

Main Street Recreation Complex Feasibility Study Town of Lynnfield, MA

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Gale JN 715630

MAIN STREET RECREATION PARK FEASIBILITY STUDY LYNNFIELD, MA

SECTION 1.0 - BACKGROUND AND FEASIBILITY STUDY OBJECTIVES

Gale Associates, Inc. (Gale) was engaged in September of 2012, to assist the Town of Lynnfield, Massachusetts (the Town), to complete a limited feasibility study for the development of an athletic and recreation complex at a group of twelve (12) undeveloped parcels of land located in the Town. The parcels are currently owned by the Lynnfield Center Water District (LWD) and are located to the northwest of Main Street in the Town and to the south of Elm Street in the Town of North Reading.

The parcels are located in the "Single Residence D" zone, based on the Lynnfield Zoning map. The parcels do not contain frontage on any right of way in the Town and are currently accessed through LWD property off of Elm Street in North Reading. (Refer to the enclosed Existing Conditions Plans for Book and Map information for the parcels.) The parcels will be referred to as a single parcel, the "Main Street Parcel," throughout this report. The combined parcel total approximately 98.5 acres in size. The parcel is extensively forested and contains a network of cart paths and trails throughout the site. An abandoned railroad easement extends across the northern portion of the property, running east to west. The northern limits of the parcel are bordered by the Ipswich River, while Wills Brook flows across the southern portion. Property to the east consists of undeveloped lands and single-family dwellings along Main Street, while an industrial building owned by Bostik exists to the northeast. Property to the west is primarily town-owned, undeveloped areas and property to the south and southeast is occupied by the Sagamore Springs Golf Club.

The feasibility study is intended to coincide with the development of a Recreational and Athletic Field Master Plan for the Town and to determine the viability of developing a Recreation Complex at the Main Street Parcel. Based on the results of the Master Plan, the Town has a deficit of approximately five to six (5-6) multipurpose athletic fields and a significant perceived need (by Town's citizens') for additional recreational programming space. The intent of this feasibility study is to determine what recreational needs can be met through development of the Main Street Parcel.

The process used to complete the feasibility study focused on a specific set of tasks, which are summarized as follows.

1. To perform a background investigation, including property line survey, wetland delineation and geotechnical test pits, to determine the geotechnical, topographical and resource area constraints that may impact the development potential of the site.

2. To determine how the existing parcel may be developed and configured to best meet the athletic facility needs of the Town, specifically focusing on the priorities resulting from the Recreational and Athletic Field Master Plan.
3. To prepare a set of schematic level plans for the Recreation Complex proposed at the Main Street Parcel.
4. To design and prepare permitting level plans and cost estimates for a roadway to the Recreation Complex, accessible from Main Street, through property owned by Bostik, for which an access agreement is being negotiated by the Town.

This report documents the prevailing site conditions, conceptual development layout, pre-design cost estimates and the permitting requirements to allow the Town to determine if development of the Main Street Parcel is feasible to meet the Town's recreational needs based on the Recreational and Athletic Facility Master Plan.

SECTION 2.0 - EXISTING CONDITIONS AND BACKGROUND INVESTIGATION

In order to facilitate the planning of the proposed athletic facility development, Gale's survey consultant, Eaglebrook, LLC, performed a property line survey, incorporating topographic information provided by the Town. Gale's wetland consultant, LEC Environmental Consultants (LEC), performed environmental resource area delineations to locate rivers, streams, bordering vegetated wetlands and bordering land subject to flooding throughout the parcel. An Existing Conditions Plan was compiled for the parcel and contains property line data, topography and the locations of wetland flags. The Existing Conditions Plan is attached as Enclosure 1, and LEC's Resource Report is attached as Enclosure 4.

Gale completed multiple site visits to the parcel to evaluate the topography, groundcover, geology, accessibility, proximity of abutters and locations of existing structures.

