7
2016	10

NOTES:

1. DATA PROVIDED BY MR. RAFI JAFRI, PRESIDENT, ENGLEWOOD CLIFFS LITTLE LEAGUE

APPENDIX D

CONCEPT PLANS

APPENDIX E

CONCEPT COST ESTIMATES

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

	TURF FIELD	**NATURAL GRASS FIELD**
MATERIALS & BASE PREPARATION	$10.00 PER SQ. FT.	$5.00 PER SQ. FT.
TOTAL BASE PREPARATION	$1,800,000	$900,000
MAINTENANCE*	$10,000.00 PER YEAR	$40,000.00 PER YEAR
TOTAL COST FOR 180,000 SQ. FT. FIELD FOR 10 YEARS	$1,900,000	$1,300,000
SCHEDULING POSSIBILITIES**	120 HOURS X 40 WEEKS X 10 YEARS = 48,000 HOURS	60 HOURS X 30 WEEKS X 10 YEARS = 18,000 HOURS
AVERAGE COST PER HOUR OF USE	$39.58	$72.22

*RATES ARE ESTIMATED BASED ON AVERAGE COSTS NATIONWIDE FOR A 180,000 SQ. FT. FIELD

**RATES ARE ESTIMATED BASED ON AVERAGE VALUES NATIONWIDE

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 1 - ALL TURF FIELDS	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	180,000	$ 7.50	$ 1,350,000.00
2	SODDING	SF	0	$ 1.00	$ -
3	INFIELD CLAY (6" THICK)	SF	0	$ 2.50	$ -
4	IRRIGATION SYSTEM	LS	0	$ 30,000.00	$ -
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 10,000.00	$ 1.00	$ 10,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ -	$ 1.00	$ -
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	3	$ 250.00	$ 750.00
21	TURF DOUBLE BASE	SET	1	$ 250.00	$ 250.00
22	TURF BASE	SET	3	$ 500.00	$ 1,500.00
23	PORTABLE PITCHING MOUND	UNIT	3	$ 15,000.00	$ 45,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,650	$ 65.00	$ 107,250.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 150,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	475	$ 40.00	$ 19,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,245,000.00	$ 1,245,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	10,500	$ 7.50	$ 78,750.00
				ESTIMATED CONSTRUCTION COST	**$3,586,625.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 1 - ALL GRASS FIELDS	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	0	$ 7.50	$ -
2	SODDING	SF	148,000	$ 1.00	$ 148,000.00
3	INFIELD CLAY (6" THICK)	SF	32,000	$ 2.50	$ 80,000.00
4	IRRIGATION SYSTEM	LS	1	$ 30,000.00	$ 30,000.00
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ -	$ 1.00	$ -
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ 40,000.00	$ 1.00	$ 40,000.00
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	350	$ 75.00	$ 26,250.00
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	0	$ 250.00	$ -
21	TURF DOUBLE BASE	SET	0	$ 250.00	$ -
22	TURF BASE	SET	0	$ 500.00	$ -
23	PORTABLE PITCHING MOUND	UNIT	0	$ 15,000.00	$ -
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	0	$ 40.00	$ -
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,650	$ 65.00	$ 107,250.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ -	$ 1.00	$ -
35	ASPHALT PATH, 10' WIDE	LF	475	$ 40.00	$ 19,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,245,000.00	$ 1,245,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	10,500	$ 7.50	$ 78,750.00
				ESTIMATED CONSTRUCTION COST	**$2,340,375.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 2 - ALL TURF FIELDS	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	180,000	$ 7.50	$ 1,350,000.00
2	SODDING	SF	0	$ 1.00	$ -
3	INFIELD CLAY (6" THICK)	SF	0	$ 2.50	$ -
4	IRRIGATION SYSTEM	LS	0	$ 30,000.00	$ -
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 10,000.00	$ 1.00	$ 10,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ -	$ 1.00	$ -
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	3	$ 250.00	$ 750.00
21	TURF DOUBLE BASE	SET	1	$ 250.00	$ 250.00
22	TURF BASE	SET	3	$ 500.00	$ 1,500.00
23	PORTABLE PITCHING MOUND	UNIT	3	$ 15,000.00	$ 45,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,650	$ 65.00	$ 107,250.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 150,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	475	$ 40.00	$ 19,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,155,000.00	$ 1,155,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	10,500	$ 7.50	$ 78,750.00
				ESTIMATED CONSTRUCTION COST	**$3,496,625.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 2 - LITTLE LEAGUE BASEBALL GRASS FIELD AND THE REST OF THE FIELDS TURF	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	143,500	$ 7.50	$ 1,076,250.00
2	SODDING	SF	29,500	$ 1.00	$ 29,500.00
3	INFIELD CLAY (6" THICK)	SF	7,000	$ 2.50	$ 17,500.00
4	IRRIGATION SYSTEM	LS	1	$ 15,000.00	$ 15,000.00
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 8,000.00	$ 1.00	$ 8,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ 8,000.00	$ 1.00	$ 8,000.00
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	2	$ 250.00	$ 500.00
21	TURF DOUBLE BASE	SET	1	$ 250.00	$ 250.00
22	TURF BASE	SET	2	$ 500.00	$ 1,000.00
23	PORTABLE PITCHING MOUND	UNIT	2	$ 15,000.00	$ 30,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,650	$ 65.00	$ 107,250.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 120,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	475	$ 40.00	$ 19,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,210,000.00	$ 1,210,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	10,500	$ 7.50	$ 78,750.00
				ESTIMATED CONSTRUCTION COST	**$3,330,125.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 3 - ALL TURF FIELDS	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	180,000	$ 7.50	$ 1,350,000.00
2	SODDING	SF	0	$ 1.00	$ -
3	INFIELD CLAY (6" THICK)	SF	0	$ 2.50	$ -
4	IRRIGATION SYSTEM	LS	0	$ 30,000.00	$ -
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 10,000.00	$ 1.00	$ 10,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ -	$ 1.00	$ -
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	350	$ 75.00	$ 26,250.00
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	3	$ 250.00	$ 750.00
21	TURF DOUBLE BASE	SET	1	$ 250.00	$ 250.00
22	TURF BASE	SET	3	$ 500.00	$ 1,500.00
23	PORTABLE PITCHING MOUND	UNIT	3	$ 15,000.00	$ 45,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	0	$ 40.00	$ -
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,650	$ 65.00	$ 107,250.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 150,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	475	$ 40.00	$ 19,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,265,000.00	$ 1,265,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	10,500	$ 7.50	$ 78,750.00
				ESTIMATED CONSTRUCTION COST	**$3,619,875.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 3 - ALL GRASS FIELDS	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	0	$ 7.50	$ -
2	SODDING	SF	148,000	$ 1.00	$ 148,000.00
3	INFIELD CLAY (6" THICK)	SF	32,000	$ 2.50	$ 80,000.00
4	IRRIGATION SYSTEM	LS	1	$ 30,000.00	$ 30,000.00
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ -	$ 1.00	$ -
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ 40,000.00	$ 1.00	$ 40,000.00
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	350	$ 75.00	$ 26,250.00
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	0	$ 250.00	$ -
21	TURF DOUBLE BASE	SET	0	$ 250.00	$ -
22	TURF BASE	SET	0	$ 500.00	$ -
23	PORTABLE PITCHING MOUND	UNIT	0	$ 15,000.00	$ -
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	0	$ 40.00	$ -
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,650	$ 65.00	$ 107,250.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ -	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	475	$ 40.00	$ 19,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,265,000.00	$ 1,265,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	10,500	$ 7.50	$ 78,750.00
				ESTIMATED CONSTRUCTION COST	**$2,510,375.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 4 - ALL TURF FIELDS	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	190,000	$ 7.50	$ 1,425,000.00
2	SODDING	SF	0	$ 1.00	$ -
3	INFIELD CLAY (6" THICK)	SF	0	$ 2.50	$ -
4	IRRIGATION SYSTEM	LS	0	$ 30,000.00	$ -
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	10,000	$ 1.00	$ 10,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	0	$ 1.00	$ -
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	3	$ 250.00	$ 750.00
21	TURF DOUBLE BASE	SET	1	$ 250.00	$ 250.00
22	TURF BASE	SET	3	$ 500.00	$ 1,500.00
23	PORTABLE PITCHING MOUND	UNIT	3	$ 15,000.00	$ 45,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,750	$ 65.00	$ 113,750.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	150,000	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	700	$ 40.00	$ 28,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,300,000.00	$ 1,300,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	1,250	$ 7.50	$ 9,375.00
				ESTIMATED CONSTRUCTION COST	**$3,662,750.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 4 - SOFTBALL GRASS FIELD AND THE REST OF THE FIELDS TURF	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	157,500	$ 7.50	$ 1,181,250.00
2	SODDING	SF	26,250	$ 1.00	$ 26,250.00
3	INFIELD CLAY (6" THICK)	SF	6,250	$ 2.50	$ 15,625.00
4	IRRIGATION SYSTEM	LS	1	$ 15,000.00	$ 15,000.00
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 8,000.00	$ 1.00	$ 8,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ 8,000.00	$ 1.00	$ 8,000.00
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	2	$ 250.00	$ 500.00
21	TURF DOUBLE BASE	SET	0	$ 250.00	$ -
22	TURF BASE	SET	2	$ 500.00	$ 1,000.00
23	PORTABLE PITCHING MOUND	UNIT	2	$ 15,000.00	$ 30,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,750	$ 65.00	$ 113,750.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 120,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	700	$ 40.00	$ 28,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,300,000.00	$ 1,300,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	1,250	$ 7.50	$ 9,375.00
				ESTIMATED CONSTRUCTION COST	**$3,465,875.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 4 - LITTLE LEAGUE BASEBALL GRASS FIELD AND THE REST OF THE FIELDS TURF	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	153,500	$ 7.50	$ 1,151,250.00
2	SODDING	SF	29,500	$ 1.00	$ 29,500.00
3	INFIELD CLAY (6" THICK)	SF	7,000	$ 2.50	$ 17,500.00
4	IRRIGATION SYSTEM	LS	1	$ 15,000.00	$ 15,000.00
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 8,000.00	$ 1.00	$ 8,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ 8,000.00	$ 1.00	$ 8,000.00
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	2	$ 250.00	$ 500.00
21	TURF DOUBLE BASE	SET	1	$ 250.00	$ 250.00
22	TURF BASE	SET	2	$ 500.00	$ 1,000.00
23	PORTABLE PITCHING MOUND	UNIT	2	$ 15,000.00	$ 30,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,750	$ 65.00	$ 113,750.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 120,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	700	$ 40.00	$ 28,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,300,000.00	$ 1,300,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	1,250	$ 7.50	$ 9,375.00
				ESTIMATED CONSTRUCTION COST	**$ 3,441,250.00**

PROJECT:	WITTE FIELD FEASIBILITY STUDY	**DATE:**	12/14/16
MUNICIPALITY:	BOROUGH OF ENGLEWOOD CLIFFS	**PROJECT NO.**	ECB068
PREPARED BY:	BAK	**REVIEWED BY:**	TSM

ITEM NO	CONCEPT 4 - LITTLE LEAGUE BASEBALL AND SOFTBALL GRASS FIELDS AND THE REST OF THE FIELDS TURF	APPROX. UNIT	QTY	UNIT PRICE	TOTAL
1	SYNTHETIC TURF	SF	121,000	$ 7.50	$ 907,500.00
2	SODDING	SF	55,750	$ 1.00	$ 55,750.00
3	INFIELD CLAY (6" THICK)	SF	13,250	$ 2.50	$ 33,125.00
4	IRRIGATION SYSTEM	LS	1	$ 20,000.00	$ 20,000.00
5	SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FEE	LS	1	$ 1,925.00	$ 1,925.00
6	FIELD MAINTENANCE (SYNTHETIC TURF PER YEAR)	ALLOWANCE	$ 6,000.00	$ 1.00	$ 6,000.00
7	FIELD MAINTENANCE (NATURAL GRASS PER YEAR)	ALLOWANCE	$ 16,000.00	$ 1.00	$ 16,000.00
8	PLAYGROUND AREA	LS	1	$ 203,000.00	$ 203,000.00
9	WATER FOUNTAIN	UNIT	3	$ 3,000.00	$ 9,000.00
10	SOCCER GOALS	UNIT	1	$ 4,000.00	$ 4,000.00
11	SOLAR CHARGING POLES	UNIT	2	$ 3,000.00	$ 6,000.00
12	TRASH RECEPTACLE	UNIT	5	$ 1,000.00	$ 5,000.00
13	SITE BENCH	UNIT	6	$ 1,500.00	$ 9,000.00
14	BIKE RACK	UNIT	2	$ 1,000.00	$ 2,000.00
15	PORTABLE FENCING	LF	0	$ 75.00	$ -
16	FITNESS CENTER	LS	1	$ 20,000.00	$ 20,000.00
17	SHELTER	UNIT	2	$ 35,000.00	$ 70,000.00
18	STORMGUARD NETTING	LF	520	$ 60.00	$ 31,200.00
19	REMOVABLE FOUL POLE	UNIT	6	$ 2,000.00	$ 12,000.00
20	TURF HOME PLATE	UNIT	1	$ 250.00	$ 250.00
21	TURF DOUBLE BASE	SET	0	$ 250.00	$ -
22	TURF BASE	SET	2	$ 500.00	$ 1,000.00
23	PORTABLE PITCHING MOUND	UNIT	1	$ 15,000.00	$ 15,000.00
24	TEAM BENCH	UNIT	4	$ 2,000.00	$ 8,000.00
25	SOCCER CORNER FLAG	SET	4	$ 500.00	$ 2,000.00
26	DOG WASTE STATION	UNIT	3	$ 1,000.00	$ 3,000.00
27	DUGOUT (INCLUDING CONCRETE SLAB, SHELTER AND BENCHES)	UNIT	4	$ 20,000.00	$ 80,000.00
28	REHIBILITATION OF EXISTING DUGOUTS	UNIT	2	$ 5,000.00	$ 10,000.00
29	BATTING TUNNEL	LS	1	$ 20,000.00	$ 20,000.00
30	BRICK MEMORIAL AREA	LS	1	$ 15,000.00	$ 15,000.00
31	BLACK VINYL CHAIN LINK FENCE, 4' HIGH	LF	325	$ 40.00	$ 13,000.00
32	BLACK VINYL CHAIN LINK FENCE, 8' HIGH	LF	1,750	$ 65.00	$ 113,750.00
33	20' X 40' STORAGE SHED	LS	1	$ 30,000.00	$ 30,000.00
34	STORMWATER DETENTION	ALLOWANCE	$ 80,000.00	$ 1.00	$ 150,000.00
35	ASPHALT PATH, 10' WIDE	LF	700	$ 40.00	$ 28,000.00
36	SPORTSFIELD LIGHTING	LS	1	$ 1,300,000.00	$ 1,300,000.00
37	SCOREBOARD	LS	2	$ 10,000.00	$ 20,000.00
38	RELOCATION OF EXISTING SCOREBOARD	LS	1	$ 5,000.00	$ 5,000.00
39	PARKING LOT AND DROP OFF AREA (6" DGA, 6" ASPHALT)	SF	1,250	$ 7.50	$ 9,375.00
				ESTIMATED CONSTRUCTION COST	**$ 3,234,875.00**

APPENDIX F

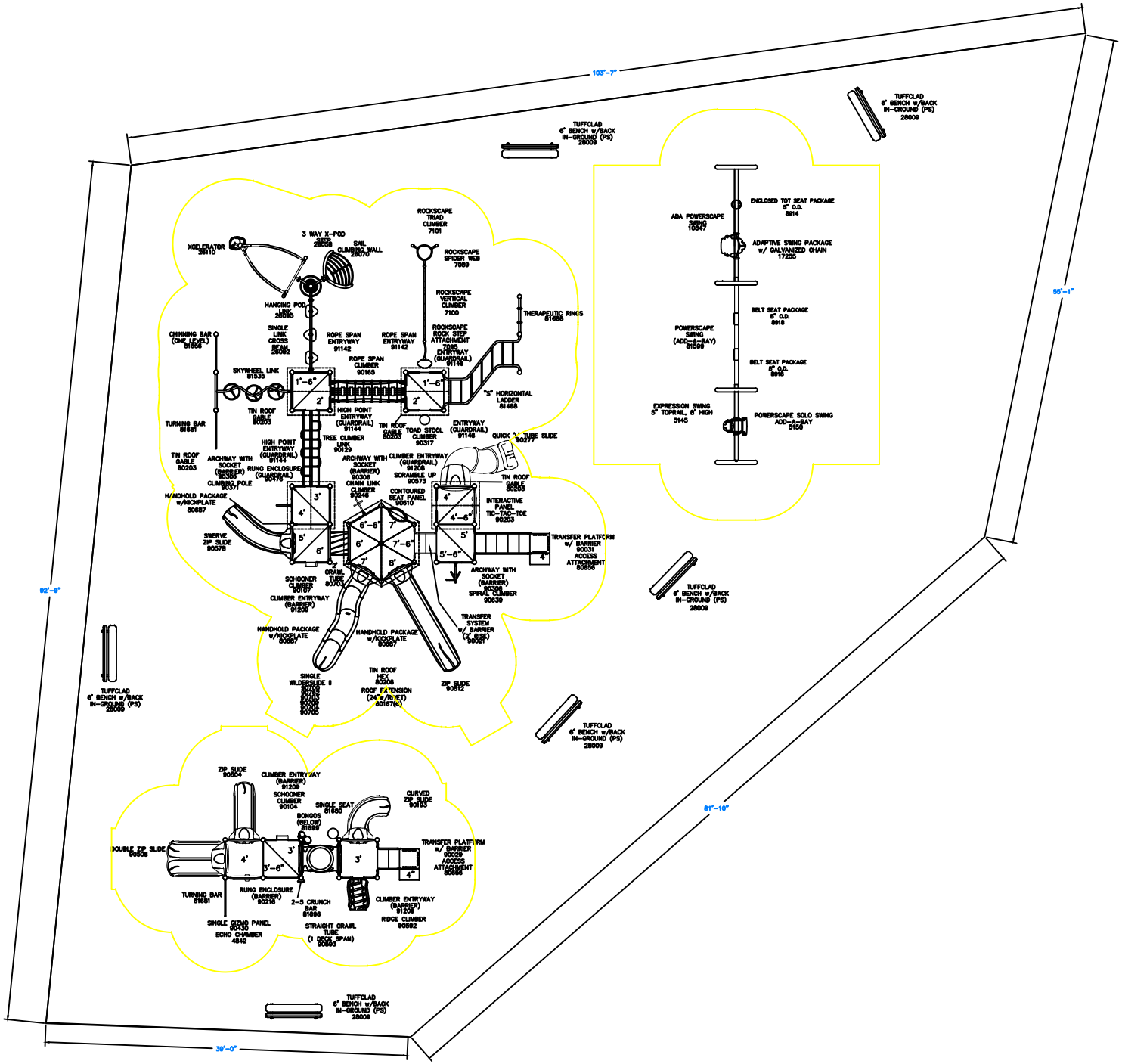
PROPOSED PLAYGROUND

AND AMENITIES CUT SHEETS

PROPOSED PLAYGROUND

2-5 Year Olds Unit

5-12 Year Olds Unit



103'-7"
55'-1"
92'-9"
81'-10"
39'-0"
TUFFCLAD 6' BENCH w/BACK IN-GROUND (PS) 28009
ENCLOSED TOT SEAT PACKAGE 5" O.D. 8914
ADA POWERSCAPE SWING 10847
ADAPTIVE SWING PACKAGE w/ GALVANIZED CHAIN 17255
BELT SEAT PACKAGE 5" O.D. 8918
POWERSCAPE SWING (ADD-A-BAY) 81599
BELT SEAT PACKAGE 5" O.D. 8916
EXPRESSION SWING 5" TOPRAIL, 8' HIGH 5145
POWERSCAPE SOLO SWING ADD-A-BAY 5150
ROCKSCAPE TRIAD CLIMBER 7101
ROCKSCAPE SPIDER WEB 7089
ROCKSCAPE VERTICAL CLIMBER 7100
ROCKSCAPE ROCK STEP ATTACHMENT 7095
ENTRYWAY (GUARDRAIL) 91146
THERAPEUTIC RINGS 81688
"S" HORIZONTAL LADDER 81468
XCELERATOR 28110
3 WAY X-POD STEP 28058
SAIL CLIMBING WALL 28070
HANGING POD LINK 28095
SINGLE LINK CROSS BEAM 28092
ROPE SPAN ENTRYWAY 91142
ROPE SPAN CLIMBER 90165
CHINNING BAR (ONE LEVEL) 81656
SKYWHEEL LINK 81535
TURNING BAR 81681
TIN ROOF GABLE 80203
HIGH POINT ENTRYWAY (GUARDRAIL) 91144
TREE CLIMBER LINK 90129
TOAD STOOL CLIMBER 90317
ENTRYWAY (GUARDRAIL) 91146
QUICK 'N' TUBE SLIDE 90277
ARCHWAY WITH SOCKET (BARRIER) 90306
RUNG ENCLOSURE (GUARDRAIL) 90476
CLIMBING POLE 90371
CLIMBER ENTRYWAY (GUARDRAIL) 91208
SCRAMBLE UP 90573
CHAIN LINK CLIMBER 90246
CONTOURED SEAT PANEL 90610
INTERACTIVE PANEL TIC-TAC-TOE 90203
HANDHOLD PACKAGE w/KICKPLATE 80687
SWERVE ZIP SLIDE 90578
TRANSFER PLATFORM w/ BARRIER 90031 ACCESS ATTACHMENT 80656
CRAWL TUBE 80703
SCHOONER CLIMBER 90107
CLIMBER ENTRYWAY (BARRIER) 91209
ARCHWAY WITH SOCKET (BARRIER) 90306
SPIRAL CLIMBER 90639
TRANSFER SYSTEM w/ BARRIER (2' RISE) 90021
SINGLE WILDERSLIDE II 90700 90702 90703 90709 90702 90705
TIN ROOF HEX 80206
ROOF EXTENSION (24"x/RIVET) 80167(6)
ZIP SLIDE 90512
ZIP SLIDE 90604
CLIMBER ENTRYWAY (BARRIER) 91209
SCHOONER CLIMBER 90104
SINGLE SEAT 81680
CURVED ZIP SLIDE 90193
BONGOS (BELOW) 81699
DOUBLE ZIP SLIDE 90508
TRANSFER PLATFORM w/ BARRIER 90029 ACCESS ATTACHMENT 80656
TURNING BAR 81681
RUNG ENCLOSURE (BARRIER) 90216
2-5 CRUNCH BAR 81696
CLIMBER ENTRYWAY (BARRIER) 91209
RIDGE CLIMBER 90592
SINGLE GIZMO PANEL 90430
ECHO CHAMBER 4842
STRAIGHT CRAWL TUBE (1 DECK SPAN) 90693

AMENITIES CUT SHEETS

Halsey Taylor®
Satisfying Thirsts Since 1912

Endura II™ Outdoor Tubular Bottle Filling Station

Model 4420BFDB

Dual Station with Pet Fountain

This fountain is certified to NSF/ANSI 61-Annex G, AB1953

GENERAL
Pedestal, Endura II™ Steel Outdoor Dual Station Fountain with Bottle Filling Station and Pet Fountain. Rounded corner design with textured powder-coat finish and E-Coat immersion for year-round beauty with minimum maintenance. The E-coat immersion process coats the inside and outside for the ultimate in corrosion protection.

BOTTLE FILLER
Provides a quick fill at 1 gallon per minute. Laminar flow provides a clean fill with minimal splash and easy maintenance.

BUBBLER
Vandal-resistant bubbler is one-piece, chrome-plated. Unit has integral hood guard design to prevent contamination from other users, airborne deposits and tampering.

BASIN
Contour-formed stainless steel design with rounded edges reduces splatter, ensures proper drainage and prevents standing water.

PUSHBUTTON ACTUATION MECHANISM
Self-closing, vandal-resistant pushbutton does not require grasping or twisting.

INLET STRAINER
Easily cleaned in-line strainer screen traps particles of 140 microns or larger before they enter the waterway.

WATER INLET & DRAIN OUTLET
Inlet: 3/8" O.D. tubing
Outlet: 1-1/4" tube outlet for 1-1/4" slip joint connection

ACCESS PANELS
Heavy-gauge steel with vandal-resistant screws. Provides access for easy hook-up of all plumbing connections.

PET FOUNTAIN
Actuated by upper pushbutton. Slow drainage feature for easy drinking.

SUGGESTED SPECIFICATION
Unit shall include powder-coated finish with vandal-resistant pushbutton actuation, vandal-resistant bubblers with integral hood guard, and contour-formed rounded basins to reduce splash and prevent standing water. Bottle Filler shall include a laminar flow for minimal splash and provide 1 gallon per minute fill rate. Shall comply with ADA standards and be certified to lead-free compliance including NSF/ANSI 61-Annex G, AB1953.

Model 4420BF1UDB is shown. Image varies based on quantity and location of bottle fillers.

Standard Finish is Evergreen Textured powder-coat Endura II™
Additional colors available.

Trap and service stop not included.

OPTIONS
Available with single or dual bottle fillers.

JOB NAME: _____
_____
_____
ENGINEER/CONTRACTOR NAME:
_____
APPROVAL: _____
DATE: _____

ADA NSF/ANSI 61

halseytaylor.com
HALSEY TAYLOR, 2222 CAMDEN COURT, OAK BROOK, ILLINOIS 60523

10-2010

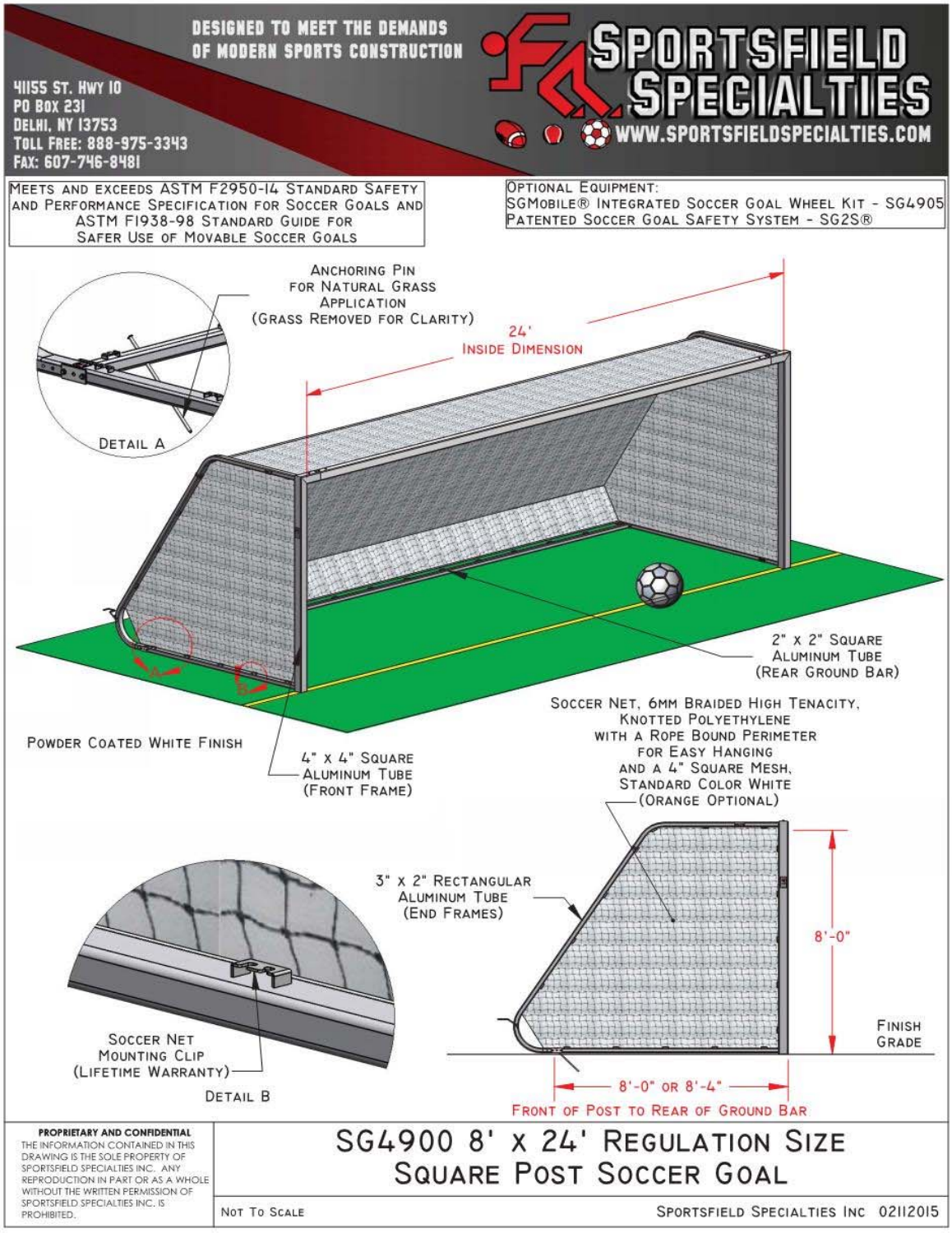
MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

WATER FOUNTAIN CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

1



MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

SOCCER GOAL CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

2

Solar Charging Pole

In Just Minutes: Plug in, Charge up and stay Connected

Sun Charge Systems Solar charging Pole is an environmentally friendly, self contained power system.

Our charging stations are built to provide access to electrical outlets for the purpose of charging personal electronic devices such as cell phones, tablets, and laptops.

The charging station converts clean solar energy to electricity and contains outlets so that USB or 12 volt chargers can be used to power devices in areas where conventional electrical outlets are unavailable.

Features an adjustable solar charging pole for easy orientation of solar panel towards the sun. Charges up to five mobile devices at once.

Technology:

- 60 Watt polycrystalline solar panel
- Battery management system
- 4 x USB outlets
- 1 x 12 Volt outlet
- Water resistant enclosure
- Designed to function year round
- Theft resistant mounting with steel security screws
- 4G Wireless Internet Hotspot (Optional)

Installation:

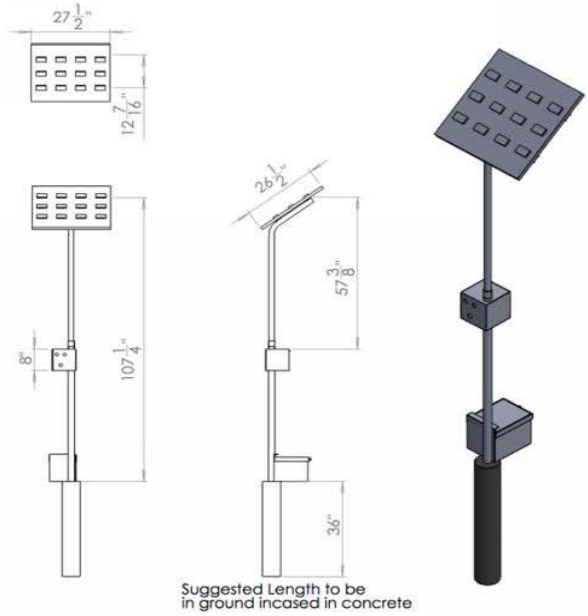
- Place away from structures that could produce shade and block direct sun light.
- Can be bolted to the ground with 1/2 anchor bolts

Available colors:

- White
- Other colors available upon request

Weight:

- 120 Lb



57 Arena Drive. Cleveland, AL 35049
Tel: 205-274-7002
www.sunchargesystems.com
Patent Pending

Sun Charge Systems, Inc.

Made In the U.S.A.

MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

SOLAR CHARGING POLE CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

3

TR-1940

"Highpoint Trash Receptacle"

Anchoring Methods

RCLF offers three different ways with which to incorporate your beautifully crafted piece into its surroundings

- Surface mount (-SM)
- In-ground mount (-IG)
- Freestanding (-FS)

Options

Capacities: 20 gallon (-20), 30 gallon (-30), and 50 gallon (-50)

Ash Tray: -AT

Lids: Available in all of RCLF's Standard Lid options
**Shown with Dome Lid 3 (-DL3)

Customization

RCLF takes pride in our ability to provide plaques, decals, and custom artwork to incorporate into almost any of our products. Whether you're looking to brand your furniture, or add a touch of personal design, RCLF has the ability customize our furnishings to suit your personal flair. Inquire for more information.

Basic Information

Height: 50"

Length: 24"

Depth: 24"

Weight: N/A

Materials

- 3/16" solid steel sheet metal
- 2" x 3/16" metal flat bar

Construction

-Body: Constructed from 3/16" sheet metal that has been punched and rolled to create cylindrical shape.

-Anchoring: Bottom of can is wrapped in 2" flat bar with bolt down feet

Powder Coat Finish Procedure

-1. Metal substrate is shot-blasted to remove contaminants and create an optimal etched profile for powder adhesion.

2. Substrate is then washed with an alkaline rinse to further enhance coating effectiveness.

3. An industrial sealer is applied to the piece to inhibit rusting.

4. The piece is then coated with an epoxy powder coat primer and subsequently cured in our oven according to manufacturer's guidelines.

5. The metal returns to the powder booth for application of UV-resistant, polyester powder coat finish and is cured again in the oven. The furniture emerges with a beautiful and durable exterior that is capable of withstanding the rigors of demanding public spaces.

Warranty

- The Renaissance team warrants the quality of every site amenity that leaves our factory. If the product is installed according to our recommendations, we will guarantee the frame construction for **the life** of the item. All other components are guaranteed for three years after shipment.

RCLF SITE FURNISHINGS

2807 Mary Linda Ave. | N.E. Roanoke, VA 24012

540.342.1548 | www.rclfsitefurnishings.com

MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

TRASH RECEPTACLE CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

B-1452
"Blue Ridge Bench"

Basic Information

Height: 53.5"

Length: 72"

Depth: 21.5"

Weight: 129 lbs

Materials

- 3/16" sheet metal
- 11 GA sheet metal
- 2" square tubing
- 1 ½" square tubing

Construction

-Back: Slat pattern is laser-cut into 3/16" sheet metal and welded to tubing frame
-Seat: Slat pattern is laser-cut into 11GA sheet metal and is tab welded to back.
-Frame: consists of 2" and 1 ½" square tubing, fully welded in joints

Powder Coat Finish Procedure

-1. Metal substrate is shot-blasted to remove contaminants and create an optimal etched profile for powder adhesion.

2. Substrate is then washed with an alkaline rinse to further enhance coating effectiveness.

3. An industrial sealer is applied to the piece to inhibit rusting.

4. The piece is then coated with an epoxy powder coat primer and subsequently cured in our oven according to manufacturer's guidelines.

5. The metal returns to the powder booth for application of UV-resistant, polyester powder coat finish and is cured again in the oven. The furniture emerges with a beautiful and durable exterior that is capable of withstanding the rigors of demanding public spaces.

Warranty

- The Renaissance team warrants the quality of every site amenity that leaves our factory. If the product is installed according to our recommendations, we will guarantee the frame construction for **the life** of the item. All other components are guaranteed for three years after shipment.

RCLF SITE FURNISHINGS

2807 Mary Linda Ave. | N.E. Roanoke, VA 24012

540.342.1548 | www.rclfsitefurnishings.com

Anchoring Methods

RCLF offers three different ways with which to incorporate your beautifully crafted piece into its surroundings

- Surface mount (-SM)
- In-ground mount (-IG)
- Freestanding (-FS)

Options

Lengths: 4'-8' (-4, -5, -6, -7, -8)

Backless: (For backless version, see B-1455)

Intermediate armrests: (-IA)

Customization

RCLF takes pride in our ability to provide plaques, decals, and custom artwork to incorporate into almost any of our products. Whether you're looking to brand your furniture, or add a touch of personal design, RCLF has the ability customize our furnishings to suit your personal flair. Inquire for more information.

BK-2220
"Coaster Rack"

Basic Information

Height: 24"

Length: 110"

Depth: 24"

Weight: 84 lbs

Materials

- 3/4" round tubing
- 1/8" solid steel sheet metal

Construction

- Channels: Constructed from laser-cut 1/8" sheet metal that has been bent to form the channel
- Bike Spaces: ¾" round steel tubing is bent and welded to channel with roughly 11.5" in between each bike

Powder Coat Finish Procedure

1. Metal substrate is shot-blasted to remove contaminants and create an optimal etched profile for powder adhesion.

2. Substrate is then washed with an alkaline rinse to further enhance coating effectiveness.

3. An industrial sealer is applied to the piece to inhibit rusting.

4. The piece is then coated with an epoxy powder coat primer and subsequently cured in our oven according to manufacturer's guidelines.

5. The metal returns to the powder booth for application of UV-resistant, polyester powder coat finish and is cured again in the oven. The furniture emerges with a beautiful and durable exterior that is capable of withstanding the rigors of demanding public spaces.

Warranty

The Renaissance team warrants the quality of every site amenity that leaves our factory. If the product is installed according to our recommendations, we will guarantee the frame construction for **the life** of the item. All other components are guaranteed for three years after shipment.

RCLF SITE FURNISHINGS

2807 Mary Linda Ave. | N.E. Roanoke, VA 24012

540.342.1548 | www.rclfsitefurnishings.com

Anchoring Methods

RCLF offers two different ways with which to incorporate your beautifully crafted piece into its surroundings

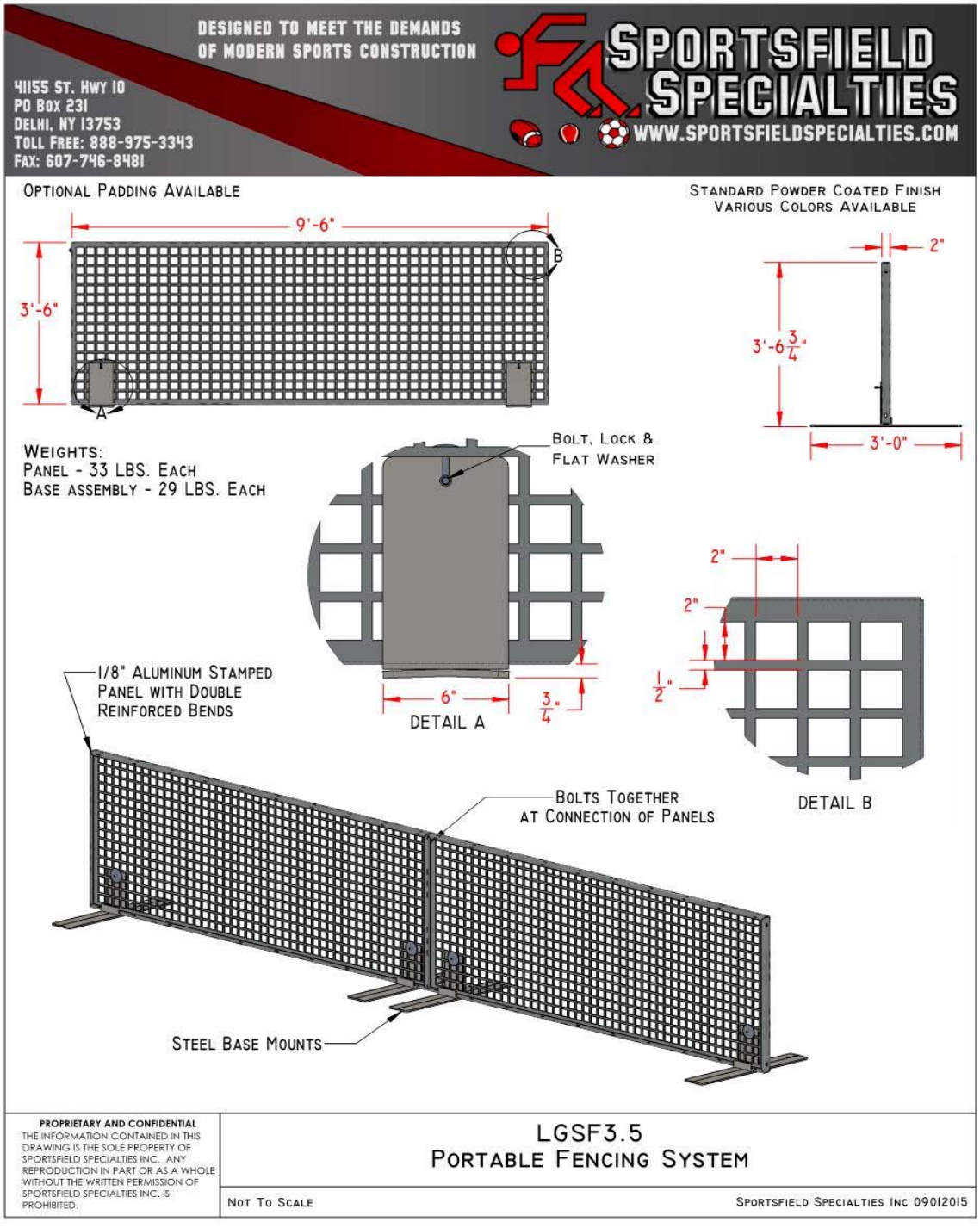
- Surface mount (-SM)
- In-ground mount (-IG)

Options

Capacities: Dependent upon length. Inquire within!

Customization

RCLF takes pride in our ability to provide plaques, decals, and custom artwork to incorporate into almost any of our products. Whether you're looking to brand your furniture, or add a touch of personal design, RCLF has the ability customize our furnishings to suit your personal flair. Inquire for more information.



MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

PORTABLE FENCE CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

7

GameTime
A PLAYCORE Company

LAVERTE

Model: FT15006
Age Groups:

Features and Benefits

Description

The LaVerte package is all about strength and access for people of all abilities. We've included Chin-Up, Push-Up and Horizontal chin-up stations, as well as accessible versions of our Chest Press and Lat Pull Down for building muscle strength in the upper body. The Hand Cycle and Upright Cycle provide low-impact aerobic activities, the Leg Press helps build lower body muscle strength and the Balance Board is a great station for improving core strength, as well as balance and flexibility.

GAMETIME, A PLAYCORE COMPANY

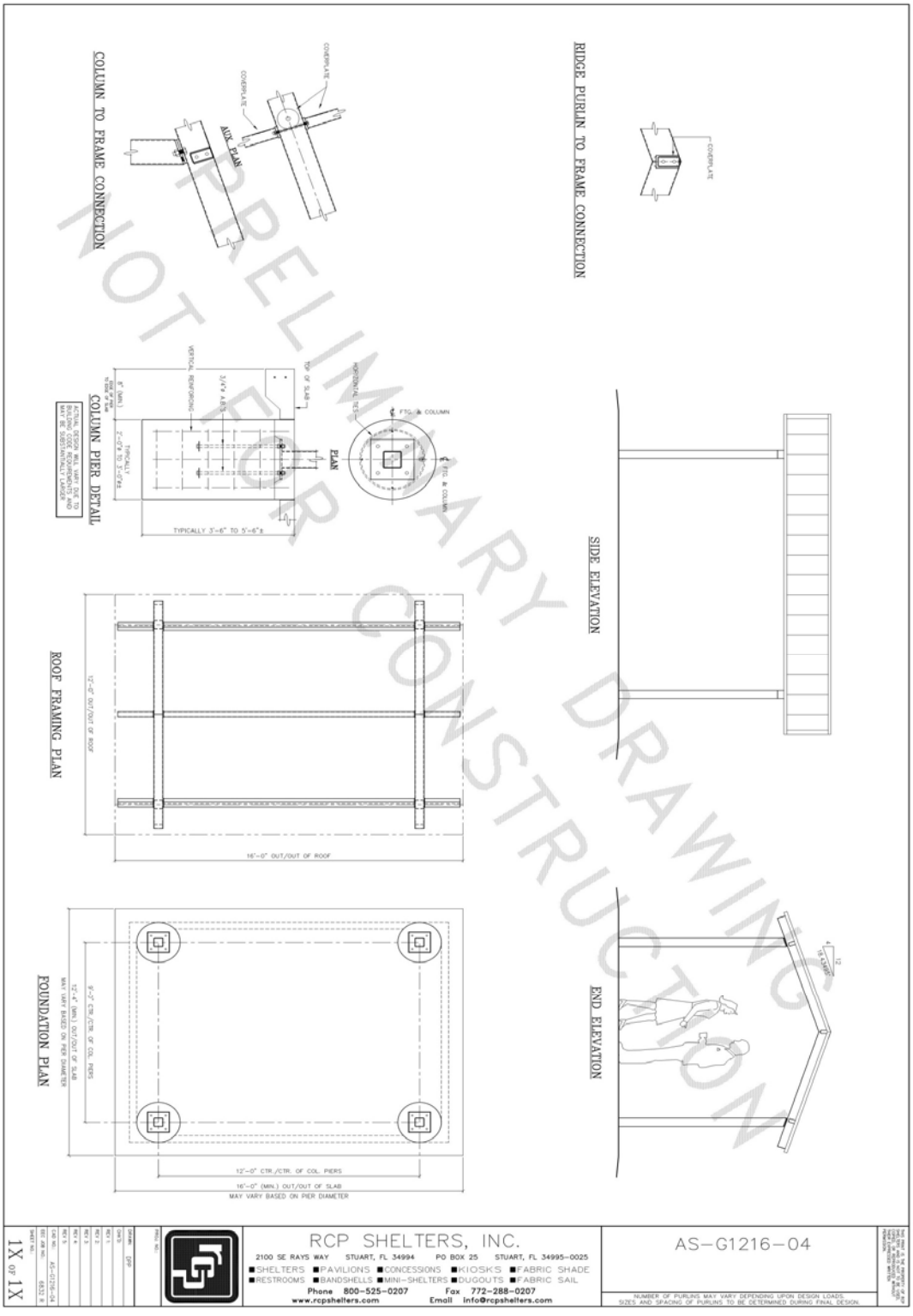
1-800-235-2440 | GAMETIME.COM

MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

FITNESS CENTER CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

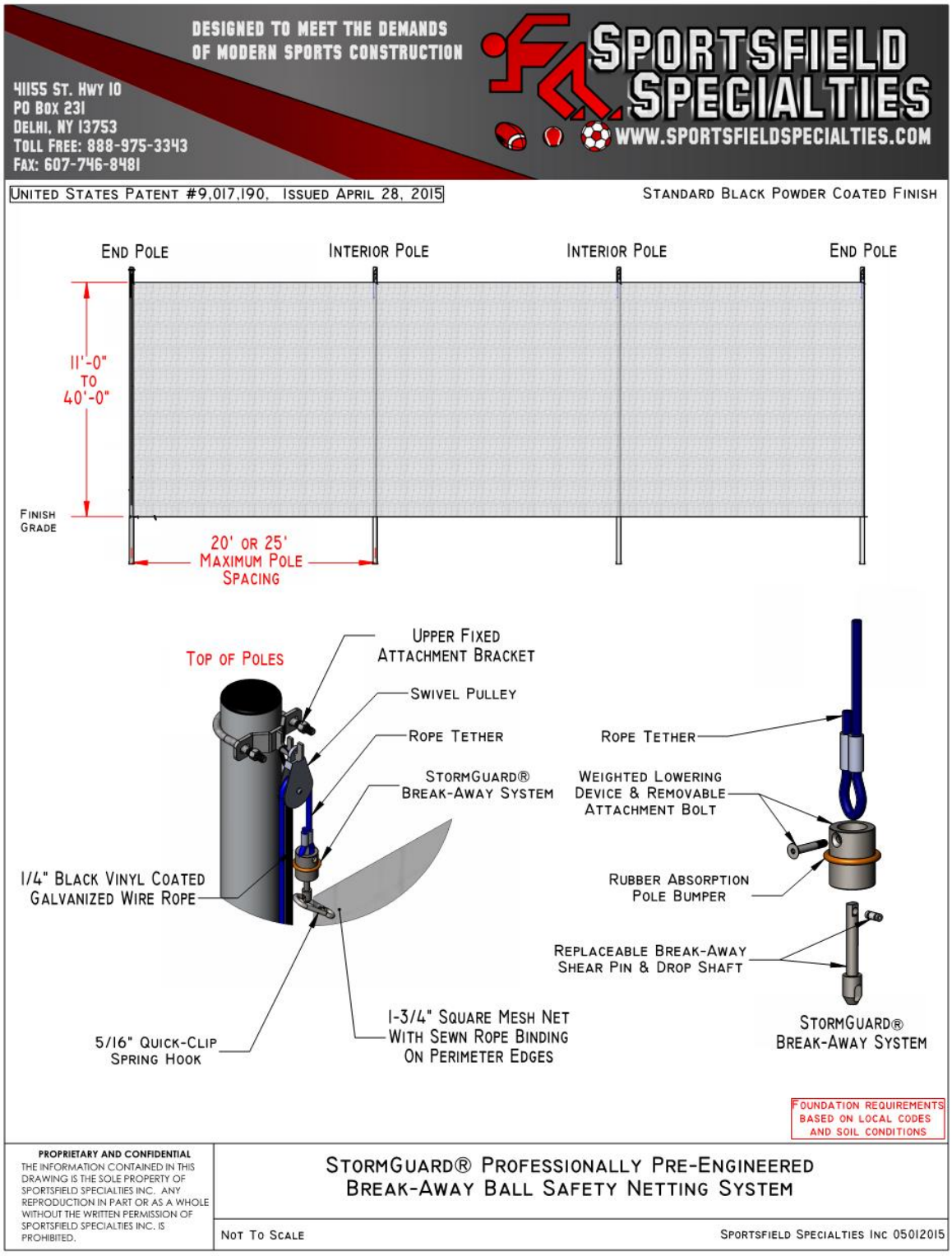


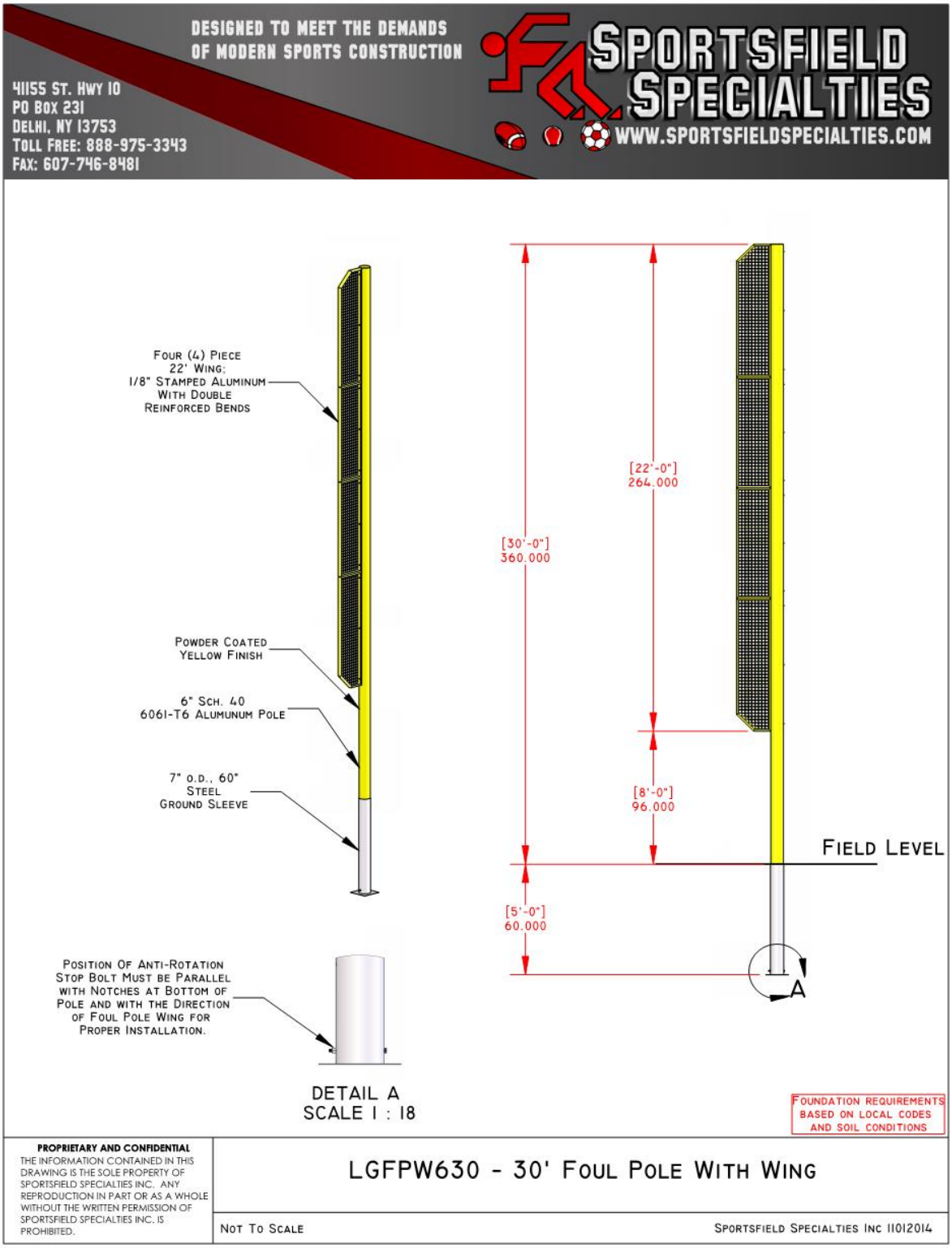
MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

SHADE SYSTEM CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure


DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION
41155 ST. HWY 10
PO BOX 231
DELHI, NY 13753
TOLL FREE: 888-975-3343
FAX: 607-746-8481
SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM
UNITED STATES PATENT #9,017,190, ISSUED APRIL 28, 2015
STANDARD BLACK POWDER COATED FINISH
END POLE
INTERIOR POLE
INTERIOR POLE
END POLE
11'-0" TO 40'-0"
FINISH GRADE
20' OR 25' MAXIMUM POLE SPACING
TOP OF POLES
UPPER FIXED ATTACHMENT BRACKET
SWIVEL PULLEY
ROPE TETHER
STORMGUARD® BREAK-AWAY SYSTEM
1/4" BLACK VINYL COATED GALVANIZED WIRE ROPE
5/16" QUICK-CLIP SPRING HOOK
1-3/4" SQUARE MESH NET WITH SEWN ROPE BINDING ON PERIMETER EDGES
ROPE TETHER
WEIGHTED LOWERING DEVICE & REMOVABLE ATTACHMENT BOLT
RUBBER ABSORPTION POLE BUMPER
REPLACEABLE BREAK-AWAY SHEAR PIN & DROP SHAFT
STORMGUARD® BREAK-AWAY SYSTEM
FOUNDATION REQUIREMENTS BASED ON LOCAL CODES AND SOIL CONDITIONS
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.
STORMGUARD® PROFESSIONALLY PRE-ENGINEERED BREAK-AWAY BALL SAFETY NETTING SYSTEM
NOT TO SCALE
SPORTSFIELD SPECIALTIES INC 05012015

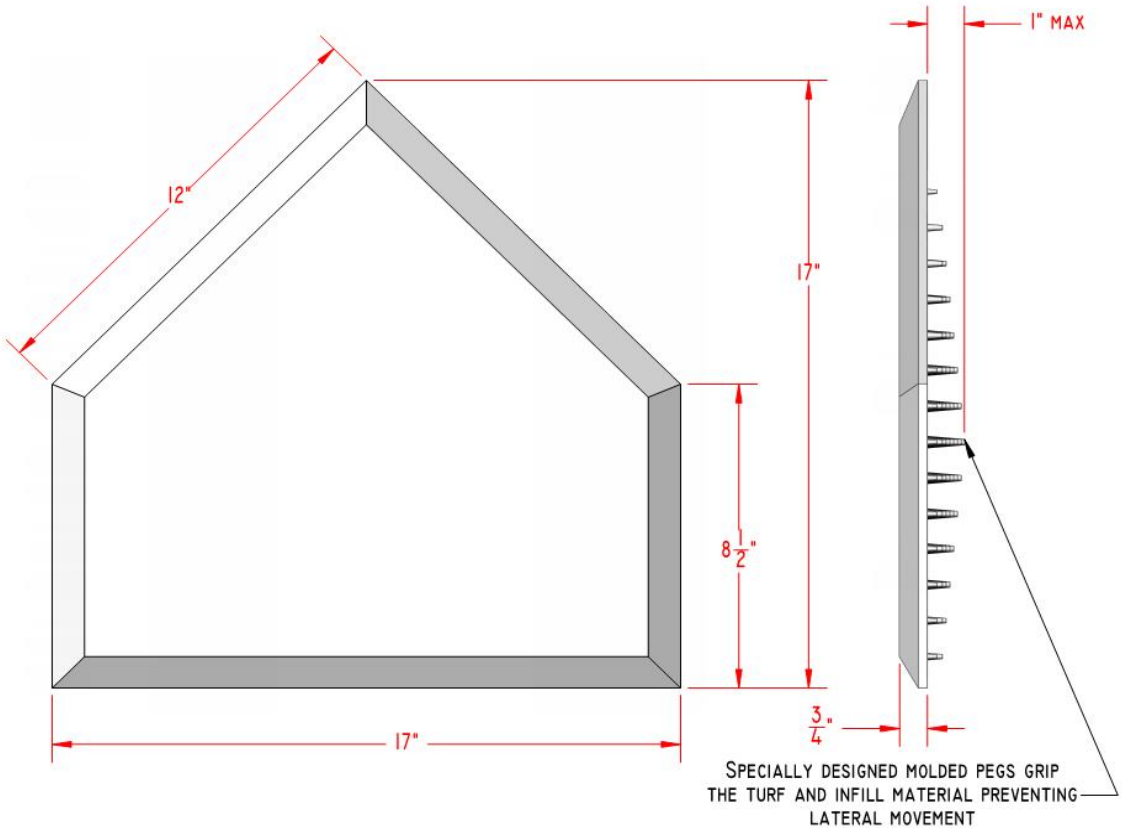

DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION
SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM
41155 ST. HWY 10
PO BOX 231
DELHI, NY 13753
TOLL FREE: 888-975-3343
FAX: 607-746-8481
FOUR (4) PIECE 22' WING: 1/8" STAMPED ALUMINUM WITH DOUBLE REINFORCED BENDS
POWDER COATED YELLOW FINISH
6" SCH. 40 6061-T6 ALUMUNUM POLE
7" O.D., 60" STEEL GROUND SLEEVE
POSITION OF ANTI-ROTATION STOP BOLT MUST BE PARALLEL WITH NOTCHES AT BOTTOM OF POLE AND WITH THE DIRECTION OF FOUL POLE WING FOR PROPER INSTALLATION.
DETAIL A
SCALE 1 : 18
[22'-0"]
264.000
[30'-0"]
360.000
[8'-0"]
96.000
[5'-0"]
60.000
FIELD LEVEL
A
FOUNDATION REQUIREMENTS BASED ON LOCAL CODES AND SOIL CONDITIONS
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.
LGFPW630 - 30' FOUL POLE WITH WING
NOT TO SCALE
SPORTSFIELD SPECIALTIES INC 11012014

DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION

41155 St. Hwy 10
PO Box 231
Delhi, NY 13753
Toll Free: 888-975-3343
Fax: 607-746-8481

SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM

United States Patent #8,337,340, Issued December 25, 2012



* Designed specifically for synthetic turf applications
* No ground anchor installation is necessary
* Durable all rubber mesh reinforced construction
* Official size

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.