- 2.1 Site Description.** THE LWD property is bounded to the north by the Ipswich River, to the west by Conservation Commission land, to the south by the Sagamore Golf Club and to the east by land owned by Bostik. The property consists of twelve (12) parcels owned by the LWD and is approximately 98.5 acres in size. The property does not contain frontage on any right of way, but is located just north of Main Street and south of Elm Street. The property can be accessed from Elm Street, at the entrance to the existing LWD pumping station, and through the abandoned railroad easement, which runs through the property from east to west. Refer to the Existing Conditions Plan (Enclosure 1) for property line and topographic information.

2.1.1 Soils. Gale used two (2) methods to determine the soil profile characteristics throughout the limits of the parcel. The first method used was through the Natural Resources Conservation Service (NRCS), which provides soil classification mapping for a specific area. The second method was through deep hole test pits, which were conducted by the Lynnfield Department of Public Works (DPW) and observed by Gale. They were placed at six (6) locations throughout the parcel, to determine the soil profiles, parent materials, depth to groundwater and drainage characteristics of on-site subsurface soils.

Because of the significant size of the parcel, the NRCS Web Soil Survey identified several classifications of soils existing within the limits of the parcel. The following is a summary of the classifications that occurred most frequently within the parcel.

“255B - Windsor Loamy Sand, 3% - 8% slopes.” The parent material for this classification of soil consists of loose sandy glaciofluvial deposits. Its soil profile consists of loamy sand and sand, with excessive draining capabilities and a depth to groundwater greater than 80”.

“323C - Poquonock loamy sand, 8% - 15% slopes, very stony.” The parent material for this classification of soil consists of loose sandy glaciofluvial deposits over dense loamy lodgment till. Its soil profile consists of loamy sand, loamy fine sand, and gravelly fine sandy loam, considered to be well drained and with a depth to groundwater of about 18” to 36”.

“311B - Woodbridge fine sandy loam, 3% - 8% slopes, very stony.” The parent material for this classification of soil consists of friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till. Its soil profile consists of fine sandy loam and gravelly fine sandy loam, and is considered to be moderately well drained with a depth to groundwater of approximately 18” to 36”.

“73A - Whitman loam, 0% - 3% slopes, extremely stony.” The parent material for this classification of soil consists of friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till. Its soil profile consists of loam, gravelly fine sandy loam and fine sandy loam with very poor drainage capabilities due to a restrictive fine loamy layer. Depth to groundwater is estimated at 12”-25”.

Refer to the enclosed NRCS Web Soil Survey (Enclosure 2) for the soil mapping results of the entire parcel.

While the NRCS Web Soil Survey can be used to approximate soil classifications, Gale observed a series of test pits to provide a more accurate soil profile analysis at specific locations. Seven (7) test pits were excavated, sampled and a soil log completed for each. Refer to the enclosed Test Pit Logs (Enclosure 3) for the results. Because of extensive wetland resource areas in the parcel, the test pits were conducted in the main upland area, located at the northern portion of the parcel. Test pits were not performed along the proposed Access Drive due to challenging access and proximity to wetlands. We recommend that soil testing in this area be performed prior to developing detailed construction drawings. Refer to the Existing Conditions Plan (Enclosure 1) for the test pit locations and Test Pit Logs (Enclosure 3) for soil profile data. The following is a summary of the geotechnical test pit data.

The profile of the subsurface soils located within the northern portion of the LWD parcel generally includes a 6" to 10" layer of loam and organics, underlain by 24" to 52" of a combination of loamy sand, loamy fine sand, fine sand and medium sand, depending on the location of the test pit. While these classifications can vary in textural analysis, the drainage characteristics of these layers can be considered moderately to well draining. The parent materials for the majority of the test pits consisted of glaciofluvial deposits, with some lodgment till at the greatest depths of the test pits. The soils at the greatest depths of the test pits (84" to 102" depths) consisted mainly of sand or fine to medium sands, with high draining capabilities. Indicators of groundwater, such as redoximorphic features and/or standing water were not discovered in the test pits. Based on the information collected during the test pits, it appears that the upland areas of the parcel contain well-draining soils, with no observations that indicate an existence of a high groundwater table.