LGTURFBASEHP - TurfBase® Home Plate

Not To Scale

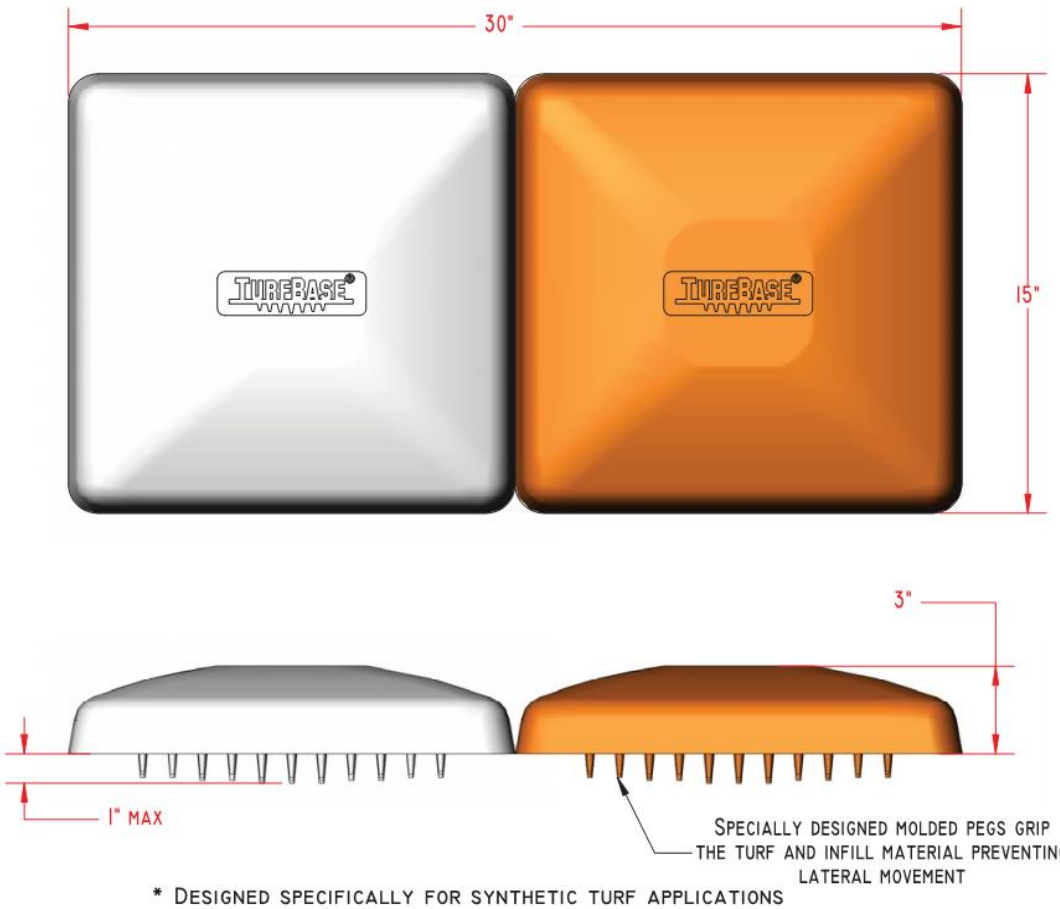
Sportsfield Specialties Inc 11012014

DESIGNED TO MEET THE DEMANDS OF MODERN SPORTS CONSTRUCTION

41155 ST. HWY 10
PO BOX 231
DELHI, NY 13753
TOLL FREE: 888-975-3343
FAX: 607-746-8481

SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM

UNITED STATES PATENT #8,337,340, ISSUED DECEMBER 25, 2012



* DESIGNED SPECIFICALLY FOR SYNTHETIC TURF APPLICATIONS
* NO GROUND ANCHOR INSTALLATION IS NECESSARY
* DURABLE ALL RUBBER MESH REINFORCED CONSTRUCTION
* OFFICIAL SIZE - (1) DOUBLE FIRST BASE AND (2) TURFBASE BASES

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.

LGTURFBASEDB - TURFBASE® DOUBLE BASE

NOT TO SCALE

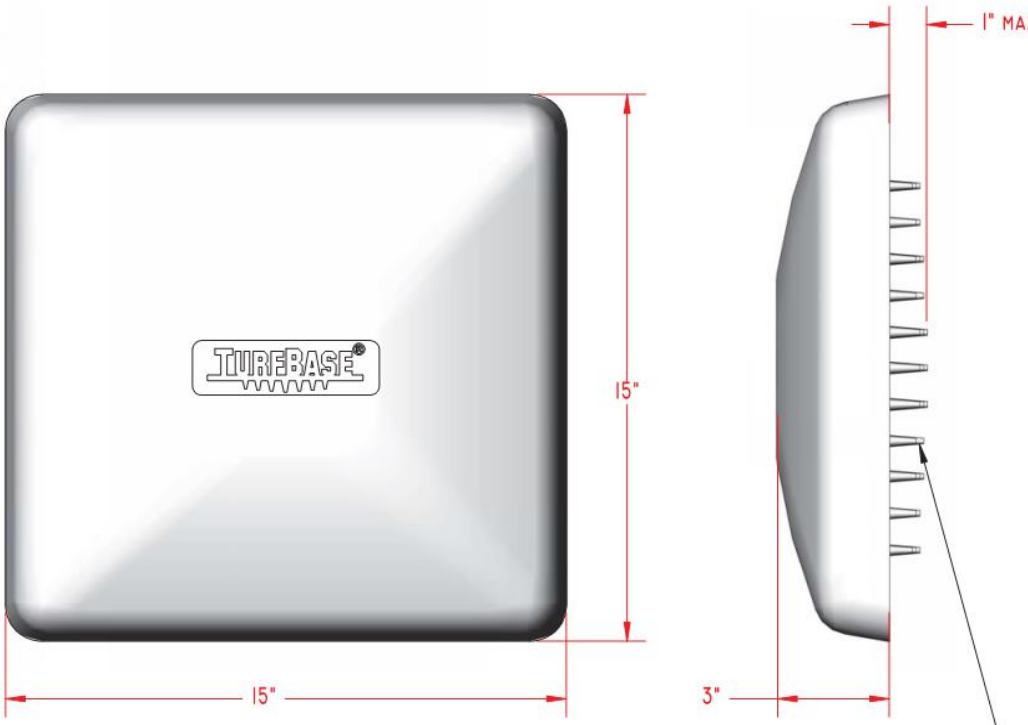
SPORTSFIELD SPECIALTIES INC 11012014

DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION

41155 St. Hwy 10
PO Box 231
Delhi, NY 13753
Toll Free: 888-975-3343
Fax: 607-746-8481

SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM

United States Patent #8,337,340, Issued December 25, 2012



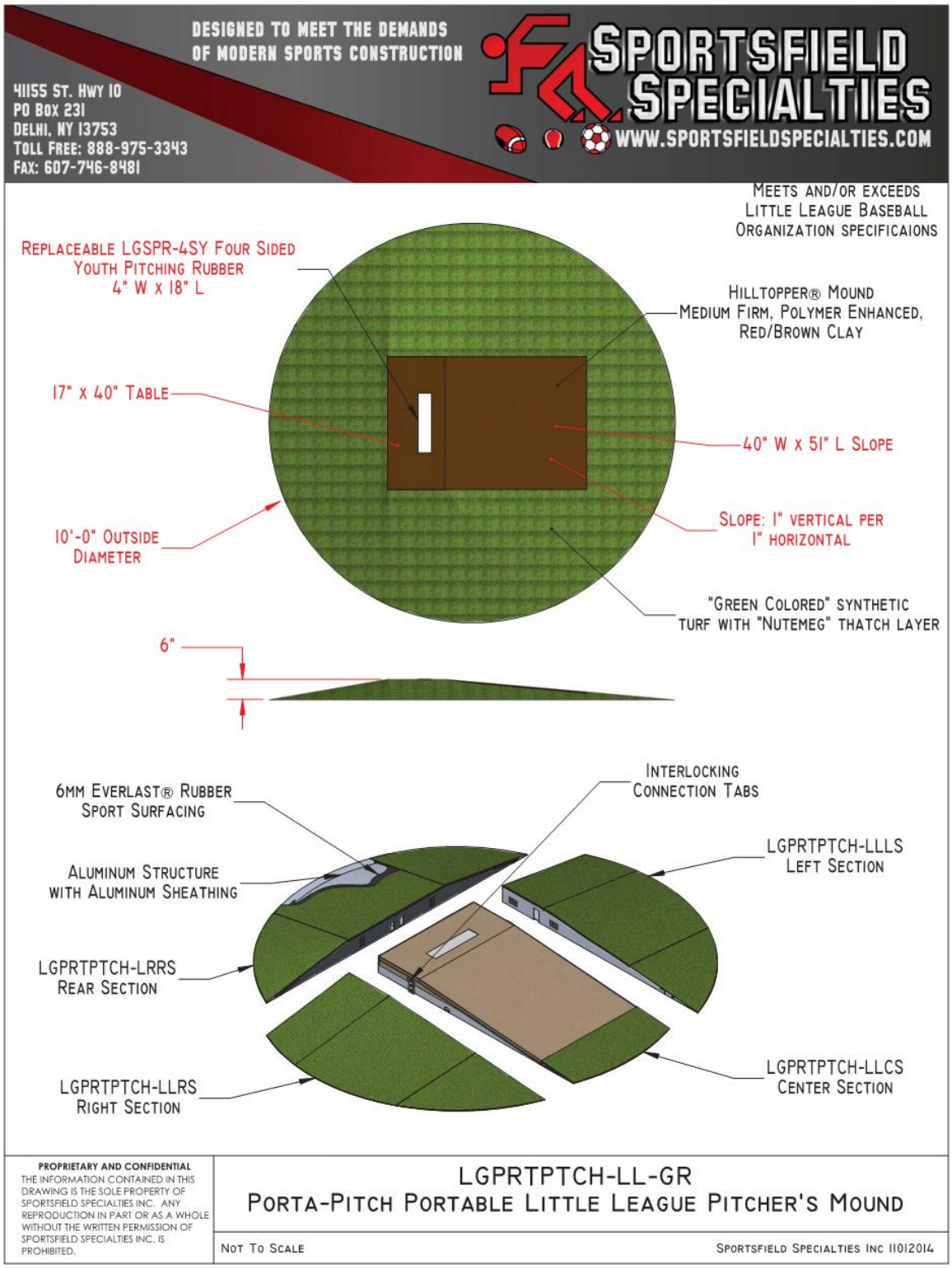
* Designed specifically for synthetic turf applications
* No ground anchor installation is necessary
* Durable all rubber mesh reinforced construction
* Official size - Set of 3

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.

LGTURFBASE - TurfBase® Base

Not To Scale

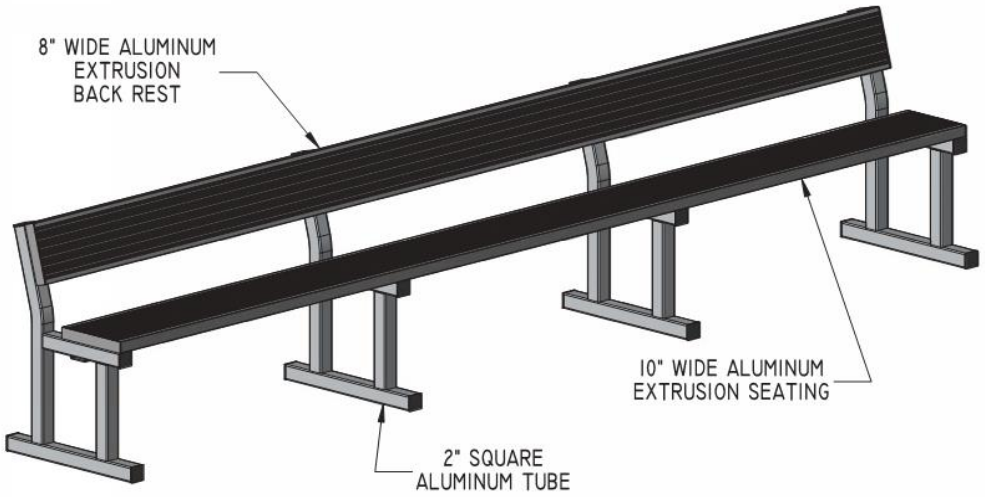
Sportsfield Specialties Inc 11012014

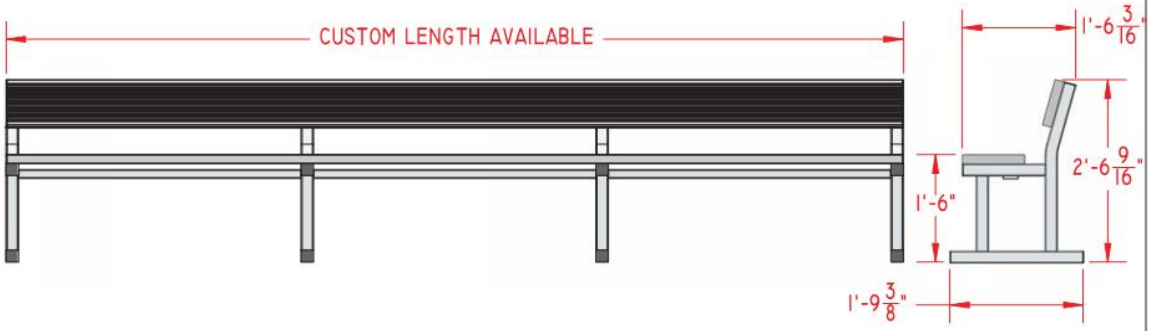

DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION
SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM
41155 St. Hwy 10
PO Box 231
Delhi, NY 13753
Toll Free: 888-975-3343
Fax: 607-746-8481
Meets and/or exceeds
Little League Baseball
Organization specificaions
Replaceable LGSPR-4SY Four Sided
Youth Pitching Rubber
4" W x 18" L
Hilltopper® Mound
Medium Firm, Polymer Enhanced,
Red/Brown Clay
17" x 40" Table
40" W x 51" L Slope
10'-0" Outside
Diameter
Slope: 1" vertical per
1" horizontal
"Green Colored" synthetic
turf with "Nutemeg" thatch layer
6"
6mm Everlast® Rubber
Sport Surfacing
Interlocking
Connection Tabs
LGPRTPTCH-LLLS
Left Section
Aluminum Structure
with Aluminum Sheathing
LGPRTPTCH-LRRS
Rear Section
LGPRTPTCH-LLCS
Center Section
LGPRTPTCH-LLRS
Right Section
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.
LGPRTPTCH-LL-GR
Porta-Pitch Portable Little League Pitcher's Mound
Not To Scale
Sportsfield Specialties Inc 11012014

DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION

41155 ST. HWY 10
PO BOX 231
DELHI, NY 13753
TOLL FREE: 888-975-3343
FAX: 607-746-8481

SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM





STANDARD PART NUMBERS AND WEIGHTS:	
LG-STAL-BRPT-08	50 LBS
LG-STAL-BRPT-10	60 LBS
LG-STAL-BRPT-12	70 LBS
LG-STAL-BRPT-15	85 LBS

POWDER COATED FRAME AND EXTRUSION AVAILABLE
IN A VARIETY OF STANDARD COLORS

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.

SINGLE TIER
PORTABLE ALUMINUM PLANK BENCH WITH BACK REST

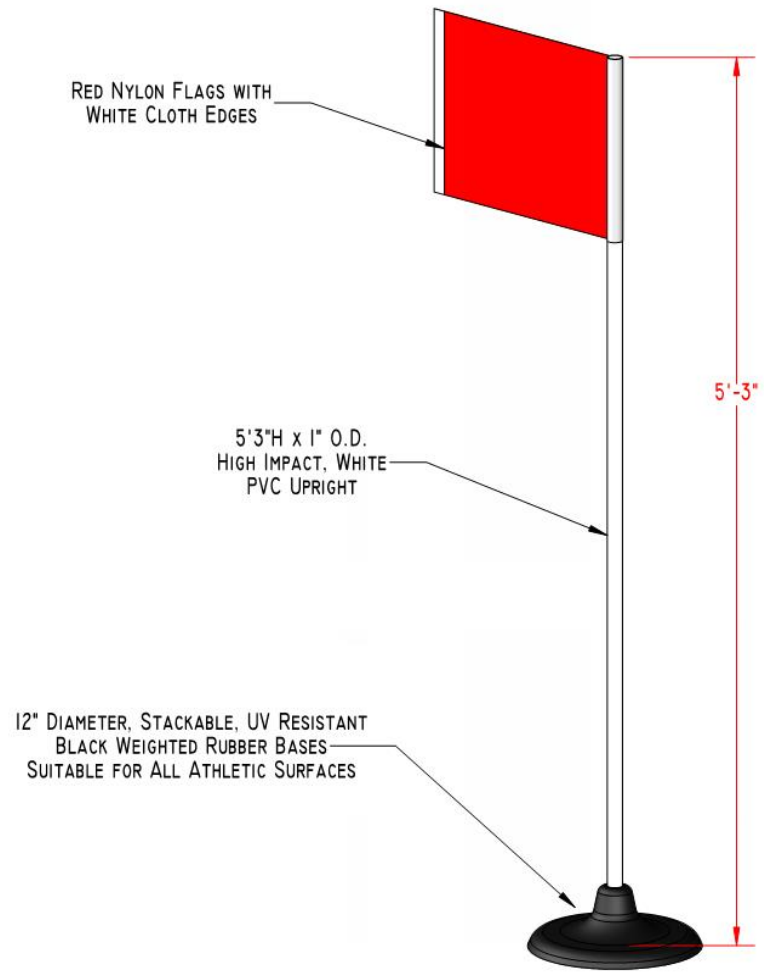
NOT TO SCALE

SPORTSFIELD SPECIALTIES INC 11012014

DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION

41155 St. Hwy 10
PO Box 231
Delhi, NY 13753
Toll Free: 888-975-3343
Fax: 607-746-8481

SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM



PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.

SG6BI404 - Set of Four (4)
KwikGoal® Premier Soccer Corner Flags

Not To Scale

Sportsfield Specialties Inc 02122016

Exclusive Sign Options!

Choose your design and fine!

Unique signs that will not peel or fade.

Less Refills!

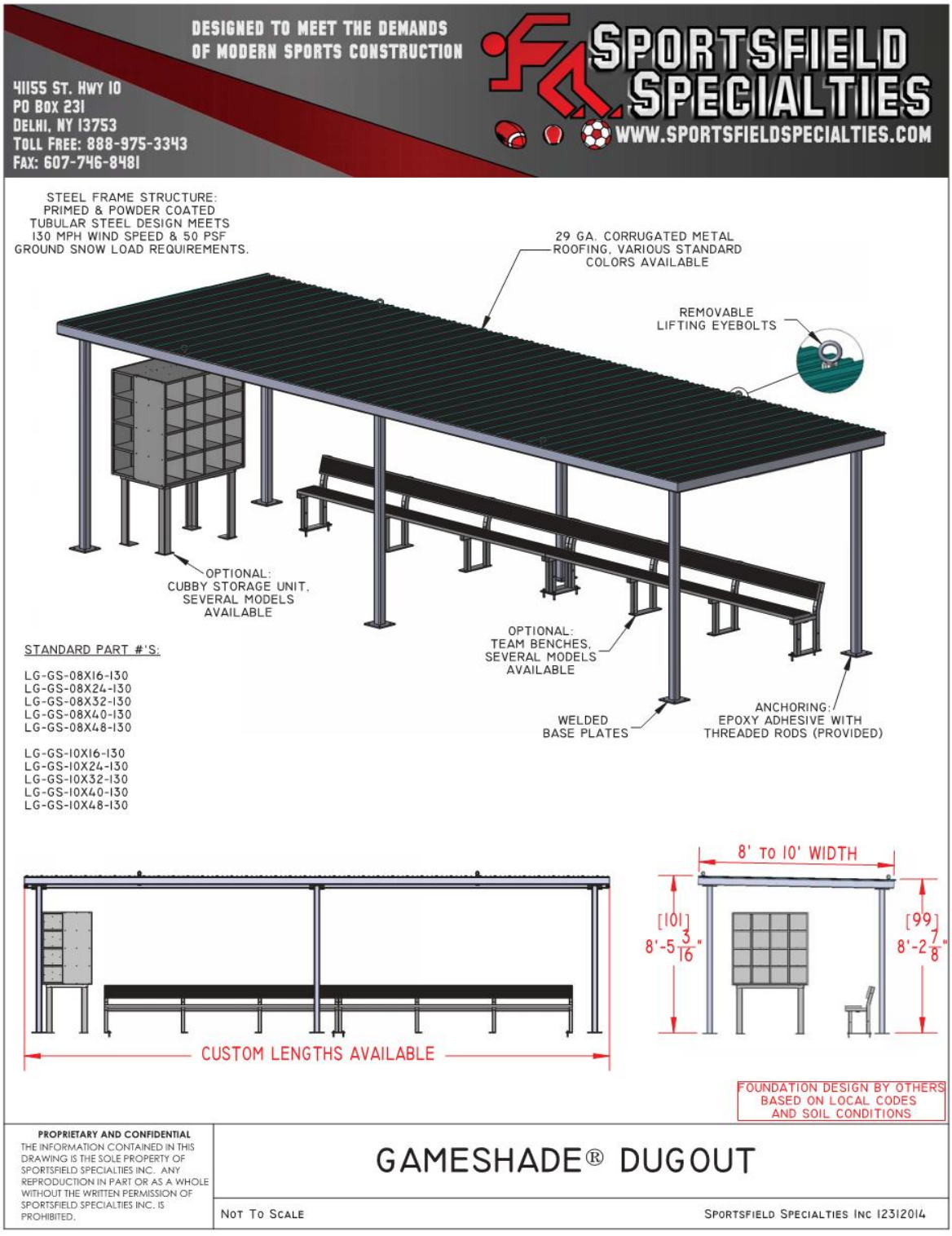
Holds more bags— save time and money on maintenance.

Rust-proof!

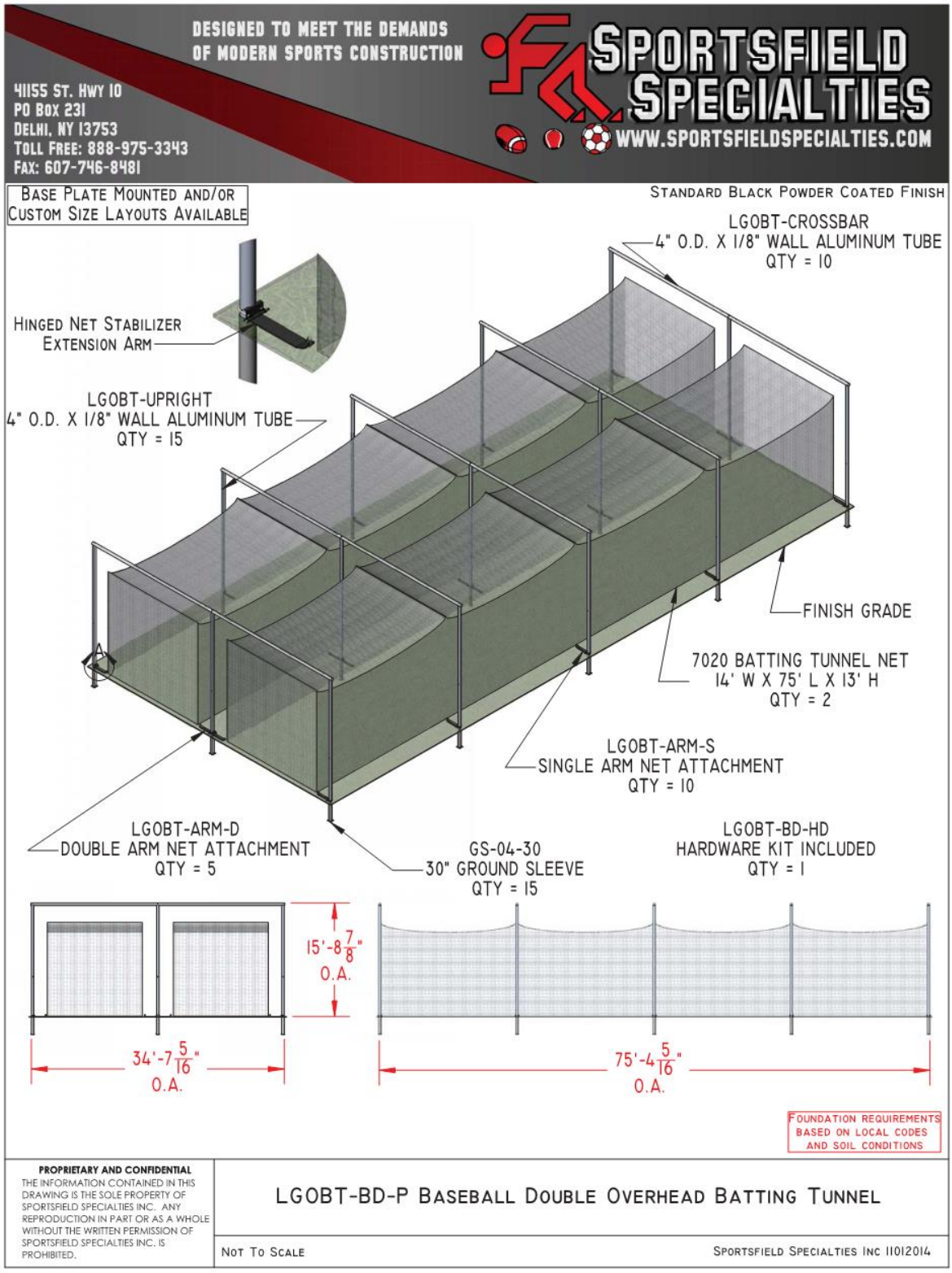
Made from weather-resistant steel.

LIFE TIME GUARANTEE

MASER CONSULTING P.A. MC PROJECT NO. ECB-068	**DOG WASTE STATION CUT SHEET** **WITTE FIELD FEASIBILITY STUDY** **BOROUGH OF ENGLEWOOD CLIFFS** **BERGEN COUNTY, NEW JERSEY**	**Figure** 18



MC PROJECT NO. ECB-068	**DUGOUT CUT SHEET** **WITTE FIELD FEASIBILITY STUDY** **BOROUGH OF ENGLEWOOD CLIFFS** **BERGEN COUNTY, NEW JERSEY**	**Figure** 19


DESIGNED TO MEET THE DEMANDS
OF MODERN SPORTS CONSTRUCTION
SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM
41155 ST. HWY 10
PO BOX 231
DELHI, NY 13753
TOLL FREE: 888-975-3343
FAX: 607-746-8481
BASE PLATE MOUNTED AND/OR CUSTOM SIZE LAYOUTS AVAILABLE
STANDARD BLACK POWDER COATED FINISH
LGOBT-CROSSBAR
4" O.D. X 1/8" WALL ALUMINUM TUBE
QTY = 10
HINGED NET STABILIZER EXTENSION ARM
LGOBT-UPRIGHT
4" O.D. X 1/8" WALL ALUMINUM TUBE
QTY = 15
FINISH GRADE
7020 BATTING TUNNEL NET
14' W X 75' L X 13' H
QTY = 2
LGOBT-ARM-S
SINGLE ARM NET ATTACHMENT
QTY = 10
LGOBT-ARM-D
DOUBLE ARM NET ATTACHMENT
QTY = 5
GS-04-30
30" GROUND SLEEVE
QTY = 15
LGOBT-BD-HD
HARDWARE KIT INCLUDED
QTY = 1
15'-8 7/8" O.A.
34'-7 5/16" O.A.
75'-4 5/16" O.A.
FOUNDATION REQUIREMENTS BASED ON LOCAL CODES AND SOIL CONDITIONS
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPORTSFIELD SPECIALTIES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPORTSFIELD SPECIALTIES INC. IS PROHIBITED.
LGOBT-BD-P BASEBALL DOUBLE OVERHEAD BATTING TUNNEL
NOT TO SCALE
SPORTSFIELD SPECIALTIES INC 11012014

ELECTRO-MECH
SCOREBOARD COMPANY

MODEL LX1130
Outdoor
Baseball

Dimensions	Weight	Cabinet Material	Caption Height	Accent Material
8 ft. x 6 ft.	170 lbs.	Aluminum	6 in.	2.4 mil cast vinyl

Digit Height	Indicator Size	Digit Colors	Electrical
18 in., 11 in.	4 in.	Amber or Red	1.4 Amps, 120 VAC

STANDARD EQUIPMENT & FEATURES

- Single cabinet design with heavy duty extruded aluminum framing
- Light weight, rust free, all aluminum construction
- Mounting hardware for permanent installation on posts without the need for on site fabrication
- Automotive grade baked on enamel based paint applied to the scoreboard face
- Choice of 18 standard paint colors
- Choice of amber or red LED displays
- LED display circuit scoreboards conformal coated for outdoor use
- Full-sized 37-key control console with LCD display
- Fifty programmable brightness levels
- Junction box and patch cable for hardwired installations
- Five-year limited warranty
- Toll free technical support via phone and online for the life of the product

OPTIONAL EQUIPMENT & UPGRADES

- ID panels with custom graphics, in a variety of sizes, shapes and styles, to mount above, below, or beside the scoreboard
- Extended configurations for ID panels built into the left or right side of the scoreboard cabinet
- Full color video and other electronic display panels
- Stadium Sound System packages
- Custom paint colors
- Team name in place of HOME
- Up to 1,000 feet of data cable for hardwired installations
- ScoreLink Wireless RF modem system for wireless communication
- Additional warranty and support plans

DIGITS / INDICATORS:

Guest Score, Home Score, and Inning digits are 18 inches tall. Pitch Count digits are 11 inches tall, and Ball, Strike, and Out indicators are 4 inches in diameter. Digits and indicators are formed from matrices of super-bright, long-lasting, energy-efficient LEDs (Light Emitting Diodes). Choose either amber or red LEDs for all outdoor products. Our LED displays are protected by aluminum masks that allow the hard epoxy shells of the LEDs to be exposed for maximum viewing angles.

PAINT COLOR OPTIONS

ELECTRO-MECH
SCOREBOARD COMPANY
72 Industrial Blvd.
Wrightsville, GA 31096
(800)-445-7846
electro-mech.com

Lifetime Warranty

BMI's Vitralase®/Vitrix® Laser Engraving

BMI warrants, through its Lifetime Warranty, that its patented Vitralase®/Vitrix® vitrification processes will be of good quality and workmanship and will not fade, chip, oxidize, peel or separate from the brick, paver or tile for the life of the surface of the engraved brick, paver or tile. BMI requires that the brick, paver or tile manufacturer meet all ASTM (American Standards of Testing Materials) standards for quality, durability and longevity.

This warranty is limited to the repair or replacement of any Vitralase®/Vitrix® vitrification processes engraved into a brick, paver or tile meeting ASTM standards. Any Vitralase®/Vitrix® vitrification engraving processes that prove(s) defective will be repaired or replaced by BMI provided that such defect is due to faulty material or workmanship on the part of BMI and not the result of tampering, vandalism, misuse, abuse, improper installation or maintenance misapplication, natural disaster or acts of God, excluding normal environmental conditions such as rain, sleet, snow and freeze/thaw conditions.

Patented Laser Engraving Advantages

OUR LASER ENGRAVING

THEIR ENGRAVING

Traditional engraving methods of sandblasting & pantographing are known to have high maintenance and replacement costs due to deterioration of paint, epoxy or grout fills; substandard engraving depths; and low tolerance to general foot traffic and/or weather exposure. Ask your representative for a full laser vs. sandblast brochure.

ADVANTAGES	BMI's LASER ENGRAVING	SANDBLASTING	PANTOGRAPHING
PERMANENT MARK	●		
COST EFFECTIVE	●	●	●
INTRICATE GRAPHICS	●		
MAINTENANCE FREE	●		
NO FADING	●		
LIFETIME WARRANTY	●		
CRISP & FINE DETAIL	●		
PAINT, EPOXY, GROUT FILL		●	●
NO FILL	●		
HARDENED GLASS	●		
ENGRAVE ON ALL MATERIALS		●	●
ENVIRONMENTALLY SAFE GREEN TECHNOLOGY	●		

We want our clients to decide for themselves!

Arrays

MASER CONSULTING P.A.

MC PROJECT NO. ECB-068

BRICK MEMORIAL AREA CUT SHEET
WITTE FIELD FEASIBILITY STUDY
BOROUGH OF ENGLEWOOD CLIFFS
BERGEN COUNTY, NEW JERSEY

Figure

Arrow Vinyl Murryhill Heavy-duty Building 14' x 31'

COLOR PALETTE

ARROW Storage Products
INNOVATION UNDER COVER

VINYL COATED STEEL™

- Vinyl Coated Steel – electro galvanized and coated with vinyl providing exceptional corrosion resistance
- 5X thicker coating than standard steel buildings
- UV resistant
- Protects against rot, insects, and extreme weather conditions

© 2015 Arrow Shed, LLC

STEEL IS IDEAL

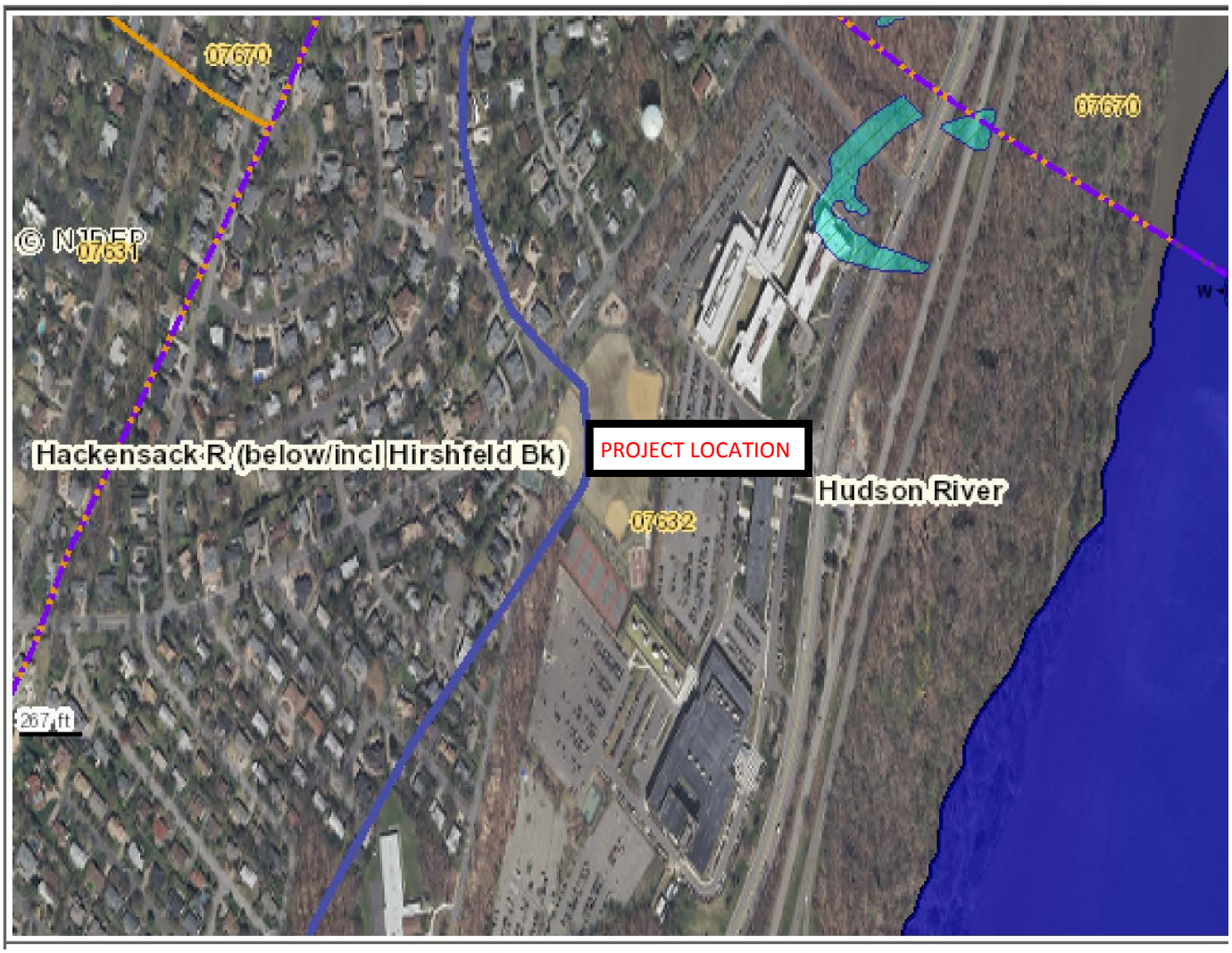
DESCRIPTION | **SPECIFICATIONS**

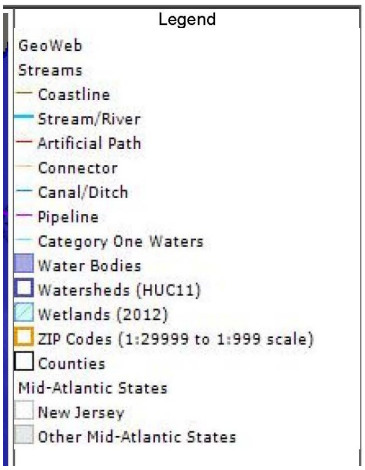
Model Number	Nominal Size	Storage Area		Interior Dimensions			Wall Height	Door Opening		Foundation Size	
		Sq. Ft.	Cu. Ft.	Width	Depth	Ht.		Width	Ht.	Width	Depth
VT1431	14' x 31'	422'	3663'	164"	370 1/2"	114 1/2"	94"	106 1/2"	91 3/4"	164"	370 1/2"
VT1431	4,2m x 9,4m	39,2 m^2	103,7 m^3	417 cm	941 cm	291 cm	187 cm	271 cm	233 cm	4,17 m	9,41 m

APPENDIX G

PERMITTING

NJDEP GEOWEB





MASER CONSULTING P.A.

Branch Office
400 Valley Road, Suite 304
Mt. Arlington, NJ 07856
T: 973.398.3110
F: 973.398.3199
www.maserconsulting.com

Witte Field Feasibility Study
Wetlands Map
Johnson Avenue
Borough of Englewood Cliffs
Bergen County, New Jersey

Scale: Not to Scale

Date: December 7, 2016

MC Project No. ECB068

BERGEN COUNTY

SOIL EROSION AND SEDIMENT CONTROL

CERTIFICATION APPLICATION WITH FEE SCHEDULE

For District Use Only
Application Number

APPLICATION FOR SOIL EROSION AND SEDIMENT CONTROL PLAN CERTIFICATION

The enclosed soil erosion and sediment control plan and supporting information are submitted for certification pursuant to the Soil Erosion and Sediment Control Act, Chapter 251, P.L. 1975 as amended (NJSA 4:24-39 et. seq.) An application for certification of a soil erosion and sediment control plan shall include the items listed on the reverse side of this form.

Name of Project		Project Location: Municipality	
Project Street Address		Block	Lot
Project Owner(s) Name			Phone # Fax #
Project Owner(s) Street Address (No P.O. Box Numbers)		City	State Zip
Total Area of Project (Acres)	Total Area or Land to be Disturbed (Acres)	No. Dwelling or other Units	Fee $
Plans Prepared by*			Phone # Fax #
Street Address		City	State Zip

*(Engineering related items of the Soil Erosion and Sediment Control Plan **MUST** be prepared by or under the direction of and be sealed by a Professional Engineer or Architect licensed in the State of New Jersey, in accordance with NJAC 13:27-6.1 et. seq.)

Agent Responsible During Construction			
Street Address			
City	State Zip	Phone	Fax #

The applicant hereby certifies that all soil erosion and sediment control measures are designed in accordance with current **Standards for Soil Erosion and Sediment Control In New Jersey** and will be installed in accordance with those Standards and the plan as approved by the Soil Conservation District and agrees as follows:

1. To notify the District in writing at least 48 hours in advance of any land disturbance activity. Failure to provide such notification may result in additional inspection fees.
2. To notify the District upon completion of the Project (Note: No certificate of occupancy can be granted until a report of compliance is issued by the District.
3. To maintain a copy of the certified plan on the project site during construction.
4. To allow District agents to go upon project lands for inspection.
5. That any conveyance of this project or portion thereof prior to its completion will transfer full responsibility for compliance with the certified plan to any subsequent owners.
6. To comply with all terms and conditions of this application and certified plan including payment of all fees prescribed by the district fee schedule hereby incorporated by reference.

The applicant hereby acknowledges that structural measures contained in the Soil Erosion and Sediment Control Plan are reviewed for adequacy to reduce offsite soil erosion and sedimentation and not for adequacy of structural design. The applicant shall retain full responsibility for any damages which may result from any construction activity notwithstanding district certification of the subject soil erosion and sediment control plan. It is understood that approval of the plan submitted with this application shall be valid only for the duration of the initial project approval granted by the municipality. All municipal renewals of this project will require submission and approval by the district. In no case shall the approval extend beyond three and one half years at which time resubmission and certification will be required. Soil Erosion and Sediment Control Plan certification is limited to the controls specified in the plan. It is not authorization to engage in the proposed land use unless such use has been previously approved by the municipality or other controlling agency.

1. Applicant Certification* Signature Date Applicant Name (Print)	3. Plan determined complete: Signature of District Official Date
2. Receipt of fee, plan and supporting documents is hereby acknowledged: Signature of District Official Date	4. Plan certified, denied or other actions noted. Special Remarks: Signature of District Official Date

***If other than project owner, written authorization of owner must be attached.**

Revised 4/15/10

BERGEN COUNTY SOIL CONSERVATION DISTRICT

FEE SCHEDULE

(A) DETACHED SINGLE FAMILY SUBDIVISION (or duplex on a single lot)

# of LOTS	BASE FEE	INSPECTION/COMPLIANCE FEE
1 - 3	$ 625	$200 per lot
4 - 10	875	$200 per lot
11 - 25	1,125	$200 per lot
26 - 50	1,525	$200 per lot
51 - 100	1,975	$200 per lot
101+	2,525	$200 per lot

❊❊❊
❊❊❊

(B) MULTI-FAMILY RESIDENTIAL (townhouses, condominiums, apartments, excluding duplex)

# OF BUILDINGS	BASE FEE	INSPECTION/COMPLIANCE FEE
1 - 5	$ 725	$200 per building plus $50 per unit
6 - 15	1,125	$200 per building plus $50 per unit
16 - 30	1,525	$200 per building plus $50 per unit
31 - 50	1,925	$200 per building plus $50 per unit
51 - 100	2,325	$200 per building plus $50 per unit
101+	2,725	$200 per building plus $50 per unit

❊❊❊
❊❊❊

(C) **COMMERCIAL, INDUSTRIAL, PUBLIC CONSTRUCTION** (All general land disturbing activities (e.g. land grading, stockpiles, dredging, stream improvements, demolition, etc.).

*** When area is > 1 acre, round off partial acreage to nearest whole acre**.

*****AREA (total disturbance)	BASE FEE	INSPECTION/COMPLIANCE FEE
>5,000 sq. ft. to ≤ .25 acre	$ 625	$300 total
>.25 to ≤.50 acre	675	$300 total
>.50 to < 1 acre	725	$300 total
1 - 4 acres	875	$200 per acre
5 - 11 acres	925	$200 per acre
12 - 25 acres	1,125	$200 per acre
26 - 50 acres	1,425	$200 per acre
51 - 100 acres	1,925	$200 per acre
101+ acres	2,425	$200 per acre

(D) <u>"DISTRICT AUTHORIZED" ROADS AND DRAINAGE ONLY</u> Used in conjunction with Sections (A), (B), or (C) where applicable. See note below.

*** <u>When area is > 1 acre, round off partial acreage to nearest whole acre</u>**.

*AREA (total disturbance)	BASE FEE	INSPECTION/COMPLIANCE FEE
>5,000 sq. ft. - 1 acre	$ 725	$300 total
2 - 5 acres	925	$200 per acre
6 - 10 acres	1,125	$200 per acre
11 - 25 acres	1,425	$200 per acre
26 - 50 acres	1,925	$200 per acre
51+ acres	2,425	$200 per acre

NOTE: On plans where individual lot development cannot be specific in areas including but not limited to building location, parking, drainage, grading, topography (steep grades, streams, etc.), the applicant will be required to submit a Soil Erosion and Sediment Control Plan, application, and appropriate fee for the construction and associated disturbance for roads and drainage only. A separate Soil Erosion and Sediment Control Plan, application, and appropriate fee (Sections A, B, or C) will then be required for each individual lot before it is developed. This individual lot responsibility is transferred with ownership. **This type of submittal ("Roads and Drainage Only") can only be made with prior authorization of the Bergen County SCD.**

❈❈
❈❈❈
❈
❈

(E) <u>LANDFILLS, LEAF COMPOST FACILITIES, MINING, QUARRYING</u>

*** <u>When area is > 1 acre, round off partial acreage to nearest whole acre</u>**.

*AREA (total disturbance)	BASE FEE	INSPECTION/COMPLIANCE FEE
> 5,000 sq. ft. - 1 acre	$ 625	$300 total
2 - 10 acres	825	$200 per acre
11 - 20 acres	1,025	$200 per acre
21 - 50 acres	1,225	$200 per acre
51+ acres	1,525	$200 per acre

❈❈❈
❈

❄❄❄

(F) ADDITIONAL FEES (based on hourly rates for professional & technical staff)

(1) **Reinspection** - A fee of $60 will be charged when a requested inspection for the issuance of a Report of Compliance is performed, and the site is not stabilized in accordance with the NJ Standards for Soil Erosion and Sediment Control. This fee is payable upon the reinspection and subsequent issuance of the Report of Compliance. No Report of Compliance will be issued until all fees are paid in full.

(2) **Resubmission** - A fee of $100 per hour will be charged to review/certify Soil Erosion and Sediment Control Plans which have been previously denied by the District. Additionally, all inspection/compliance fees must be updated in accordance with the current fee schedule with credit given for the unused portion of those fees previously paid. NOTE: A major revision to the original Soil Erosion and Sediment Control Plan will constitute an entire new submittal (plans, application form, fee).

(3) **Recertification** - A fee of $100 per hour will be charged to review/certify Soil Erosion and Sediment Control Plans which have been previously certified by the District, but have been revised or modified. Additionally, all inspection/compliance fees must be updated in accordance with the current fee schedule with credit given for the unused portion of those fees previously paid. NOTE: A major revision to the original Soil Erosion and Sediment Control Plan will constitute an entire new submittal (plans, application form, fee).

(4) **Plan/Application Withdrawal** - A fee of $100 per hour will be charged for services performed up to the time of withdrawal. The District must receive the project owner's written request for withdrawal prior to the start of construction.

(5) **Noncompliance** - A fee of $60 per hour will be charged for additional inspections required as a result of noncompliance with the certified Soil Erosion and Sediment Control Plan and/or the NJ Standards for Soil Erosion and Sediment Control Plan. Projects under construction, which have not provided the District with written advance notice (48 hours) of their intent to start construction, will be considered to be in noncompliance. No Report of Compliance will be issued until all fees are paid in full. The applicant will be notified immediately upon the imposition of these fees.

(6) **Stop Construction Order** - A fee of $100 per hour will be charged for District services as well as full reimbursement of all legal and miscellaneous fees incurred by the District as the result of the issuance, enforcement, and lifting of a District issued Stop Construction Order. No Stop Construction Order will be lifted until all fees are paid in full. An itemized breakdown of District Stop Construction Order expenses will be furnished upon the written request of the project owner.

(7) **Extraordinary Expenses** - Where a project continues beyond the original certification period or where extraordinary review, inspections, or other services have exhausted the original project fee payment, the District shall notify the applicant that additional fees shall be required.
Such additional fees shall, at the option of the District, be based upon: (a) the hourly rates for such required additional services ($100 per hour for plan review, $60 per hour for inspection) or (b) based upon the current approved fees for the area, number of lots or other units remaining to be completed and stabilized with permanent measures to control soil erosion and sedimentation.
The District shall, upon the applicant's request, provide an accounting of services provided which have resulted in the exhaustion of the original review, inspection, and enforcement fee payment.
With respect to this policy, extraordinary means additional required project review and inspection related services which exceed those anticipated under fees previously paid and cannot be covered by that fee amount. No Report of Compliance will be issued until all fees are paid in full.

(8) **Returned Check Charge** - A fee of $100 will be charged for any check which fails to properly clear through the bank. All fees must be paid in full before the project application is processed.

(9) **Letters of Exemption** – The District may issue a letter of exemption if it determines that a land disturbance activity is exempt from the Soil Erosion and Sediment Control Act. The applicant has the burden of proof to demonstrate to the District that a proposed land disturbance does not meet the definition of a "project" or fall within an exception of the Act. A fee of $100 will be charged by the District for the issuance of an exemption letter.

(10) **State Soil Conservation Committee Surcharge –** All base fees include a $25.00 State Soil Conservation Committee surcharge for each application.

COUNTY OF BERGEN

PLANNING AND ENGINEERING

SITE PLAN APPLICATION, FEE SCHEDULE

AND STORMWATER ORDINANCE

SITE PLAN

Application # SP …..……

James Tedesco III
County Executive

COUNTY OF BERGEN
Department of Planning & Engineering
One Bergen County Plaza, Hackensack N.J. 07601-7000 (201) 336-6446

APPLICATION FOR SITE PLAN APPROVAL

The undersigned hereby applies for approval of the accompanying site development plan. Four (4) copies of this Application accompanied by the Initial Investigation Fee and four (4) copies of the plan conforming to the minimum requirements as outlined in Section III, Site Plan Details, of the County of Bergen Site Plan Review Resolution. Permission is given to walk the property for review purposes. We acknowledge that the reporting period set forth in N.J.S.A. 40:27-6.7 shall not begin to run until this application and accompanying plans are COMPLETE IN ALL RESPECTS. We acknowledge and agree that if this application is not completed within one year of the date of filing, it will be subject to administrative dismissal without prejudice. The copies of the plan submitted for review should be FOLDED, not rolled.

(1) Municipality

(2)****Signature of Applicant/Agent**_____

(3) Project Name:

(4) Full Project Description:

(5) Location (Street address & nearest intersecting street)

(6) County Facilities Affected

(7) Block(s) (8) Lot(s) (9) Plot Area (ACRES)

(10) Proposed Use (11) if residential indicate number of Dwelling Units

(12) Number of Parking Spaces Existing New Total

(13) Tot. Area of Bldg. (All Floors) Existing Sq. Ft. New Sq. Ft. Total Sq.Ft.

(14) Impervious Area Existing Sq. Ft. New Sq. Ft. Total Sq.Ft.

---

(15) This plan has also been filed with the following municipal agencies:

Planning Bd. (Date) Bd. Of Adjustment (Date) Const. Official (Date) Status

Name, Address and Telephone Number of

(16) Applicant

(17) Attorney

(18) Property Owner

(19) Plan Preparer

(20) Contract Purchaser

**ALL FIELDS MUST BE FILLED OUT – INCOMPLETE FORMS WILL BE RETURNED

PLEASE SEE FEE SCHEDULE FOR FEES

FOR OFFICIAL USE ONLY

RECEIVED

Application/Fee ……..…..…. Reproducible Plan ……..... Processing Fee …..……. Deed …..…….

Performance Guarantee ……. Soil ……. Other ……..

Approved Plan Received by: ……. Date: ……...

(Please print) (Signature)

Board of Chosen Freeholders
County of Bergen

One Bergen County Plaza • Fifth Floor • Hackensack, NJ 07601-7076
(201) 336-6200 • FAX (201) 336-6290

Dr. Joan M. Voss
Chairwoman

Steven A. Tanelli
Vice Chairman

John A. Felice
Chairman Pro Tempore

Maura R. DeNicola

David L. Ganz

Thomas J. Sullivan

Tracy S. Zur

Lisa Sciancalepore
Clerk to the Board

Edward J. Florio
Counsel to the Board

August 20, 2015

Dear Municipal Clerk:

Pursuant to N.J.S.A. 40:1A-101, attached please find copy of Ordinance No. 15-19 which was finally adopted by the Bergen County Board of Chosen Freeholders on Wednesday, August 19, 2015.

Very truly yours,

Lisa Sciancalepore, Clerk
Bergen County Board of Chosen Freeholders

Enc.

c. County Administrator
Public Safety
County Counsel
Treasurer

BOARD OF CHOSEN FREEHOLDERS
COUNTY OF BERGEN
STATEMENT

Ordinance #15-19 Entitled: "AN ORDINANCE AMENDING THE BERGEN COUNTY PLANNING BOARD'S SUBDIVISION REVIEW FEE SCHEDULE" has been finally adopted by the Board of Chosen Freeholders on August 19, 2015 and duly approved by the Bergen County Executive and the 20-day period of limitation within which a suit, action or proceeding questioning the validity of such Ordinance can be commenced, as provided in the Optional County Charter Law has begun to run from the date of the first publication of this statement.