Additionally, there were no observations of ledge or rock outcroppings that would indicate excavation refusal. It can be concluded that the existing subsurface soil, in areas where test pits were excavated, lends itself well to recreational facility development. The sandy and often gravelly materials are suitable as a sub-base material for natural or synthetic turf due to their granular consistency, high infiltration and compaction capabilities and low percentage of silts and fines. Additionally, depths to groundwater are not anticipated to be of concern in the areas where test pits were conducted.

2.1.2 Environmental Resource Areas. Gale and our environmental subconsultant, LEC, performed an analysis of environmental resource areas throughout the parcel. The following is a summary of the findings. Refer to the Environmental Resource Report attached as Enclosure 4 for more information.

According to the 13th Edition of the Massachusetts Natural Heritage Atlas, the property is not located within an Estimated or Priority Habitat for rare species. According to MassGIS, there are no certified or potential vernal pools on the site.

A FEMA Flood Insurance Rate Map for the Town indicates that the site contains extensive areas mapped as Zone "A" Areas, which are subject to inundation by the 1% annual chance of flood (100-year flood zone). The upland portions of the property are mapped as Zone "X" Areas and are determined to be outside the 100-year floodplain.

The site is contained within a Zone II wellhead protection zone and the local Groundwater Protection District. The Zone II wellhead designation restricts the amount of impervious area that can be developed without recharge and proper treatment. Based on the Zoning Regulations in the Town, recreational uses are permitted within the Groundwater Protection District.

The LEC performed wetland delineation throughout the entire parcel to determine locations of environmental resource areas, such as rivers, streams, bordering vegetated wetlands, vernal pools and bordering land subject to flooding that could potentially impact feasibility of site development. For the results of the wetland delineation, please refer to Enclosure 4.

Based on the wetland delineation performed, there appears to be approximately 15,000 linear feet of flagged wetland resource areas. This results in a 100' buffer, restricting the limits of developable, upland area and requiring permitting through the Conservation Commission. Included in the wetland resource areas on site are the Ipswich River, which is protected by a 200' Riverfront Area Buffer, an extensive amount of Bordering Vegetated Wetlands (BVW), which are protected by a 100' wetland buffer, and the Wills Brook, which is protected by a 200' Riverfront Buffer due to its classification as a perennial stream. In addition to the buffers described above, the Town imposes a 25' No-Disturb Zone and 50' No-Build Zone to further protect the wetland resource areas. Any development within the buffer zones described above would require permitting through the Lynnfield Conservation Commission.

The following is a summary of the approximate totals of wetlands, buffers and upland areas at the Main Street parcel:

Limits	Area (Acres)
Entire Parcel	98.5 acres
Delineated Wetlands	47.8 acres
25' No-Disturb Buffer	9.8 acres
Area Between 25' and 100' buffer zone	15.9 acres

Given the areas provided in the table above, the following chart summarizes the limits of upland areas that can be considered feasible for development. The twenty-five foot (25') No-Disturb Zone is considered to be unusable, or would require substantial permitting. The upland area outside of all buffers and requiring the least amount of permitting totals approximately twenty-five (25) acres. The upland areas within the 100' buffer, but outside of the twenty-five foot (25') buffer, totals approximately 40.9 acres, and would require permitting for the work proposed within the buffer limits.

Limits	Area (Acres)
Uplands (outside of all wetlands and buffers)	25 acres
Uplands (within 100' buffer, but outside of 25' buffer)	40.9 acres

Gale prepared and submitted an Abbreviated Notice of Resource Area Delineation (ANRAD) to the Lynnfield Conservation Commission on behalf of the Town and attended a public hearing on December 11, 2012. The application is currently on hold until the Town determines if it will continue with the permitting process for any proposed development at the Main Street Parcel. Refer to Enclosure 5 for the completed ANRAD application.