Lisa Sciancalepore, Clerk to the Board
Bergen County Board of Chosen Freeholders

2015
BERGEN COUNTY BOARD OF CHOSEN FREEHOLDERS
ORDINANCE (SECOND READING)

MWB 7/30/15

MEMBERS	AYE	NAY	ABSTAIN	ABSENT
DeNicola	✓			
Felice	✓			
Ganz	✓			
Sullivan	✓			
Tanelli	✓			
Zur	✓			
Chairwoman Voss	✓			
TOTALS	7	—	—	—

Ordinance No.	15-19
Date:	**AUGUST 19, 2015**
Page	**1 of 2**
Department/ Division:	**PLANNING & ENGINEERING**
Purpose:	**To Establish A New Fee Schedule For Site Plan Applications**
Account No.	
Contract No.	
Dollar Amount:	**Revenue Producing**
Prepared By:	**JPL/av**

Offered by: Ganz
Seconded by: DeNicola
Approved by: JPL

Certified as a true copy of an Ordinance introduced and passed by the Board of Chosen Freeholders on the above date at the Regular Meeting: Lisa Sciancalepore

Lisa Sciancalepore, Clerk - Board of Chosen Freeholders, Bergen County, New Jersey

"An Ordinance Amending the Bergen County Planning Board's Site Plan Review Fee Schedule."

WHEREAS, a **First Reading** of this Ordinance was adopted on **August 5, 2015**, as was recommended by the Department of Planning & Engineering and the County Counsel.

BE IT ORDAINED by the Board of Chosen Freeholders of the County of Bergen as follows:

SECTION I. The following fee schedule shall be adopted as the *Site Plan Review Fee Schedule of the County of Bergen*:

Initial Filing Fee	$1,500.00
Public Advocate Fee	$250.00
Processing Fee/per stall	$20.00
Final Approval Fee	$250.00
Inspection Fee - 6% of Performance Guarantee	(min.) $350.00
Reprocessing Fee (Revised Joint Report)	$300.00
Permit to Connect to County Storm Drain - per connection	$600.00
Extension Fee - Appl. Must be approved within (1) calendar year of filing date, or Applicant will be required to submit a written extension request along with extension fee.	$300.00
Waiver Fee - per waiver applied for	$150.00
Exemption Fee - one (1) copy of plan & completed County application	$250.00
Violation Fee Initial (Additional $100/week from date of written notification until application receives final approval)	$125.00
Outdoor Dining Encroachment Fee - per seat, based on seating plan	$100.00
Residential Driveway – Road Access Permit Fee For review of a proposed driveway on a County road not subject to Site Plan Approval or Exemption	$500.00
Cellular Towers – Processing Fee Per Antenna (max $750.00, per Ord. 03-48, 12/17/03)	$250.00

SECTION II. This Ordinance shall become effective upon adoption and publication as required by law and upon approval of the Bergen County Executive.

SECTION III. All prior Ordinances or Resolutions or portions thereof of the Bergen County Board of Chosen Freeholders inconsistent herewith, be and are hereby repealed.

SECTION IV. If any clause, section or provision of this Ordinance is declared invalid by a Court of competent jurisdiction, such position shall be deemed a separate distinct and independent provision and shall not affect the validity of the remaining portion hereof.

James J. Tedesco, III

JAMES J. TEDESCO III
County Executive

✓ APPROVED

_____ REJECTED

BERGEN COUNTY

STORM WATER MANAGEMENT PROGRAM

PERFORMANCE AND DESIGN STANDARDS

In accordance with the New Jersey County Planning Enabling statutes (N.J.S.A. 40:27-1 et seq.) wherein County Planning Boards are enabled to require adequate drainage facilities and easements in the review and approval of development applications affecting County facilities, the Bergen County Planning Board may require storm water management facilities in accordance with the following performance and design standards:

A. Storm Water Management

1. Procedures

   a. All applications for development of two (2) acres (gross area) or more including those of governmental agencies are required to submit data to the County Planning Board specifying the change in runoff due to the proposed improvements. (The additional area of improvements to County roads, or facilities required by the County Planning Board, shall be excluded from the calculations of both the gross area required and the change in runoff calculations).

   b. Those applications for development that propose one (1) acre or more of additional impervious surfaces are required to detail on the plans submitted storm water management facilities to retain/detain the additional storm water runoff being generated if downstream drainage has been determined to be inadequate to meet design standards. Residential roof areas not directly connected to storm water system shall be calculated at 60%.

   c. Any proposed development which does not have an adequate drainage outlet as determined by the County Engineer, and/or causes or increases existing flooding of a County road or adjacent land is required to submit plans indicating how these problems will be ameliorated.

   d. All applications for development (with the exception of major regional commercial centers) which drain directly to a tidal body (Hudson River, Hackensack River to Oradell Dam, Passaic River to Dundee Dam, Overpeck Creek to tide gates) or a controlled regional facility (i.e. Oradell and Woodcliff Lake Reservoirs, Lake Tappan, Darlington Lake and Overpeck Creek Lake) are exempt.

   e. Where the County engineer has determined that the receiving stream channel from a development site is adequate to handle the 100- year flood flows in bank or within the undeveloped, protected flood plain area without an adverse impact to downstream properties, on-site storm water management facilities will not be required. Flood plain areas are as defined by the N.J. Department of Environmental Protection.

   f. Where site constraints make on-site storm water management facilities clearly impractical for physical (steep slopes, rock conditions or aesthetics), public health (septic tanks), or economic reasons, (which shall be presented by the applicant and approved by the Planning Board) the County Planning Board

shall require an in-lieu cash contribution, or a combination of facilities and cash contribution, toward the construction or maintenance of regional storm water management or drainage facilities located in the particular drainage basin in which the site is located. The cash contribution will be equal to the estimated cost of providing on-site storm water management facilities that would have otherwise been required. Said monies collected shall be held and disbursed from a trust fund to be established. Said disbursements shall be used only for storm water management purposes as specifically approved by the Board of Chosen Freeholders upon recommendation of the Bergen County Planning Board and/or the County Engineer.

g. County storm water management requirements shall be coordinated with existing municipal storm water management ordinances. Where pre-application meetings are held with the applicant the results of such meetings shall be forwarded to the appropriate municipal agencies.

2. Performance Standards

a. Additional storm water runoff produced as a result of the proposed development shall be retained or detained on-site, unless exempt for reason of section 1D, 1E, or 1F.

b. Flow velocities from the outlets of storm water management facilities shall be designed in such manner as to prevent scour, erosion and siltation in channels and spillways.[1]

c. Standards for Soil Erosion and Sediment Control in New Jersey [2] shall be adhered to and soil erosion and sediment control plans shall be certified where applicable by the Bergen County Soil Conservation District in accordance with P. L. 1979, Ch. 459.

d. The applicant shall post performance bonds to the municipality or county for the total cost of installation of the approved storm water management facilities based on estimates of construction quantities to be provided by the applicant.

e. The applicant shall post maintenance bonds for the upkeep of the approved storm water management facilities for a period of two years after the release of the performance bond. The maintenance bond shall be equal to 10% of the amount of the performance bond for storm water management facilities.

f. Maintenance of storm water management facilities, after the release of the maintenance bond, shall be the responsibility of the owners of property (excluding one and two family dwellings) on which the facility is located or the responsibility of a legally constituted home-owners (residents) association, if one exists for the development in question, or the responsibility of appropriate governmental unit assuming responsibility.

g. In instances where for reasons of public health and safety it would be appropriate for a governmental body to assume the responsibility of maintaining an approved storm water management basin, the following conditions should exist:

1. Adequate easements shall be provided around the storm water management basin as well as an access easement, for maintenance to the facility.

3. Design Standards

a. Storm water management facilities include, but are not limited to, drywells, swales, basins, porous pavement, open drainage pipes, rooftop storage or a combination of these or other methods.

b. All storm water retention or detention facilities shall be designed using the 25 year design storm.[3]

c. Runoff coefficients for developed and undeveloped conditions shall be used to determine increase in runoff to be stored.

d. Methodology for determining runoff shall conform to generally accepted engineering standards and practices. (e.g. SCS Runoff Equation, Runoff Curve Numbers and dimensionless unit hydrograph[4,5] or the Rational Formula and runoff coefficients as published in the Handbook of Applied Hydrology.[6])

e. Facilities shall be designed in such manner that the rate of discharge shall not exceed that which occurred under predevelopment conditions for the design storm.

f. Storm water retention/detention basins may be depressions in parking areas, excavated basins, basins created through use of curbs, stabilized earth berms or dikes, or any other form of grading which serves to temporarily impound and store water. The following standards apply to basins:

    1. If routing study is required a short procedure may be used as described in SCS Technical Release #55 [5] or any other acceptable method.

    2. If earth berms or dikes are used to create the impounding area, they shall be provided with an emergency spillway or outlet to pass the 100 year storm and be adequately stabilized and the slopes protected with vegetative cover, paving, or rip-rap to protect against failure or breaching.

    3. Outlet pipes shall be at least 6 inches in diameter to facilitate cleaning.

    4. Suitable linings shall be placed upstream and downstream of principal outlets to prevent scour and erosion.

    5. Earthen Dam embankments shall have side slopes not steeper than 3:1. Emergency spillways must be adequately stabilized.

    6. Basin bottoms should be designed to protect against residual water periods to prevent mosquito breeding.

    7. Safety ledges shall be constructed when feasible on the side slopes steeper than 3:1 of all basins having a permanent pool of water. These ledges shall be at least 4 feet in width with one located 1-l½ feet above and-the other located 2½-3 feet below the permanent water surface.

    8. Fencing and/or vegetative screening may be erected around basins when desirable.

g. Ground absorption systems such as drywells, porous pavement or the like shall be used only where the infiltration rate of the receiving soil is acceptable as determined by percolation tests or soil borings, or as determined by the County Engineer.

h. Rooftop storage can be accomplished through temporary impoundment and storage of storm water on flat or slightly pitched building rooftops by use of drain outlets which restrict the storm water runoff from the roof surface. A design certification as to the ability of the structure to bear this weight must be presented by an appropriate licensed professional.

i. Drainage easements, where deemed necessary, will be required to assure the continuance of storm water management facilities. For subdivision applications, if the necessary drainage easements cannot be conveyed to a public body, a hardship will be deemed to exist and a cash contribution in-lieu of construction will be required, as outlined in Section A-1-f.

4. These standards shall be reviewed in approximately 6 months and periodically thereafter as determined after initial review by the Planning Board, the Board of Chosen Freeholders and a committee of representatives of appropriate professional associations to determine their effectiveness and equitability and a status report shall be given to the Board of Freeholders on the interest bearing trust fund accounts.

REFERENCES

1. Open Channel Hydraulics, Ven Te Chow, McGraw-Hill, 1959
2. Standards for Soil Erosion and Sediment Control in New Jersey, New Jersey State Soil Conservation Committee. September, 1974
3. Technical Paper Number 40 - Rainfall Frequency Atlas of the United States, U.S. Department of Commerce, Weather Bureau, 1961
4. National Engineering Handbook-Section 4 - Hydrology, U. S. Department of Agriculture, Soil Conservation Service, August 1972
5. Technical Release Number 55 - Urban Hydrology for Small Watersheds, U. S. Department of Agriculture, Soil Conservation Service, Engineering Division, January 1975
6. Handbook of Applied Hydrology, Ven Te Chow, Editor, McGraw-Hill, 1964

APPENDIX H

TRAFFIC CALMING STUDY

Engineers Planners Surveyors Landscape Architects Environmental Scientists

MASER CONSULTING P. A.

Traffic Calming Study

Johnson Avenue

Borough of Englewood Cliffs, Bergen County, New Jersey

December 7, 2016

Prepared For

Borough of Englewood Cliffs
428 Hudson Terrace
Englewood Cliffs, NJ 07632

Prepared By

Maser Consulting P.A.
400 Valley Road, Suite 304
Mt. Arlington, NJ 07856
973.398.3110

MC Project No. ECB-068

TABLE OF CONTENTS Page No.

I. INTRODUCTION 1
II. EXISTING ROADWAY CONDITIONS 2
III. STATE AND FEDERAL SPEED STANDARDS 3
IV. SPEED AND VOLUME DATA 5
V. SHORT-TERM POTENTIAL TRAFFIC CALMING 7
VI. LONG-TERM POTENTIAL TRAFFIC CALMING 10
VII. POTENTIAL TRAFFIC CALMING RECOMMENDATIONS 13
VIII. SUMMARY AND CONCLUSIONS 16

TABLES Page No.

Table 1 – Johnson Avenue Speed Data 5
Table 2 – Johnson Avenue Volume Data 5
Table 3 – Order of Magnitude Cost Estimate – Short-Term Improvements 13
Table 4 – Order of Magnitude Cost Estimate – Option A – Long-Term Improvements 14
Table 5 – Order of Magnitude Cost Estimate – Option A – Additional Raised Crosswalks 14
Table 6 – Order of Magnitude Cost Estimate – Option B – Long-Term Improvements 15

FIGURES Page No.

Figure 1 – Johnson Avenue Speed Distribution 5
Figure 2 – Johnson Avenue Cumulative Speed Distribution 6
Figure 3 – Proposed Crosswalk Signs 7
Figure 4 – Speed Feedback Sign 8
Figure 5 – Shared Lane Marking (Sharrow) 9
Figure 6 – Raised Crosswalk Image and Detail 10
Figure 7 – Crosswalk with Curb Extension 11
Figure 8 – Speed Hump Images and Detail 12
Figure 9 – Speed Hump Markings 12

APPENDICES

Appendix A. ..... Study Area Map

I. INTRODUCTION

This Traffic Calming Study has been prepared by Maser Consulting P.A. for the Borough of Englewood Cliffs to outline potential traffic calming measures along Johnson Avenue in the vicinity of Witte Memorial Field – Johnson Park within the Borough of Englewood Cliffs, Bergen County, New Jersey. The existing conditions along Johnson Avenue including physical geometry, travel speeds, and motorist operations were investigated. There are two existing crosswalks across Johnson Avenue providing pedestrian connectivity to Witte Memorial Field – Johnson Park. Johnson Park is a park with multiple public facilities including: a playground, baseball, softball and soccer fields, and tennis and basketball courts. As such, safety and community benefit are important factors in determining potential traffic calming measures.

This Traffic Study reviews the existing observed conditions and collected vehicular speed data. State and Federal standards were reviewed to determine potential traffic calming measures. New Jersey Statutes Annotated ("NJSA") Title 39 was reviewed to outline the State requirements for traffic calming. The Manual on Uniform Traffic Control Devices, 2009 Edition ("MUTCD") and the *Institute of Transportation Engineers* ("ITE") Traffic Calming: State of Practice were reviewed to provide recommended traffic calming measures.

This study provides an evaluation of the operating and speed characteristics along Johnson Avenue in the Borough of Englewood Cliffs, Bergen County, New Jersey. Specific elements included in this study are:

- An inventory of the roadway facilities in the vicinity of the study, including the existing physical and traffic operating characteristics;
- Review of State and Federal Standards;
- Analysis of Speed Data;
- Analysis of Existing Conditions;
- Recommendations of Traffic Calming Measures; and
- Summary and Conclusions.

II. EXISTING ROADWAY CONDITIONS

A field investigation was conducted in the study area to obtain an inventory of existing roadway conditions, posted traffic controls, adjacent land uses, lane configurations, and existing vehicular/pedestrian traffic patterns. A Study Area Map is provided as **Figure 1** in **Appendix A**.

Roadways

Johnson Avenue is an east-west oriented urban major collector under the jurisdiction of the Borough of Englewood Cliffs. The roadway contains one travel lane in each direction with on-street parking. The posted speed limit is 25 MPH. The land uses along Johnson Avenue are primarily residential with Witte Memorial Field located south of Johnson Avenue.

Existing Facilities

There are **two existing crosswalks** across Johnson Avenue providing pedestrian connectivity to Witte Memorial Field. The western crosswalk is located at the intersection of Johnson Avenue & Samford Drive. There are no pedestrian curb ramps at the western crosswalk. The eastern crosswalk is located mid-block between Samford Drive and Willow Drive. There is one 'dated' pedestrian curb ramp at the eastern crosswalk on the Witte Memorial Field side. On the north side of the eastern crosswalk, there is a residential driveway. Both crosswalks are supported by in-road stop for pedestrian signs (R1-6a).

There is a **speed feedback sign** along Johnson Avenue eastbound located approximately 75' west of Samford Drive. The speed feedback sign is electronic and is installed on the same assembly as a 25 MPH posted speed limit sign.

III. STATE AND FEDERAL SPEED STANDARDS

State Standards

New Jersey Statutes Annotated ("NJSA") Title 39:4-8.10 and 8.11 provide municipalities the jurisdiction to install Traffic Calming Measures, specifically speed humps. NJSA Title 39:4-8.10.2.a. states:

> *"A municipality or county may, without the approval of the commissioner, construct a speed hump on two-lane residential streets and on one-way residential streets under municipal or county jurisdiction with a posted speed of 30 mph or less and which have fewer than 3,000 vehicles per day."*

NJSA Title 39:4-8.11.3. states:

> *"Any speed hump constructed by a municipality or a board of directors or trustees shall conform in design and construction to the technical standards established by the Department of Transportation. A municipality or board shall provide advance warning, including but not limited to, the erection of appropriate signs giving notice of the presence of speed humps before the first speed hump in a series of speed humps and provide for a pavement marker to be placed at the location of the first speed hump. The signing and pavement markings for a speed hump shall conform to the current standards prescribed in the Manual of Uniform Traffic Control Devices for Streets and Highways as adopted by the Commissioner of Transportation."*

NJSA Title 39:4-197 gives the local authority the ability to regulate the stopping or starting of vehicles at special places (i.e. mid-block crosswalk) via an ordinance. NJSA Title 39:4-197 states:

> *"Except as otherwise provided in R.S.39:4-8, no municipality shall pass an ordinance or resolution on a matter covered by or which alters or in any way nullifies the provisions of this chapter or any supplement to this chapter; except that a municipality may pass, without the approval of the commissioner, and consistent with the current standards prescribed by the Manual on Uniform Traffic Control Devices for Streets and Highways, ordinances or resolutions, or by ordinances or resolutions may authorize the adoption of regulations by the board, body, or official having control of traffic in the public streets, regulating special conditions existent in the municipality on the subjects and within the limitations following:*
>
> *Regulating the stopping or starting of street cars at special places, such as railroad stations, public squares or in front of certain public buildings."*

Federal Standards

The Manual of Uniform Traffic Control Devices, 2009 Edition ("MUTCD") provides speed zoning methodology. The speed distribution should be a primary factor in determining if there is a speeding issue and if traffic calming will be beneficial. The following speed factors were reviewed:

- **85th Percentile Speed** is the speed at or below which 85 percent of the vehicles travel and is typically used as the "prevailing speed" to establish the speed limit.
- **Mean Speed** is calculated by summing all the measured speeds and dividing by the sample size.
- **Median Speed** is the measurement at the middle of the sample size.

The *Institute of Transportation Engineers* ("ITE") Traffic Calming: State of Practice provides an overview of several traffic calming measures including applicability, design and benefits/impacts.

IV. SPEED AND VOLUME DATA

Speed and volume data were collected along Johnson Avenue from Monday, November 14, 2016 to Monday, November 21, 2016 at the following locations:

- Between Willow Drive and Samford Drive; and
- Between Samford Drive and Neal Drive.

The vehicular speed data was processed to determine the 85th percentile speed (prevailing speed), mean speed, and median speed. The speed data over the entire week was averaged and processed to determine typical speed conditions along the roadway. The processed data is summarized in **Tables 1 & 2** and illustrated in **Figures 1 & 2**.

Table 1 – Johnson Avenue Speed Data

Approach	Existing Posted Speed Limit	85th Percentile Speed	Mean Speed	Median Speed
Eastbound	25 MPH	33 MPH	27 MPH	27 MPH
Westbound	25 MPH	34 MPH	27 MPH	28 MPH

Table 2 – Johnson Avenue Volume Data

Roadway	Average Daily Traffic (ADT)
Johnson Avenue	1500 vehicles

Figure 1 – Johnson Avenue Speed Distribution

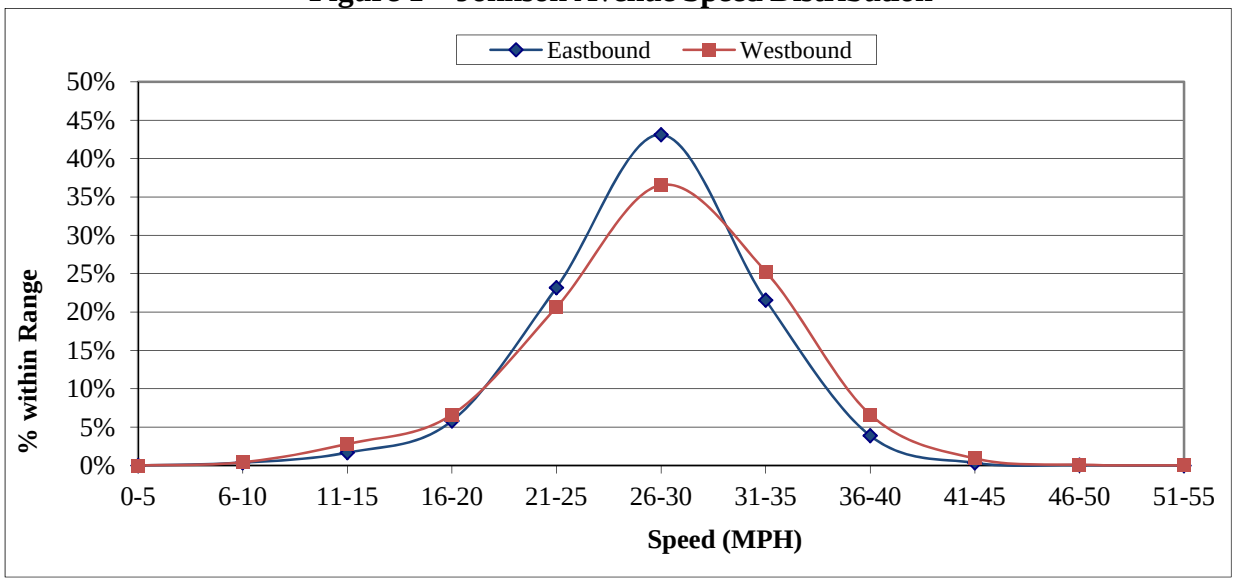
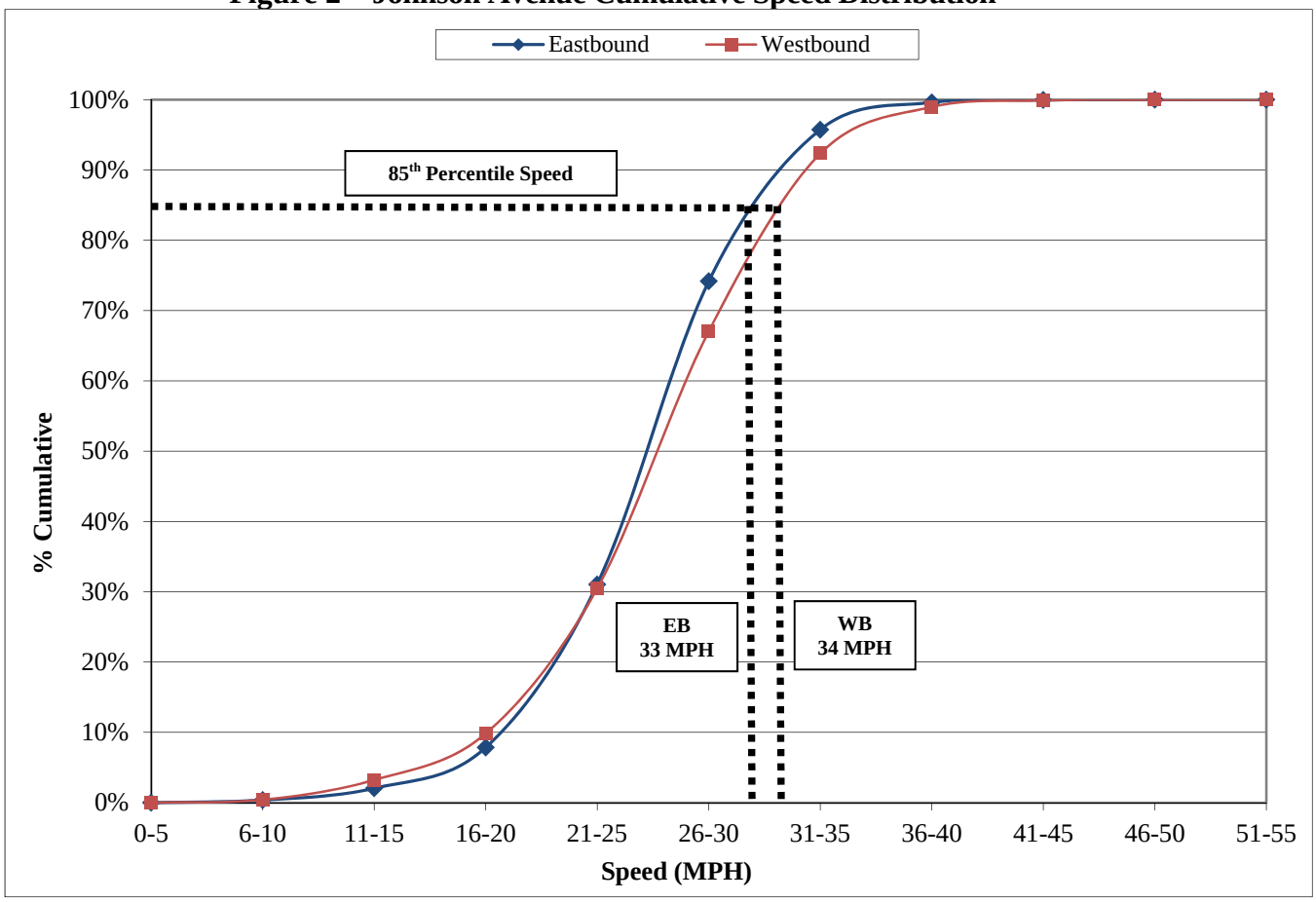


Figure 2 – Johnson Avenue Cumulative Speed Distribution



Based upon MUTCD methodology, the 85th percentile speed should typically be within 5 MPH of the posted speed limits. The 85th percentile speeds for the eastbound and westbound approaches of Johnson Avenue were found to be 33 MPH and 34 MPH, respectively. Due to the close proximity to the park and the locations of the crosswalks along Johnson Avenue, traffic calming measures are recommended in both directions to reduce the 85th percentile speed within 5 MPH of the 25 MPH posted speed limit. The following section reviews potential traffic calming measures to reduce vehicular travel speeds.

V. SHORT-TERM POTENTIAL TRAFFIC CALMING

The ITE Traffic Calming: State of Practice and the MUTCD were referenced to determine potential Short-Term traffic calming measures along Johnson Avenue. Short-Term potential traffic calming measures applicable to the study corridor are outlined below.

Pedestrian Crossing Signs

Currently, the two crosswalks across Johnson Avenue have In-Street Pedestrian Crossing Signs (R1-6a). MUTCD Section 2B.12 states:

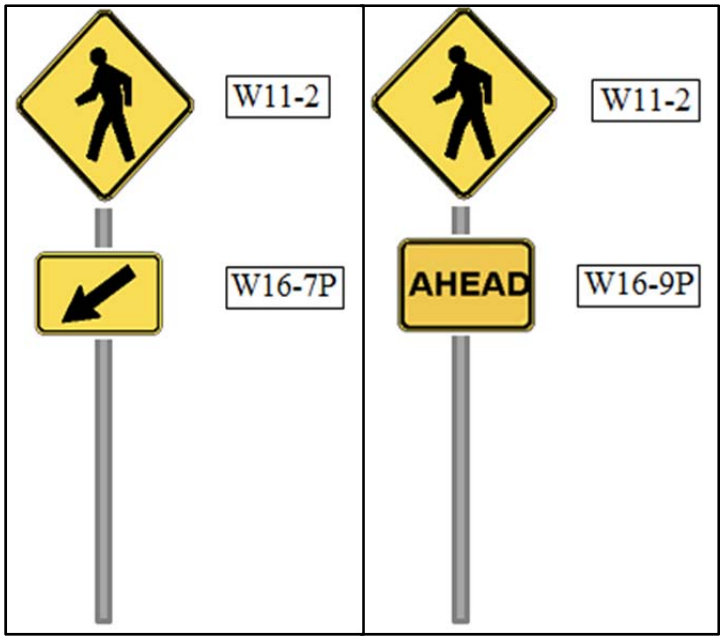
> *"If a Pedestrian Crossing (W11-2) warning sign is used in combination with an In-Street or an Overhead Pedestrian Crossing sign, the W11-2 sign with a diagonal downward pointing arrow (W16-7P) plaque may be post-mounted on the right-hand side of the roadway at the crosswalk location."*

It is recommended to improve pedestrian and vehicular safety by equipping the two existing crosswalks with the following additional MUTCD signs:

- Pedestrian signs (W11-2);
- Directional plaques (W16-7P); and
- Advanced warning plaques (W16-9P).

The pedestrian signs and plaques can be retroreflective florescent yellow to enhance pedestrian safety and visibility. The advanced warning signs installation should be located at least 100' prior to the crosswalk. **Figure 3** illustrates the additional Pedestrian Signs.

Figure 3 – Proposed Crosswalk Signs



Speed Feedback Sign

A speed feedback sign is an interactive sign, generally constructed of a series of LEDs, displaying real-time vehicular speed to drivers as they approach the sign. The purpose of this sign is to reduce vehicle speeds by making drivers aware of their speed relative to the posted speed limit. Speed feedback signs are an effective traffic calming device to enhance motorist awareness and police enforcement. FHWA studies have found that speed feedback signs can be effective in reducing mean and 85th percentile speeds in a variety of situations.

A speed feedback sign could be installed along Johnson Avenue westbound between the two existing crosswalks across Johnson Avenue. This location is ideal because the roadway has a relatively straight horizontal alignment and police can readily view the LED speed feedback sign. Additionally, the location is readily visible from motorist leaving Witte Memorial Field from an on-street parking space. This additional speed feedback sign will complement the existing speed feedback sign in the eastbound direction.

Speed feedback signs can be installed with a solar panel to power the sign. Speed feedback signs may also be equipped with a recording device to continuously record the speed of vehicles over time. This data may then be downloaded and formatted to determine the effectiveness of the sign, the change in speed regulation, and may help aid in enforcement efforts. An image of a speed feedback sign is illustrated in the inset **Figure 4**.

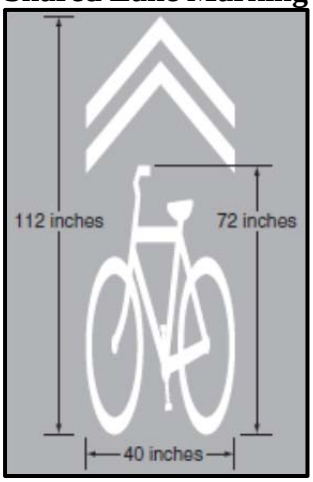
Figure 4 – Speed Feedback Sign[1]

[1]https://en.wikipedia.org/wiki/Radar_speed_sign

Shared Roadway with Markings and Signs

As Johnson Avenue is located adjacent to a recreational area and residencies, designating the roadway as a "shared roadway" with vehicles and bicycles may increase motorist awareness of bicycle traffic and better delineate traffic flow. A shared lane marking (sharrow) can be used to delineate the bicycle traffic. A shared lane marking (sharrow) image is provided as **Figure 5**.

Figure 5 – Shared Lane Marking (Sharrow)



MUTCD Section 9C.07 states shared lane markings (sharrow) may be used to:

- Assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle,
- Assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane,
- Alert road users of the lateral location bicyclists are likely to occupy within the traveled way, and
- Encourage safe passing of bicyclists by motorists.

The following conditions shall be met if a shared lane markings are implemented:

- If used in a shared lane with on-street parallel parking, Shared Lane Markings should be placed so that the centers of the markings are at least 11 feet from the face of the curb, or from the edge of the pavement where there is no curb.
- If used, the Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter.

VI. LONG-TERM POTENTIAL TRAFFIC CALMING

The ITE Traffic Calming: State of Practice and the MUTCD were referenced to determine potential Long-Term traffic calming measures along Johnson Avenue. Long-Term potential traffic calming measures applicable to the study corridor are outlined below.

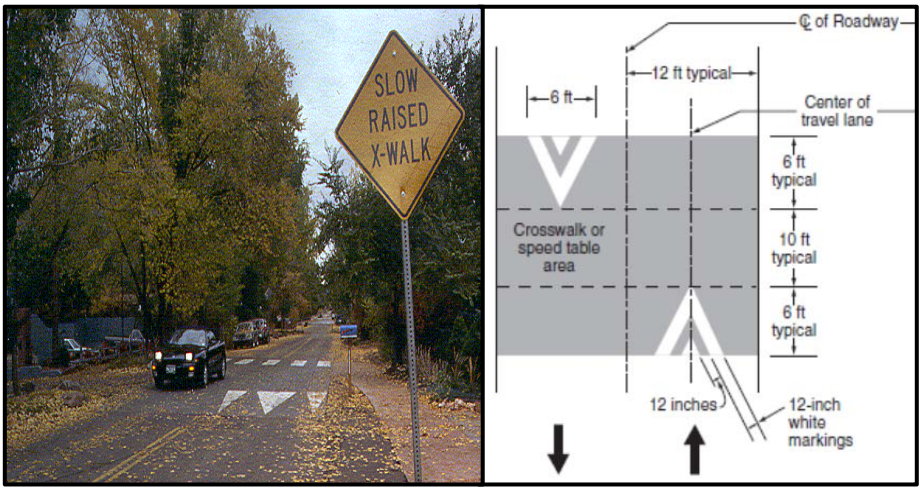
Speed Table (Raised Crosswalk)

A speed table (or raised crosswalk) could be provided at the two existing crosswalks. An image and detail of a raised crosswalk is provided as **Figure 6**. ITE describes raised crosswalks or speed tables as *"long raised speed humps with a flat section in the middle and ramps on the ends; sometimes constructed with brick or other textured materials on the flat section."*

Applications

- Local and collector streets.
- Main roads through small communities.
- Typically long enough for the entire wheelbase of a passenger car to rest on top.
- Work well in combination with textured crosswalks and curb extensions.
- Speed limit must be less than 30 MPH and the roadway average daily traffic must be less than 3,000 vpd. Both conditions are met along Johnson Avenue.

Figure 6 – Raised Crosswalk Image and Detail[1]



Design Standards

- Typically 22 feet in the direction of travel with 6 foot ramps on each end and a 10 foot flat section in the middle.
- Most common height is between 3 and 4 inches.
- Ramps are typically 6 feet long and are either parabolic or linear.
- Careful design is needed for drainage.

Benefits/Impacts

- Speeds are reduced, but usually to a higher crossing speed than at speed humps.
- Reported to increase pedestrian visibility and likelihood that driver yields to pedestrian.

Requirements

- Municipal Engineer Certification at the mid-block crosswalk if implemented.
- Ordinance at the mid-block crosswalk if implemented.

Curb Extensions

Curb extensions are another traffic calming measure outlined by ITE. They are described as "*curb extension at midblock or intersection corners that narrow a street by extending the sidewalk or widening the planting strip.*" An example image is provided as **Figure 7**.

Figure 7 – Crosswalk with Curb Extension[2]

Applications

- Local or collector streets.
- Pedestrian crossings.
- Work well with speed tables, raised intersections and textured crosswalks.

Design Standards

- Adequate drainage is a key consideration.
- Provides opportunity for landscaping.
- Vertical delineators or object markers are often used to make visible to snowplow operators and typical motorists.

Benefits/Impacts

- Can impact parking and driveway access.
- Reduces pedestrian crossing width and increases visibility of pedestrian.
- The curb extensions will improve pedestrian sight distance at the crosswalks due to on-street parking.
- Speeds have typically been reduced on average by 4 percent for two-lane curb extensions.

Requirements

- Municipal Engineer Certification at the mid-block crosswalk if implemented.
- Ordinance at the mid-block crosswalk if implemented.

[2] http://www.fhwa.dot.gov/publications/research/safety/pedbike/

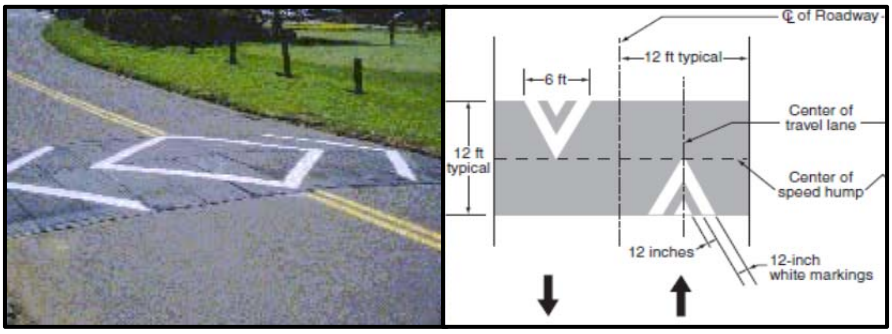
Speed Hump

In lieu of raised crosswalks and curb extension, speed humps are a different traffic calming measures that are suitable at the subject location. ITE describes speed humps as **"***round raised areas of pavement typically 12 to 14 feet in length*.**"**

Applications

- Residential and local streets.
- Midblock placement, not at an intersection or at a crosswalk.
- Speed limit must be less than 30 MPH and the roadway average daily traffic must be less than 3,000 vpd. Both conditions are met along Johnson Avenue.

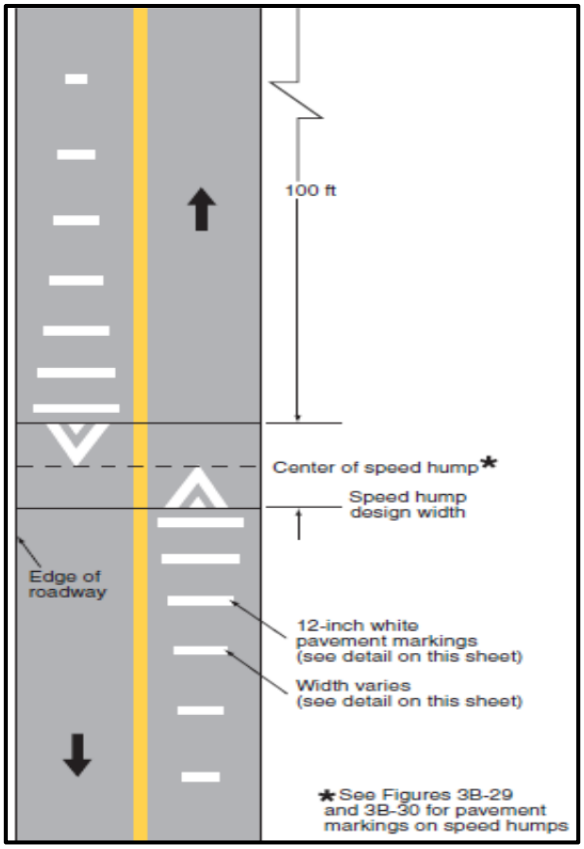
Figure 8 – Speed Hump Images and Detail[1]



Design Standards

- Typically 12 to 14 feet in length.
- Hump height is typically between 3 and 3-½ inches.
- Speed Hump (W17-1) and Advanced Speed Hump signs required. Use of a 15MPH plaque at the speed hump sign installation and "ahead" plaque on the advanced speed hump sign is highly recommended to meet State standards and increase safety.
- Typical pavement marking are shown in **Figures 8 & 9**.
- Taper the edge near curb to allow gap for drainage.
- Design should account for on-street parking and bicycle traffic. It is recommended to provide gaps in the speed hump and/or limiting the extents for parking and bicycles.

Figure 9 – Speed Hump Markings



Benefits/Impacts

- Speeds between humps have been observed to be reduced between 20 and 25 percent on average.
- Possible increase in traffic noise from braking and acceleration of vehicles.

VII. POTENTIAL TRAFFIC CALMING RECOMMENDATIONS

The following potential Traffic Calming Measures are provided and are categorized into **"Short-Term," "Long-Term – Option A"** and **"Long-Term – Option B."**

Short-Term Traffic Calming Improvements

The following Short-Term Traffic Calming improvements are anticipated to enhance pedestrian and bicyclist safety and potentially reduce vehicular speeds with less cost and construction efforts than the Long-Term improvements. These improvements should also be incorporated into any Long-Term improvements constructed at a later time.

1. Installation of Pedestrian Crossing signs (W11-2) with an arrow plaque at the two existing crosswalks and Pedestrian Crossing Advanced Warning signs (W11-2) with an "ahead" plaque at least 100' in advance of the two existing crosswalks along Johnson Avenue eastbound and westbound.
2. Installation of a new speed feedback sign along Johnson Avenue westbound between the two existing crosswalks across Johnson Avenue.
3. Designation of Johnson Avenue, in the vicinity of Witte Memorial Field, as a "shared roadway" and implement shared lane markings (bicycle sharrows) and share the road signs (W16-1P).

Short-Term "Order of Magnitude" Cost Estimate

Table 3 details the order of magnitude cost estimate the potential Short-Term Improvements.

Table 3 – Order of Magnitude Cost Estimate – Short-Term Improvements

Traffic Calming Measure	Cost Estimate Range		
Additional Pedestrian Signs	$2,000	to	$3,000
Speed Feedback Sign	$5,000	to	$6,000
Shared Roadway Lane Markings and Signs	$2,000	to	$3,000

Long-Term Traffic Calming Improvements (Option A - Curb Extension)

Option A contains curb extensions and new ADA compliant curb ramps. The following summarizes the potential improvements and order of magnitude cost estimate.

1. Construction of curb extensions along Johnson Avenue at the intersection of Johnson Avenue & Samford Drive. This improvement will trigger the construction of ADA curb ramps at the intersection.
2. Construction of curb extensions along Johnson Avenue at the existing mid-block crosswalk between Samford Drive and Willow Drive. This improvement will trigger the construction of ADA curb ramps at the mid-block crosswalk. Please note, the north side of this existing crosswalk terminates at a residential driveway. It is recommended to relocate this crosswalk and pedestrian access route from the existing driveway to an acceptable location for an ADA curb ramp. A municipal engineer certification and adopted ordinance will be necessary if the mid-block crosswalk is relocated or improved.
3. Installation of Pedestrian Crossing signs (W11-2) with an arrow plaque at the crosswalks and Pedestrian Crossing Advanced Warning signs (W11-2) with an "ahead" plaque at least 100' in advance of the crosswalks along Johnson Avenue eastbound and westbound.

Long-Term "Order of Magnitude" Cost Estimate – Option A

The order of magnitude cost estimate for Option A provides a general idea of construction and installation costs. The cost estimate does not account for a design fee. Additionally, significant drainage improvements are anticipated due to the curb extensions, which cannot be properly calculated until design plans are prepared. **Table 4** details the order of magnitude cost estimate without design or drainage costs for the Long-Term Improvement Option A.

Table 4 – Order of Magnitude Cost Estimate – Option A – Long-Term Improvements

Traffic Calming Measure	Cost Estimate Range		
Two Curb Extensions at Southern Crosswalk	$10,000	to	$15,000
Two Curb Extensions at Northern Crosswalk	$15,000	to	$20,000
Two ADA Curb Ramps at Southern Crosswalk	$5,000	to	$10,000
Two ADA Curb Ramps at Northern Crosswalk	$10,000	to	$15,000
Long-Term Improvement Total – Option A	**$40,000**	**to**	**$60,000**

Raise Crosswalks (Speed Tables) added to Option A

In conjunction with the curb extensions, the installation of raised crosswalks at the two existing crosswalks across Johnson Avenue could also increase the traffic calming effectiveness. The additional cost to implement raised crosswalks with Option A is detailed in **Table 5**.

Table 5 – Order of Magnitude Cost Estimate – Option A – Additional Raised Crosswalks

Traffic Calming Measure	Cost Estimate Range		
Raised Crosswalk at Southern Crosswalk	$5,000	to	$10,000
Raised Crosswalk at Northern Crosswalk	$5,000	to	$10,000
Raised Crosswalks Total – Option A	**$10,000**	**to**	**$20,000**

Long-Term Traffic Calming Improvements (Option B - Speed Humps)

Option B has been provided if the cost of modifying the existing crosswalks and constructing new curb extensions outweighs the benefits of the traffic calming. Option B includes the following potential improvements:

1. Construction of a speed hump along Johnson Avenue between the two existing crosswalks across Johnson Avenue. The appropriate pavement markings, signs and advanced warning signs shall be provided as per the MUTCD.
2. Construction of a speed hump along Johnson Avenue at least 300' west of Samford Drive. The appropriate pavement markings, signs and advanced warning signs shall be provided as per the MUTCD and in accordance with NJAC Title 39.

Long-Term "Order of Magnitude" Cost Estimate – Option B

The order of magnitude cost estimate for Option B provides a general idea of construction and installation costs. The cost estimate does not account for design fee. The speed humps should be design with a gap adjacent to the existing curbs to permit stormwater to flow; therefore, significant drainage improvements are not anticipated with Option B. **Table 6** details the order of magnitude cost estimate without design or drainage cost for Long-Term Improvement Option B.

Table 6 – Order of Magnitude Cost Estimate – Option B – Long-Term Improvements

Traffic Calming Measure	Cost Estimate Range		
Speed Hump between the two existing crosswalks	$3,000	to	$4,000
Speed Hump at least 300' west of Samford Drive	$3,000	to	$4,000
Long-Term Improvement Total – Option B	**$6,000**	**to**	**$8,000**

Additional Considerations

1. Only one of the Long-Term Options A or B should be selected. Speed humps should not be combined with raised crosswalks with curb extensions.
2. A municipal engineer certification will be required for the mid-block crosswalk along Johnson Avenue if it is relocated or improved. Additionally, the relocated or improved mid-block crosswalk will have to be adopted by local ordinance.
3. The municipality should inform motorists of the implemented traffic calming measures via public outreach.

VIII. SUMMARY AND CONCLUSIONS

This Traffic Study investigated traffic calming measures along Johnson Avenue in the Borough of Englewood Cliffs, Bergen County, NJ. The findings are provided below:

1. Johnson Avenue provides on-street parking and pedestrian crosswalks to the Witte Memorial Field – Johnson Park. As such, safety and community benefit are important factors in determining potential traffic calming measures.

2. The 85th percentile speed along Johnson Avenue EB/WB is 33 MPH and 34 MPH, respectively. The 85th percentile speed exceeds the current posted speed limit of 25 MPH by more than 5 MPH. As such, traffic calming measures are recommended at this location.

3. Potential Short-Term traffic calming measures include:

   - Pedestrian Crossing signs and Pedestrian Crossing Advanced Warning signs at the two existing crosswalks along Johnson Avenue eastbound and westbound.
     - Order of Magnitude Cost (without design costs) - $2,000 to $3,000
   - A new speed feedback sign along Johnson Avenue westbound between the two existing crosswalks across Johnson Avenue.
     - Order of Magnitude Cost (without design costs) - $5,000 to $6,000
   - Designate Johnson Avenue in the vicinity of Witte Memorial Field as a “shared roadway” and implement bicycle sharrows and share the road signs.
     - Order of Magnitude Cost (without design costs) - $2,000 to $3,000

4. Three potential Long-Term traffic calming options were established and are outlined below.

   - Option A
     - Curb extensions and ADA curb ramps at both crosswalks crossing Johnson Avenue. Please note, the north side of this existing mid-block crosswalk terminates at a residential driveway. It is recommended to relocate this crosswalk and pedestrian access route from the driveway to an acceptable location for an ADA curb ramp.
       - Order of Magnitude Cost (without design or drainage costs) - $40,000 to $60,000
     - The installation of raised crosswalks at the two existing crosswalks across Johnson Avenue could also be implemented with Option A to increase the traffic calming effectiveness.
       - Order of Magnitude Cost (without design or drainage costs) - $10,000 to $20,000

- Option B
  - Two speed humps along Johnson Avenue. Speed humps are permitted as per NJSA Title 39 at these locations as Johnson Avenue has a posted speed limit of 25 MPH and has an ADT of 1,500 veh. The appropriate pavement markings, signs and advanced warning signs shall be provided as per the MUTCD and in accordance with NJAC Title 39.
    - Order of Magnitude Cost (without design costs) - $6,000 to $8,000

5. Additional Considerations:

- Only one of the Long-Term Options A or B should be selected. Speed humps should not be combined with raised crosswalks and curb extensions.
- A municipal engineer certification will be required for the mid-block crosswalk along Johnson Avenue if it is relocated or improved. Additionally, the relocated or improved mid-block crosswalk will have to be adopted by local ordinance.
- The municipality should inform motorists of the implemented traffic calming measures via public outreach.

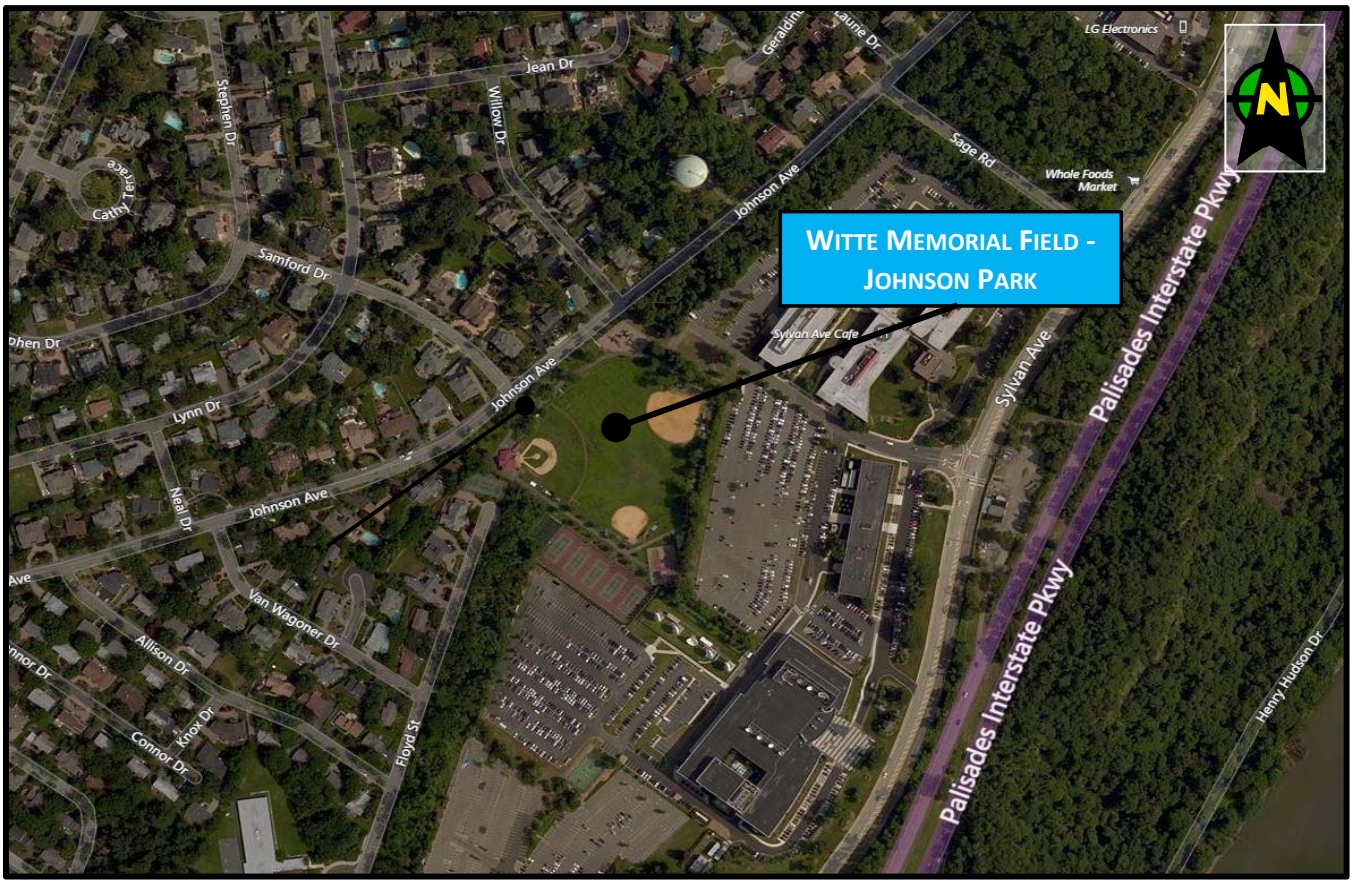
In summary, the Johnson Avenue study area is a location that will benefit from traffic calming. The traffic calming measures outlined in this study are anticipated to enhance vehicle, pedestrian, and cyclist safety adjacent to the Witte Memorial Field.

JOHNSON AVENUE

TRAFFIC CALMING STUDY

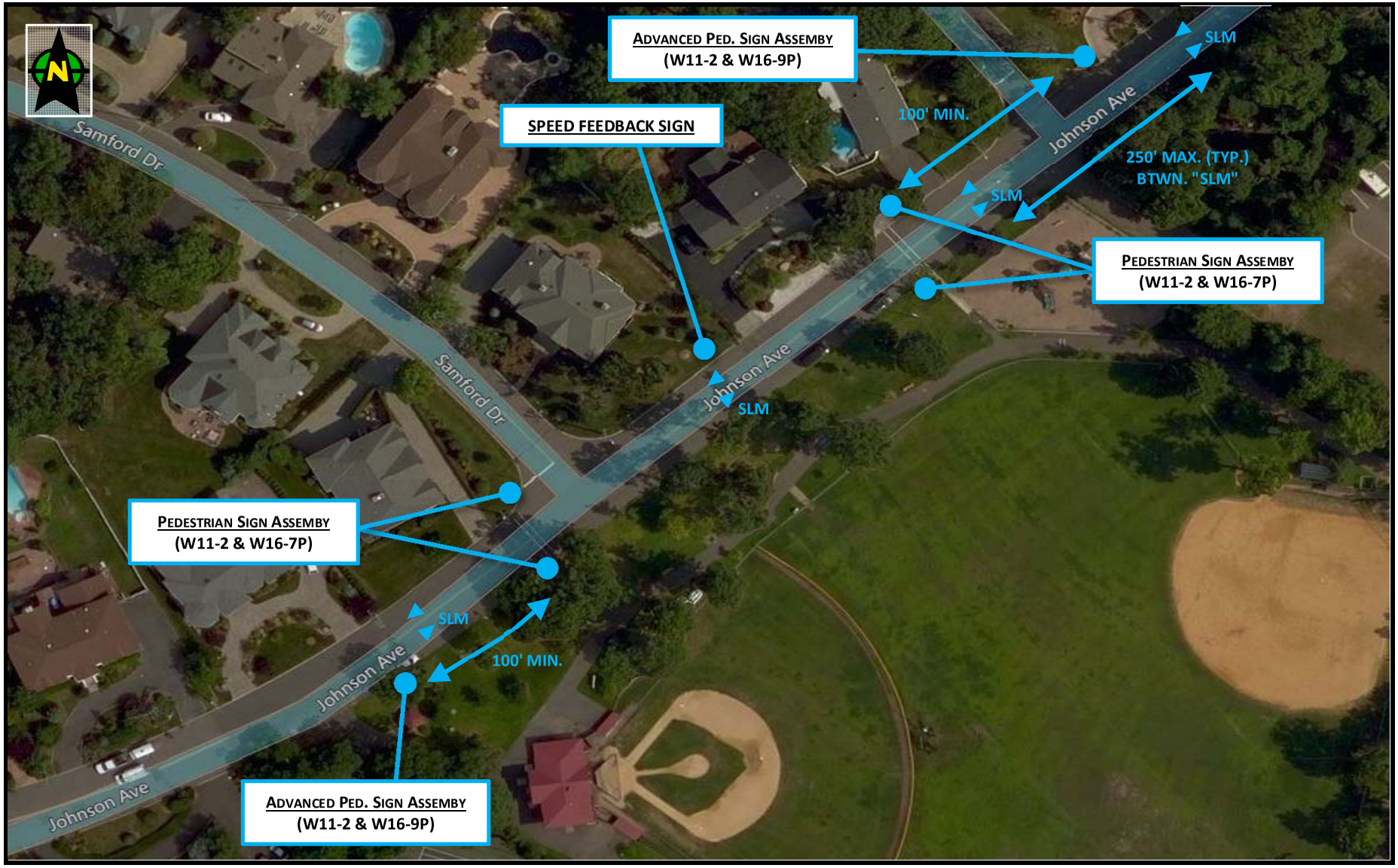
APPENDIX A

STUDY AREA MAP



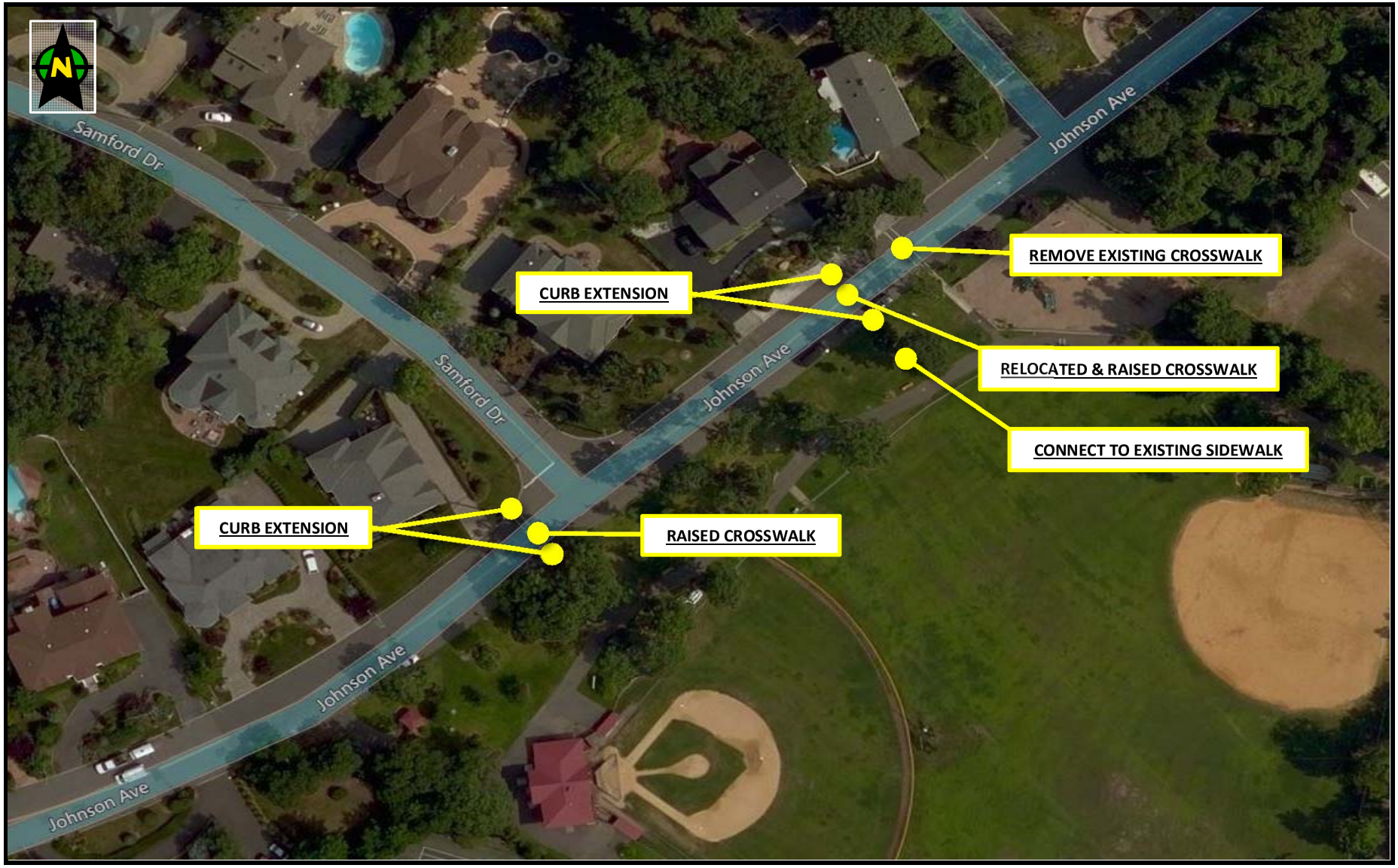
ECB-068	Johnson Avenue - Traffic Calming Study Borough of Englewood Cliffs, Bergen County, New Jersey	**Study Area Map**

TRAFFIC CALMING EXHIBITS
(SHORT TERM, LONG TERM,
OPTION A LONG TERM,
AND OPTION B



"SLM" = Shared Lane Marking (aka Bike Sharrow).

ECB-068	Traffic Calming Study - Johnson Avenue	**Exhibit 1**
	Borough of Englewood Cliffs, Bergen County, New Jersey	**Short-Term Improvements**



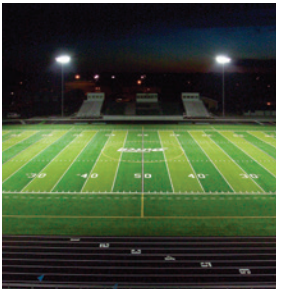
ECB-068	Traffic Calming Study - Johnson Avenue	**Exhibit 2**
	Borough of Englewood Cliffs, Bergen County, New Jersey	**Long-Term Improvements - Option A**

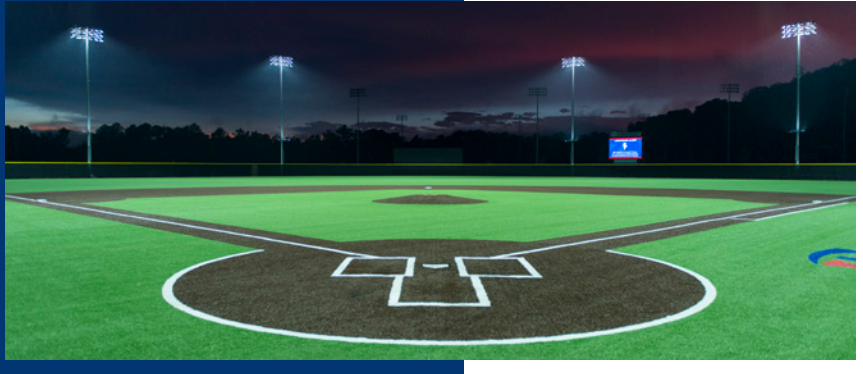
ECB-068	Traffic Calming Study - Johnson Avenue	**Exhibit 3**
	Borough of Englewood Cliffs, Bergen County, New Jersey	**Long-Term Improvements - Option B**

APPENDIX I

LIGHTING INFORMATION

IS LED THE RIGHT LIGHT SOURCE FOR MY PROJECT?





Sports Lighting

Is LED the right light source for my project?

Answers to 9 Common Questions

musco Lighting

We Make It Happen.

Aviva Stadium
Dublin, Ireland

©1996, 2015 Musco Sports Lighting, LLC

Decisions . . .

There are many decisions to make when planning a sports-field lighting project. As the decision maker, the standards you set will affect recreation or athletic programs in your community for 20 to 30 years.

Obviously, you want to select a trouble-free lighting system that will be a safe, energy-efficient source of community pride rather than a disappointing source of high-maintenance headaches and neighbor complaints.

Lighting a sports facility is a big investment. You and your design consultant should ask questions about initial and long-term benefits to ensure you get the most value from the dollars you spend. The more you know about sports lighting, the better chance you have of getting the results you want.

Read on for answers to the most common questions people have about sports lighting

Common Questions — Page

1. Is LED right for my project? **2**

2. What affects the cost of lighting my ball field? **4**

3. How many lights do I need? **6**

4. How much will it cost to operate my lights? **8**

5. There are no houses near my field, so why should I be concerned about spill light and glare? **10**

6. If they use the same wattage lamp, aren't all fixtures the same? **12**

7. Why does pole type and height matter? **14**

8. How can I make sure I get the results I want? **16**

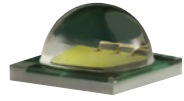
9. Is there funding help available? **17**

Lighting terms you'll hear. **18**

1. Is LED right for my project?

For sports-lighting applications, the two typical light source options are metal halide and light-emitting diode (LED). If supported by a well-designed system of light control, structures, electrical, and application, both light sources can result in good quality of lighting. Choosing which light source is best for your project is one of dozens of decisions that impact the performance and cost results.

Metal halide lamp



Light-emitting diode

Benefits and Costs

Hours of use have a major impact on the economics of balancing capital and operating cost. Most indoor sports facilities are used almost daily, so the energy savings using a diode light source generally pay back its higher capital equipment cost in just a few years. Additionally, many indoor facilities have multiple uses, making the dimming ability of LED useful. The instant on/off characteristic of diode can also be of value, particularly for player introductions and halftime performances.

Outdoor recreational facilities are often used less than 500 hours per year. At 10 cents per kilowatt hour, the energy cost to light a youth soccer field with metal halide is less than $2 per hour. In this case, payback through energy savings for increased LED capital costs would take several years.

Compare the capital and operating costs to see what fits your project needs. Be sure to incorporate any demand charges from your utility company, as this could significantly impact your payback timeframe.

Light Control

Neighborhood impact is a factor in outdoor sports lighting. The LED light source has the potential for extreme cut-off. However, if not properly controlled, the intensity of the multiple tiny light sources also has a greater risk of creating uncomfortable glare.

The unique needs of lighting sports fields make controlling the light a more critical issue than required for most other lighting situations. Relatively high quantities of light need to be projected over long distances in a manner that meets the differing viewing needs of players, spectators, and in many cases, television broadcast production.

"Two aspects of energy efficiency are important to consider: the efficiency of the LED device itself (source efficacy) and how well the device and fixture work together in providing the necessary lighting (fixture efficacy)."

Source: U.S. Department of Energy, http://energy.gov/eere/ssl/led-basics

Light control matters

2014 Musco Light•Structure Green™ system with LED light source
LakePoint Sporting Community · Emerson, Georgia, USA

2014 Other manufacturer's fixture with LED light source

Musco systems offer your choice of LED or metal halide light sources – we can help you evaluate which one fits your project needs.

2. What affects the cost of lighting my ball field?

Each field is unique and there are many things that impact the cost. The cost of fixtures is only a small part of the overall project cost. As you compare options, it's important to look at both the initial and operating, or life-cycle, costs. (See page 8 for more information on operating costs)

Initial costs for a complete project will include three components:

- Lighting
- Structural
- Electrical

For each of these three components you will need to select someone to:

- Design
- Supply
- Install

Decisions you make in one area will affect the others. For example, variances in fixture efficiency will affect the number of fixtures needed and, as a result, could require larger poles to support the additional wind load and additional electrical components to operate the system. Your choices will also impact operating and maintenance costs.

9 Important Sports-Lighting Decisions

	Lighting	Structural	Electrical
Design	?	?	?
Supply	?	?	?
Install	?	?	?
	OPERATE		

©1987, 2015 Musco Sports Lighting, LLC

This matrix is an easy way to quickly understand if you have covered all areas of your project when developing a cost estimate.

As you work through the 9 important sports-lighting decisions, you will need to review variables that will affect the design and final costs of your project. Here is a starting check list of items to discuss with your local sports-lighting representative:

Quantity and Quality of Light	Geographical Issues	Environmental Light Control Issues	Lighting Usage
❑ Facility type and size ❑ Players' skill level ❑ Seating capacity ❑ Television/video broadcast requirements ❑ Lighting standards (for organizations such as Little League Baseball®)	❑ Location – structural and local/state building codes ❑ Soil conditions ❑ Existing structures ❑ Pole setback requirements	❑ Proximity of neighbors ❑ Community light ordinances ❑ Nearby airports or observatories ❑ Multi-field complexes	❑ Anticipated hours of operation ❑ Local initiatives for reducing energy usage ❑ Desire for dimming or special effects

Trump National Doral Miami Golf Resort
Miami, Florida, USA

Musco provides free project planning assistance to help you navigate through the choices that impact project cost. Our foundation-to-poletop systems incorporate lighting, structural, and electrical components.

3. How many lights do I need?

What you are really buying is the quantity and quality of light on the field. It is a common practice to specify a number of fixtures, rather than the amount of light produced on the field. However, this is like buying a car based on the size of its gas tank instead of its fuel efficiency. The efficiency of reflector systems, light sources, and application experience currently available varies significantly.

Quantity of light

Light on the playing surface is measured in footcandles or lux. Several factors determine the number of footcandles or lux required to light your field:

1. **Sports type —** More light is required to light smaller, faster moving objects. For example, baseball uses a small ball traveling at high speeds, resulting in the need for higher light levels than soccer.
2. **Players' skill level —** Higher light levels are needed for increased skill, speed, and accuracy.
3. **Field size —** The size of the playing area defines the number of square feet/meters to be lighted.
4. **Seating capacity —** More light is needed to see action that is farther away.
5. **Television/video requirements (if any) —** A camera interprets images slower than the human eye and requires more light to be able to follow the action.

Generally Accepted Lighting Standards

SPORT	SPORT LEVEL	TARGET / CONSTANT LIGHT LEVELS	
		FOOTCANDLES	LUX
Baseball/Softball	Recreational	30/20	300/200
	Schools/Competitive Leagues	50/30	500/300
	Little League®	50/30	500/300
	Amateur Softball Association (ASA)	50/30	500/300
	College[1]	100/70	1000/700
Basketball (indoor)	Elementary	30	300
	High School	50	500
	College[1]	80	800
Football	Schools/Competitive Leagues	30	300
	College[1]	50	500
Soccer	Recreational/Practice	20	200
	Schools/Competitive Leagues	30	300
	College/Municipal[1]	50	500
Tennis – 2 court (side by side)	Recreational	30	300
	Schools/Competitive Leagues	50	500
	College[1]	75	750

[1] May vary due to seating capacity and television requirements.

Target vs initial light levels

Light levels naturally depreciate over time as the light sources age and dirt builds up on the fixtures. How fast it depreciates depends on the fixture design, light source type, and how it is operated. It's important to make sure your system is designed to provide maintained, or target, light levels over the life of your system to ensure you continue to have the quantity and quality of light you purchased.

Quality of light

When talking about light quality, you will hear the term uniformity, or evenness of light on the playing surface. It's stated as a ratio, like 3:1, the minimum standard for most sports. What that means is the brightest point on the field should be no more than three times as bright as the darkest point. This ratio is important because a ball can appear to change speed as it passes from dark to light areas, making it difficult for players to follow the flight and gauge the speed of the ball.

Each manufacturer should provide specific information on initial and maintained light levels as well as a uniformity ratio, so when you compare proposals you can be sure they all design to the same criteria. It's also a good idea to get written guarantees for the quantity and quality of light your system will provide.

Achieving and maintaining the right quantity and quality of light impacts tournament site selection

Musco provides free lighting design services to you or your consultant to help you achieve guaranteed light quantity and quality.

4. How much will it cost to operate my lights?

Electrical cost to operate lights is less than many people might think. A typical soccer field can range from $3 – $8 per hour. In addition to electrical cost, you should consider staff time for operating on/off schedules, tracking facility usage, routine maintenance, and unexpected repair costs.

Electrical consumption

Light source options, metal halide or LED, vary in how efficiently they convert electrical energy into light energy. Even using the same light source, differences in reflector system efficiencies and aiming design vary, which impacts the energy required to achieve the amount of light needed on the field.

Standard Soccer Field – 360 x 225 ft (110 x 69 m)
30 footcandles (300 lux)

	Musco		Other Manufacturer
	630 W LED	1500 W Metal Halide	1500 W Metal Halide
Fixtures required	44	32	52
Hourly energy cost	$2.77	$5.00	$8.42
Annual energy cost	$1,386	$2,502	$4,212
25-year energy cost	**$34,650**	**$62,560**	**$105,300**

Assumes 10¢ per kW·h electrical rate, 500 hours per year operation

A properly designed LED system may cost more than a metal halide system. Facilities with higher usage will see a faster payback with energy savings. Energy savings is just one aspect to evaluate in deciding which light source and system is right for you.

Efficient management, scheduling, and monitoring

As public concern for energy conservation grows and budget constraints impact staffing, cities and organizations are considering automated lighting control systems. The systems are more reliable than timers, better accommodate last minute changes, save energy, and eliminate staff time traveling to fields to turn lights on and off.

Some systems provide reports that track hours by user helping you set user fees to offset your operating expenses. Monitoring services ensure on/off schedules are completed and alert you or your warranty provider to any fixture outages that may affect playability.

Musco's systems are efficient, and include automated controls with 24/7 staffed support, proactive monitoring, and a no-touch warranty that covers routine maintenance and repairs.

Routine maintenance

Relamping — For metal halide light sources, its more efficient to group relamp rather than replace lamps as they burn out. You should schedule group lamp replacements prior to the end of lamp life to ensure you maintain the target light levels on your field.

Costs include:
- Lamps ($60 to $75/lamp average)
- Equipment rental to get to the top of the pole ($75 to $150/hour)
- Labor (Approximately $60 – $100/hour average)

LEDs used for sports lighting should not burn out before the end of system life, provided there is adequate design for the supporting structural and electrical components.

Fuses — Replace as needed (average cost of $10 to $15/fuse). You may need to rent equipment to access the fuses if electrical components are not accessible at ground level.

Unexpected repair costs — how to avoid them

Unexpected repairs can take significant time and money to correct. A well-designed system will be durable enough to withstand the elements and have features designed to reduce unexpected costs.

Re-aiming — Make sure your manufacturer guarantees fixture alignment. Over time, factors like weather can cause misalignment resulting in less light on the field. Labor and equipment costs to correct this can be significant.

Multiple fixture outages — Each driver or fixture should be individually fused. This minimizes multiple or "gang" failure, as well as the need for emergency repairs.

Troubleshooting — Easy-to-access systems have electrical components such as ballasts/drivers, capacitors, and fuses located close to the ground to save time and money.

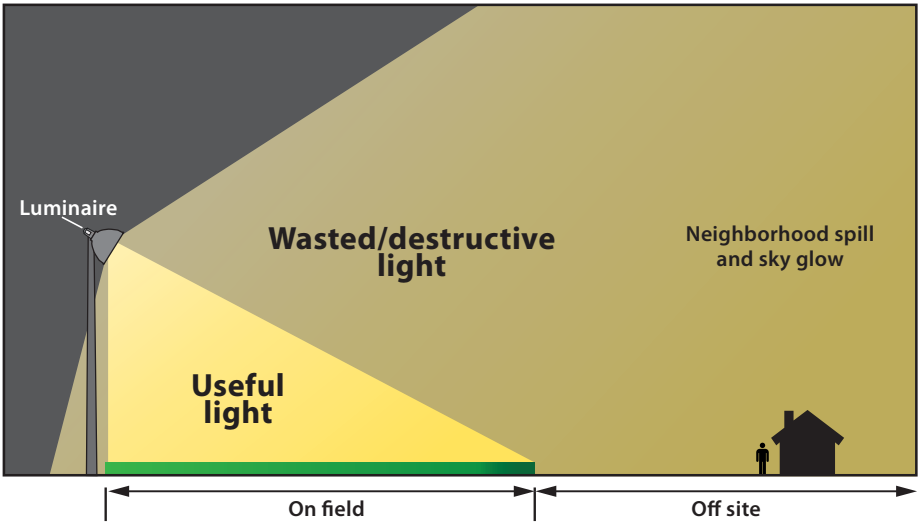
Lightning and surge protection — Built-in system grounding helps avoid equipment damage. This is especially critical with the electronics involved with LED systems.

Misalignment of as little as 10 degrees shifts light off the playing field into the stands.

Having major electrical components accessible at ground level avoids hiring a $100/hour crane to replace a $10 fuse.

5. There are no houses near my field, so why should I be concerned about spill light and glare?

Even if no houses are there now, controlling light pollution is important for several reasons. Spill light, glare, and sky glow are considered wasted or destructive.



Spill light = wasted energy

Fixtures with poor light control waste light by allowing it to go off the field into neighborhood spill and sky glow. Proper light control redirects wasted spill light back onto the playing surface. No matter which light source is used, LED or metal halide, efficient fixture and system design, along with application expertise, impacts the quantity and quality of lighting results.

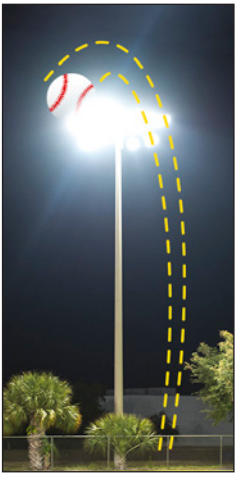
With better control, you reduce the number of fixtures needed to get useful light on the field. This also reduces operating and maintenance expenses.

Musco has developed advanced spill light and glare control systems to solve environmental concerns.

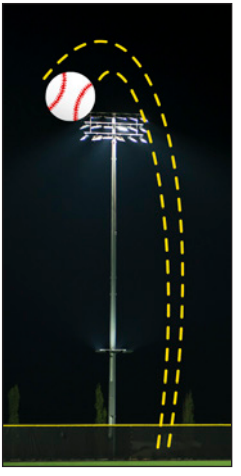
Glare problems

Glare control is important for neighbors, player safety, and spectator enjoyment. Fixture glare will make it difficult for players to follow the ball, creating the possibility for injury. Players competing on multi-field complexes can also be affected by glare from adjacent fields.

Due to the intensity of the LED light source, increased measures should be taken to provide optic controls to minimize glare. You don't have to sacrifice good light control to use a new light source.



Glare impacts players



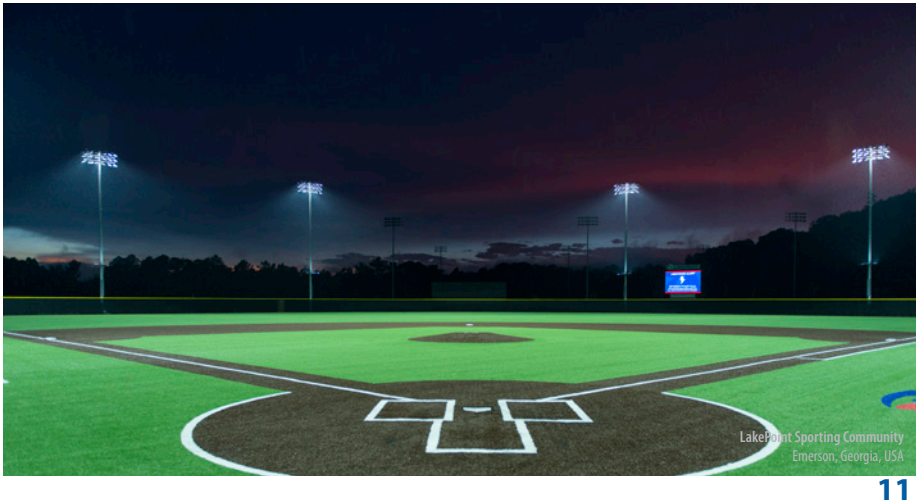
Musco gets the glare out of the players' eyes

Community growth

Even if your facility does not have neighbors today, communities often grow up around sports facilities. Your lighting system should last more than 20 years. By minimizing spill light and glare now you will have happier neighbors and receive fewer complaints for years to come.

Growing concern

We're all aware of public concern for wasting the valuable energy resources it takes to produce light. Many communities are enacting environmental light pollution ordinances to regulate bothersome light that shines on private property, through windows, onto roadways and around astronomical research facilities. Light pollution also has negative effects on wildlife.

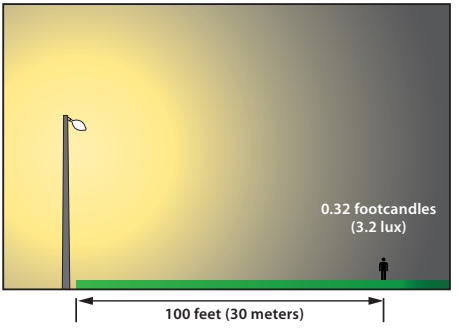


6. If they use the same wattage lamp, aren't all fixtures the same?

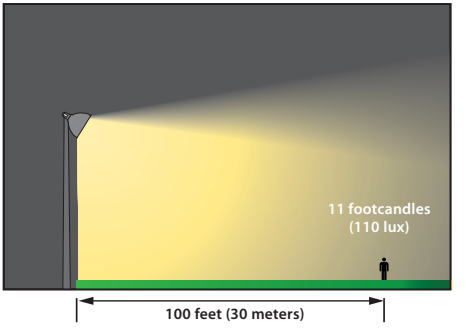
No matter what light source is used, the manufacturer's reflector design and application expertise is the critical factor in how effectively the lamp's light energy is projected onto the playing surface. Technology allows wasted spill light to be redirected back onto the playing surface, increasing the light on the field.

In the example below, the lamp produces the same amount of light at the top of the pole. Without a reflector, it projects less that 1 footcandle (10 lux) of light on an area 100 feet (30 m) away. With a well-designed reflector, it projects 30 times that amount.

Lamp with no reflector



Lamp with efficient reflector



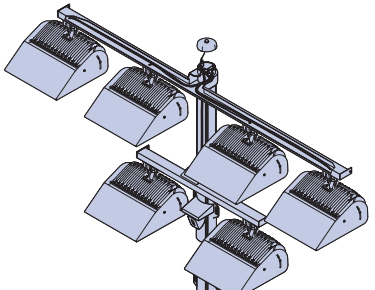
A reflector concentrates and projects the light energy onto the playing surface.

It is a common mistake to specify a number of fixtures, rather than the quantity of light produced on the field. Specifying a set number of fixtures simply spells out the amount of light that is going to be generated by the lamp at the top of the pole, rather than the light on the field.

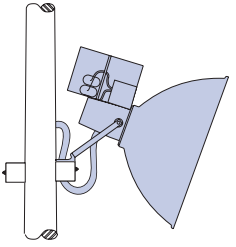
Musco's complete system is engineered from foundation-to-poletop in 5 Easy Pieces™ for optimal light control, easy installation, and trouble-free operation.

System vs parts

Lighting may be purchased as a system or as single fixtures plus other parts and pieces from a variety of sources. Here's an analysis:



System



Parts

Shaded areas indicate engineered components

System	Parts
Engineered as a complete system ▪ Parts selected by trained engineers for compatibility ▪ Critical components assembled in controlled environment ▪ Tested prior to shipping ▪ Single source accountability with light level guarantee and warranty on entire system	**Parts and pieces of unknown strength and quality put together by the installer** ▪ Inconsistent warranties from several sources ▪ Exposed wiring creates maintenance problems
Factory aimed ▪ Reduced installation time and expense ▪ Known results	**Individual fixture-by-fixture aiming from the top of the pole** ▪ Adds installation time and cost ▪ Unknown results
Electrical components mounted at pole base ▪ Easier maintenance ▪ Weight reduction better assures fixture alignment	**Electrical components on fixture** ▪ Troubleshooting must be done from the top of the pole ▪ Increases chance of misalignment
Built-in lightning and surge protection ▪ Assures its installed and operating	**Unknown protection**

7. Why does pole type and height matter?

Poles are an integral part of a lighting system. The right poles help ensure proper aiming, long-term reliability and reduced maintenance expense.

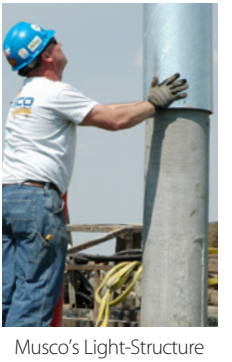
Common pole types

Pole Type	Benefits	Drawbacks
Wood	▪ Low cost of material	▪ Poles not tall enough to allow proper mounting height ▪ Fixture misalignment because wood twists and leans over time ▪ Safety hazards: rotting wood, exposed electrical conduit, toxic preservatives
Concrete	▪ Can be direct buried, eliminating the cost of footings ▪ Corrosion and moisture resistant ▪ Pleasing appearance	▪ Poles are heavier and more expensive to set ▪ High freight costs often limit their use to areas near concrete pole manufacturing plants
Base-plate Galvanized Steel	▪ Pleasing appearance ▪ Lighter weight than concrete, easy to handle	▪ Higher initial cost ▪ Require construction of concrete foundation with anchor bolts to mount poles ▪ Curing time of concrete base ▪ Corrosion at ground level ▪ Difficulty with pole orientation
Direct Burial Galvanized Steel Pole	▪ Pleasing appearance ▪ Lightweight	▪ Underground corrosion accelerated due to moisture and soil chemicals (often undetectable prior to pole failure) ▪ Unpredictable life expectancy ▪ Increase installation time and cost depending on structural engineer's criteria

Combination concrete and steel pole

This pole option combines the advantages of steel and concrete, while reducing or eliminating many of the problems. Steel pole shafts are slip-fit onto precast concrete bases that are set directly into the ground and backfilled with concrete.

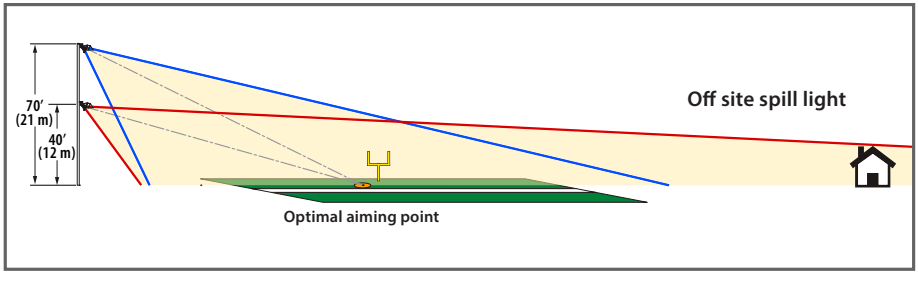
- Ease of installation - poles can be set onto pre-stressed, direct-buried bases within 24 hours
- Cost savings - poles and bases are shipped in sections and are lighter for lower freight expenses
- Corrosion resistance - concrete bases are corrosion and moisture resistant at ground level and below grade



Musco's Light-Structure Green™ system combines the benefits of both concrete and steel poles.

Pole height impacts aiming angles and the amount of spill light

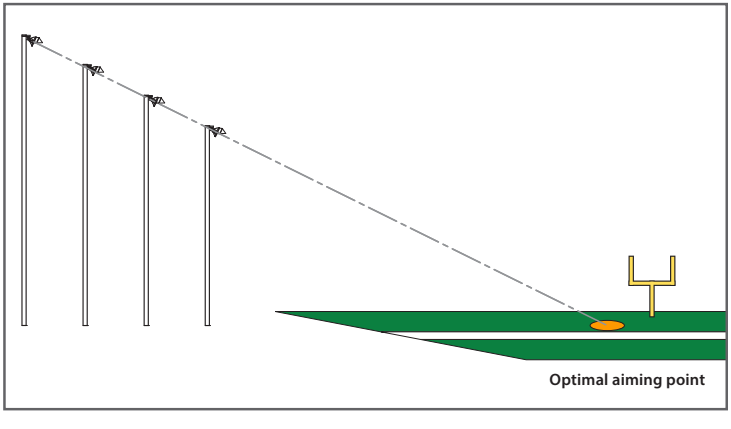
Proper fixture aiming angles ensure even light distribution across the playing area and reduce light pollution, otherwise known as spill light.



As a general rule, taller poles allow fixtures to be aimed more directly on the playing surface which reduces the amount of light spilling into unwanted surrounding areas. If city ordinances or other factors dictate the use of shorter poles, your lighting manufacturer will evaluate to see if custom measures, such as additional poles or creative aiming logic, can still allow you to meet your lighting goals on and off the field.

Distance from the aiming point determines optimal pole height

The optimal height of the poles needed for your lighting system and resulting project cost is also affected by their distance from the playing surface. Structures such as bleachers and buildings will impact pole locations. Future expansion or other facility plans should be discussed with the designer.



Musco's expert project managers and engineers will work with you to design the ideal lighting system for your specific needs.

8. How can I make sure I get the results I want?

We've reviewed some of the issues involved in choosing a lighting system. Once you've made your decisions, there are ways to ensure you get the results you want.

Define standards

It is important to have written specifications that establish the performance you expect from your system. Remember to incorporate the three components of the lighting system: lighting, structural, and electrical. Take into account the costs involved for design, supply, installation, and operation of the entire system. Specify the values you want for playability, environmental light control, life-cycle cost savings, and warranty.

Clearly defined standards will help you avoid two problems on bid date:

- Insufficient, cheap equipment substitutions to lower bid price
- High bids to cover the uncertain costs of an under-defined project

Seek accountability

Having a manufacturer that stands behind its product and provides good service will make a huge difference in long-term satisfaction with your lighting system.

Get a written guarantee — Manufacturers can provide written performance guarantees for light levels and your entire system (from the foundation to the fixtures), which will ensure the specifications you establish are met. Getting this guarantee from a single-source system provider will save you the headache of sorting out responsibility among multiple manufacturers should a problem arise.

Compare warranties and services — The warranty reflects a manufacturer's confidence in its product. Some manufacturers include services such as on/off control, monitoring, and onsite maintenance and repairs.

Evaluate their reputation — Ask for references and review the manufacturer's track record for service. A good question to ask is if there will be an on-site field performance evaluation after the installation.

Visit a lighted project — Ask to go see nearby projects similar to yours. You'll experience the results firsthand and be able to talk with the owner about how well the manufacturer helped achieve their lighting goals.

"The bitterness of poor quality remains long after the sweetness of low price is forgotten."

Benjamin Franklin

Musco's team includes more than 170 service and warranty professionals providing an industry-leading product assurance warranty with on/off control, monitoring, and on-site maintenance and repair.

9. Is there funding help available?

Finding funds can often prove to be one of the most challenging parts of the process. There are options available that can make your lighting project doable.

Utility grants/rebates

Many utility companies offer incentives to promote the use of energy-efficient products including sports lighting. Incentives vary and come in the form of rebates, grants, low-interest loans, and/or reduced kilowatt rates. Once the utility company completes an energy-savings audit, they can help fund new lights or upgrade your existing equipment with an energy-efficient system.

Financing programs

Financing programs for municipalities and public school systems provide a "budget stretcher" to help with facility improvements. The added revenue from expanded use of your facility can help make the annual payments, as well as will allow you to enjoy the benefits of your lighted facility sooner. Plus, a set payment can be built into your annual budget. This can free you from the budget uncertainties and cash flow implications of a large purchase.

Unique fundraising

Musco's unique Pennant Program™ fundraising program provides corporate advertising opportunities using pennants displayed on Musco's Light-Structure Green™ systems. Organizations have used this program to completely finance their project or to complement other fundraising efforts. And, others have continued the program after the purchase to help with annual operating costs.

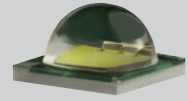
Volunteer installation

Musco's foundation to poletop system simplifies installation and makes it feasible to consider volunteer installation, which can reduce the total project cost by up to one third.

Musco has financing options and a resource database to identify grants and incentives available to help make your project happen.

Lighting terms you'll hear

Creating Light Energy



Light-emitting diode

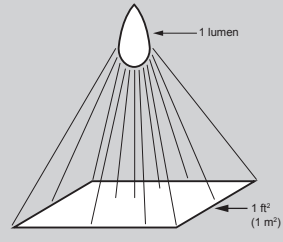
LED – Light-emitting diode
Small semiconductor device that creates light when electricity passes through it.

Metal halide lamp

High intensity discharge (HID) lamp — Metal halide, high-pressure sodium, and mercury vapor
A group of light sources that create light when electricity ignites gasses inside an arc tube.

Incandescent
A light source that creates light when electricity passes through a filament.

Measuring Light Energy



Lumen (1 lm)
Measure of light, much like a mile is a measure of distance.

Footcandle (fc)
One lumen of light spread over 1 square-foot of surface. A light level of 30 footcandles means that 30 lumens of light are being projected onto each square foot of playing surface.

Lux (lx)
Lux is the metric equivalent to a footcandle. A lux is 1 lumen spread over 1 square meter.

Candela (cd)
Measure of the intensity of a light source. Relates to predicting on-field and off-field glare. You can relate this to car headlights: high beam = approximately 30,000 cd. Low beam = approximately 12,000 cd.

Coloring rendering index (CRI)
A scale from 0 – 100 used to measure a light source's ability to show colors realistically as compared to natural light (daylight). Higher CRI values mean a light source is more true to color.

Color temperature
A unit of measure in degrees Kelvin that indicates the color of a light source. Temperatures below 3500K appear yellow or warmer. Above 4500K appear bluish white or cooler. Absolute white is 5000K.

Controlling Light – Lighting Performance

Photometrics
Control of light energy through redirection

Constant light level
The amount of light you can expect on the field at any given time over the extended life of the fixture or system.

Initial footcandles or lux
The amount of light on the field when the lighting system is first put into use.

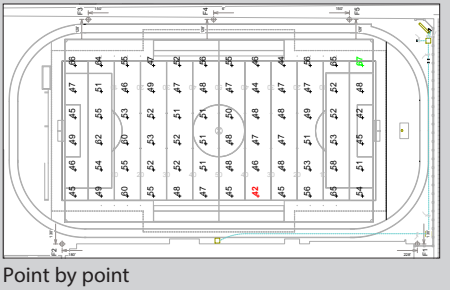
Target (maintained) footcandles or lux
The lowest average amount of light you should always have on your field to meet minimum performance requirements.

Light loss
Amount of brightness from a fixture lost over time due to aging of the light source, dirt accumulation, temperature and voltage variations, and maintenance.

L_p lumen maintenance
The number of operating hours an LED light source will maintain the percentage (p) of its initial light output, noted as Lp.

Uniformity
The smoothness of light on the field.

Point by point
Computer-generated model of your proposed lighting system showing footcandle/lux readings at given points on your field.



Point by point

Spill light
Wasted light that falls off the field into undesired areas, such as a neighbor's back yard.

Glare
Destructive light from a light source that shines in players', spectators', or neighbors' eyes, making it difficult to see.

Sky glow
Destructive light in the night sky which results from light that is reflected upwards.

Notes

We will help get you started.

From our expert project managers to our team of certified engineers, we will work with you to design a custom foundation-to-poletop lighting solution that:

- Reduces your facility's energy and life-cycle costs
- Delivers superior controlled light guaranteed to meet specified light levels
- Controls spill light, glare, and sky glow
- Eliminates maintenance costs
- Simplifies operation and reduces cost with our Control-Link® system monitoring, management tools, and on/off control

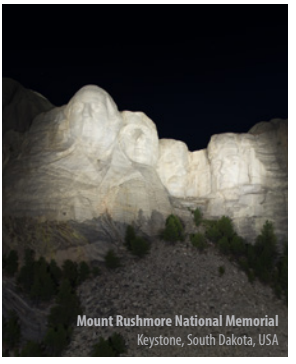
For free planning assistance for your sports-lighting project contact:

MUSCO Lighting®

We Make It Happen®

www.musco.com

lighting@musco.com



Lighting solutions for your large area applications

Need to light a non-sports project?

Musco's team of expert engineers create innovative lighting solutions for a variety of applications from small parking lots to large ports and national monuments. For nearly 40 years, Musco has established itself as the global leader in sports and large area lighting solutions. For innovative lighting systems that enhance light quality, improve effectiveness, reduce spill light and glare, cut costs, and minimize the impact on our environment, contact Musco. We make it happen®.

- Parking lots
- Buildings and architecture
- Monuments
- Ports, airports, and rail yards
- Construction sites
- Bridges
- Security
- And much more

musco Lighting

We Make It Happen®

www.musco.com

lighting@musco.com

Find us on:

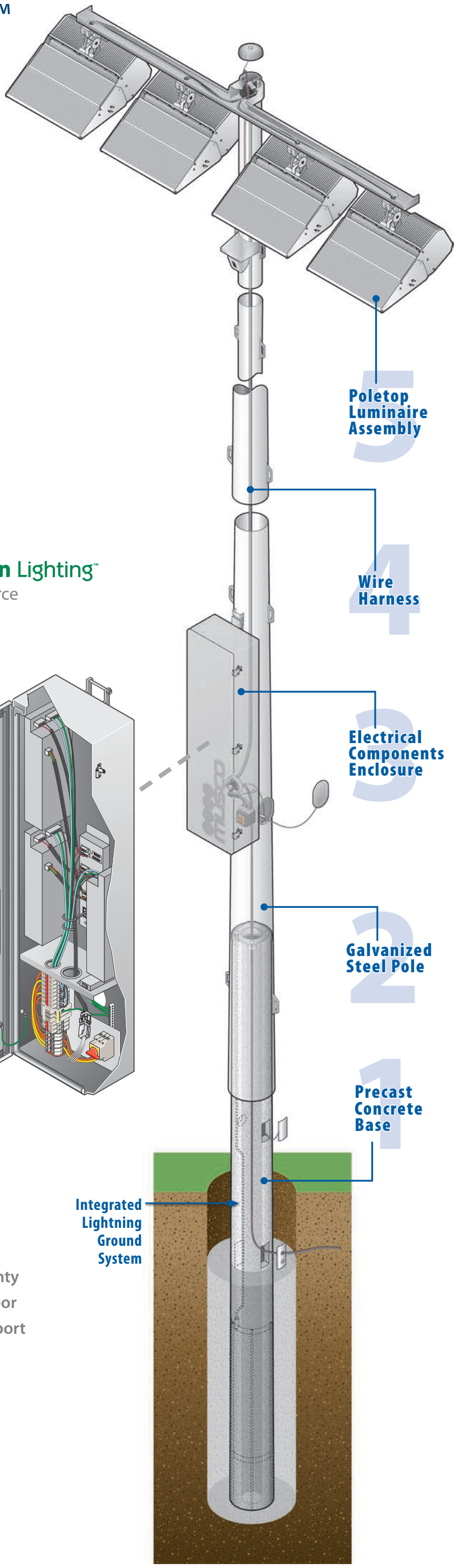
©1996, 2015 Musco Sports Lighting, LLC · M-1252-enUS-13

LUMINAIRE AND POLE INFORMATION

Light·Structure System™

5 Easy Pieces™

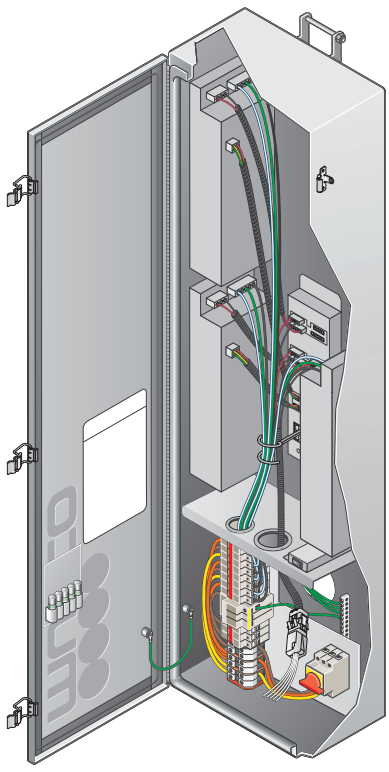
Complete System from Foundation to Poletop



Two light source options

TLC *for* LED™
Total Light Control™

Green Generation Lighting™
Metal Halide Light Source



All components designed to work together . . .
factory built, wired, aimed, and tested
to assure reliable, trouble-free operation

Covered by a 25-year product assurance and warranty program with guaranteed light levels, parts and labor for maintenance, system monitoring, and 24/7 support from Control-Link Central™

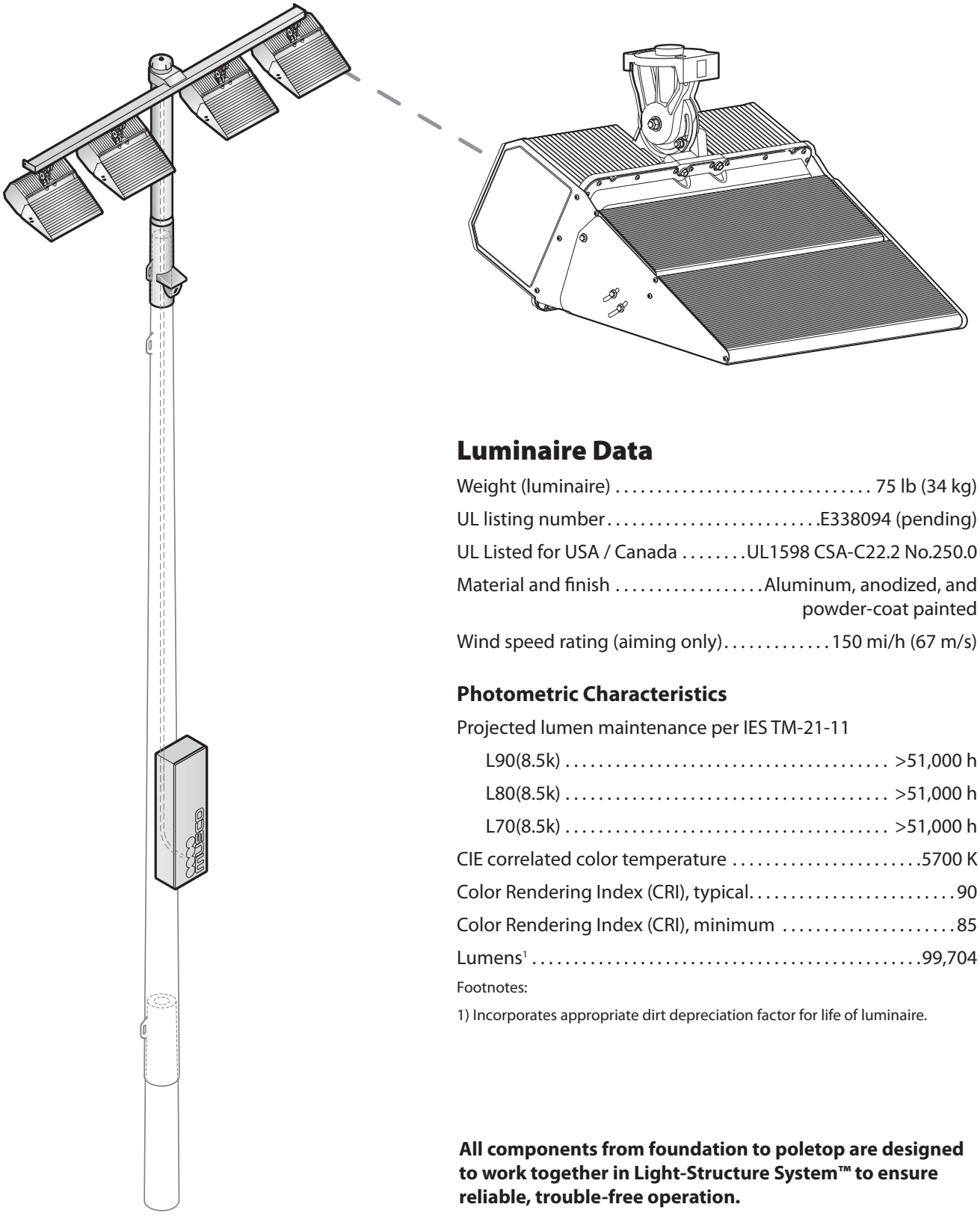
For your **BUDGET,** for the **ENVIRONMENT.**

www.musco.com
lighting@musco.com

©1993, 2016 Musco Sports Lighting, LLC • M-1779-enUS-4 • TLC-LED-1150 • U.S. and foreign patents issued and pending.

musco Lighting
We Make It Happen.

Luminaire and Driver Components – TLC-LED-1150



Luminaire Data

Weight (luminaire) . . . . . 75 lb (34 kg)

UL listing number . . . . . .E338094 (pending)

UL Listed for USA / Canada UL1598 CSA-C22.2 No.250.0

Material and finish . . . . . .Aluminum, anodized, and powder-coat painted

Wind speed rating (aiming only) . . . . . .150 mi/h (67 m/s)

Photometric Characteristics

Projected lumen maintenance per IES TM-21-11

L90(8.5k) . . . . . >51,000 h

L80(8.5k) . . . . . >51,000 h

L70(8.5k) . . . . . >51,000 h

CIE correlated color temperature . . . . . .5700 K

Color Rendering Index (CRI), typical. 90

Color Rendering Index (CRI), minimum 85

Lumens[1] 99,704

Footnotes:

1) Incorporates appropriate dirt depreciation factor for life of luminaire.

All components from foundation to poletop are designed to work together in Light-Structure System™ to ensure reliable, trouble-free operation.

U.S. and foreign patent(s) issued and pending • ©2016 Musco Sports Lighting, LLC • TLC-LED-1150 S-DRIVER 200-480V • M-2146-en04-1

Luminaire and Driver Components – TLC-LED-1150

Driver Data

Electrical Data

Rated Wattage[1]

- Per driver ..... 1,150 W
- Per luminaire ..... 1,150 W

Number of luminaires per driver 1

Starting (inrush) current ..... <40 A, 256 µ

Fuse Rating ..... 15 A

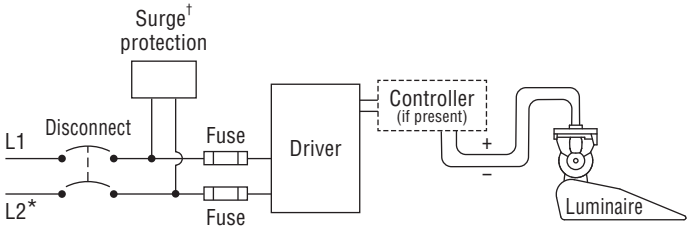
UL ambient temperature rating ..... 50°C (122°F)

Efficiency 95%

Dimming mode ..... optional

- Range, energy consumption 15-100%
- Range, light output 20-100%

Typical Wiring



* If L2 (com) is neutral then not switched or fused.
† Not present if indoor installation.

	200 Vac 50/60 Hz	208 Vac 60 Hz	220 Vac 50/60 Hz	230 Vac 50 Hz	240 Vac 50/60 Hz	277 Vac 60 Hz	347 Vac 60 Hz	380 Vac 50/60 Hz	400 Vac 50 Hz	415 Vac 50 Hz	480 Vac 60 Hz
Max operating current[2]	7.26 A	6.98 A	6.60 A	6.31 A	6.05 A	5.24 A	4.18 A	3.82 A	3.63 A	3.50 A	3.03 A

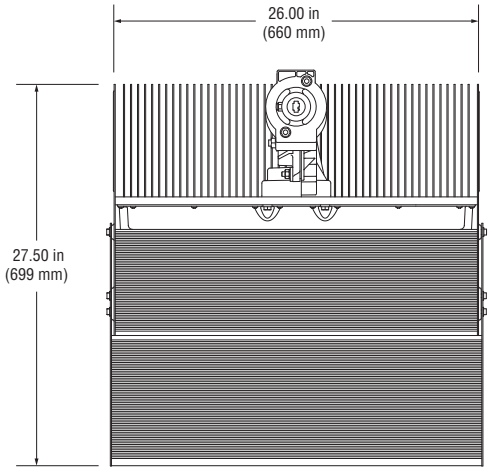
Footnotes:

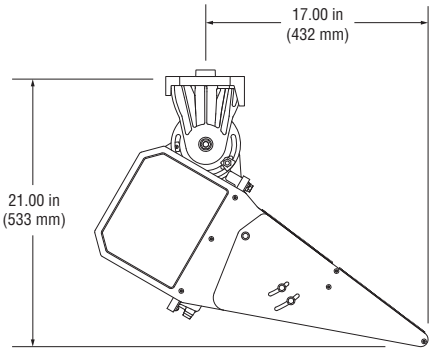
1) Rated wattage is the power consumption, including driver efficiency losses, at stabilized operation in 25° C ambient temperature environment.

2) Operating current includes allowance for 0.90 minimum power factor, operating temperature, and LED light source manufacturing tolerances.

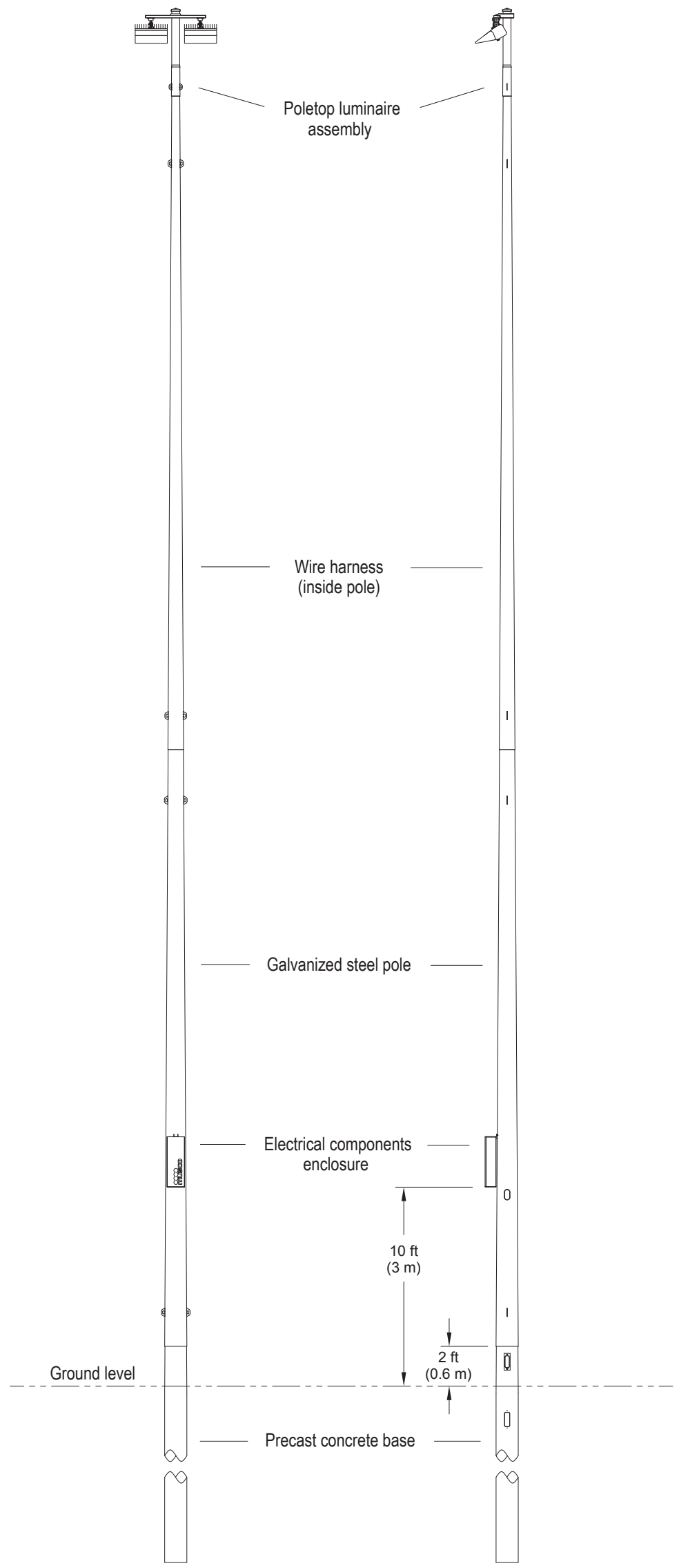
Notes

1. Use thermal magnetic HID-rated or D-curve circuit breakers.
2. See Musco *Control System Summary* for circuit information.





Copyright (C) Musco Sports Lighting, L.L.C. 1991, 2016
Not to be reproduced in whole or part without
the written consent of Musco Sports Lighting, L.L.C.
U.S. and foreign patents issued and pending.



PRELIMINARY

Light-Structure System™ typical configuration
TLC-LED-1150 Luminaires

CONFIGURATION:	02
DRAWN BY:	RWS
APPROVED BY:	TDM
SCALE:	Not to scale
DATE:	08/25/16
DRAWING NUMBER:	M-2151-en04-1_02

CORPORATE OFFICE:

P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
+1-800-825-6020
+1-641-673-0411