2.1.3 Topography. Topography data for the Main Street Parcel was compiled from record drawings provided by the Town and was verified and supplemented via on-the-ground survey.

The topography of the site generally contains low-lying wetlands toward the property lines, with several drumlins and hills between ten and fifteen feet (10'-15') in peak height throughout the site. The slopes of the upland areas range throughout the site, between one and eight percent (1%-8%), with the greatest slopes occurring over the Bostik parcel located just to the north of Main Street. At this location, Main Street is the high point and the grade generally decreases at a nine percent (9%) slope toward the LWD property.

Several small hills and flat plains exist throughout the parcel, with the flattest areas located in the low-lying wetlands. At the northern portion of the site, slopes vary between one and five percent (1% and 5%), with the exception of the small hills and drumlins, which reach slopes between eight and twenty percent (8% and 20%). At the western portion of the site a large hill exists, with a toe slope and flat plain surrounding it, adjacent to the Wills Brook. The grades in this area generally slope from south, at the property line, to north where wetlands exist.

Refer to the Existing Conditions Plan (Enclosure 1) for topography information, including contours at a two-foot (2') interval. The approximate elevation at the southern property line is 90' - 100'. The approximate elevation at the northernmost property line is approximately 60' - 70'. However, several drumlins, hills and low-lying wetlands exist between the property lines.

For this potential development, a concern is the earthwork associated with the construction of a roadway to access the parcel from Main Street, where the existing topography is sloped at 9%± over the Bostik Parcel and the length of roadway would exceed 1800'. Additionally, because of the close proximity of wetlands in this area, significant retaining walls will be required to reduce development impact on wetlands and meet existing grades. In the northern and western portions of the site, earthwork will consist mainly of excavation, in which case a significant portion of the materials could likely be used in the construction of the access drive. Further detail on the impacts of the proposed development will be described in later sections.

- 2.1.4 Utilities.** Due to the remote location of the Main Street parcel and a lack of right of way frontage, existing or accessible utilities within the site are limited. The only utilities existing within the parcel are a series of drilled wells maintained by the LWD, which are scattered throughout the site and are not near the proposed complex development. Potable water is supplied to the adjacent Main Street residences, Bostik and Sagamore Country Club properties via the LWD service supplied through the Massachusetts Water Resource Authority (MWRA). There is currently no water service line to the site.

Electric service is provided to the adjacent streets and parcels through the Reading Municipal Light Department (RMLD). There is currently no service provided to the parcel from either Main Street or Elm Street. Installation of either electric service or a generator will be required upon development of the parcel. Proposed electric service provisions are discussed in Section 3.5 of this report.

No connections to either sanitary or storm drain systems within the Town currently exist from the parcel. Development of the parcel will likely require the installation of a septic system, as well as provisions for on site drainage mitigation, which may consist of a network of structures and piping, as well as detention chambers, ponds or other stormwater management practices. Proposed sanitary and storm drain systems are discussed in Sections 3.4 and 3.5.

Development of the recreation complex, including an access roadway, parking, an amenities building and lights, will require provisions for electric, telecommunications, gas, water, sanitary and storm drain services to the parcel, as none currently exist. The discussion of the proposed schematics will provided further detail on provisions for these services.

SECTION 3.0 - SCHEMATIC DESIGN – RECREATION COMPLEX

The schematic design for the proposed Recreation Complex is intended to coincide with the recreational needs, as determined by the Recreation and Athletic Field Master Plan. The Master Plan process included results of a Community Survey, feedback from members of the community during development of the Master Plan, as well as a conclusive Planning Program developed to meet the community's recreational needs. The intent of the Master Plan was to provide an evaluation of the current recreational facilities, determine the demands placed on these facilities and estimate the deficiencies that the Town is currently facing in regards to unmet recreational needs. Through use of community sensing sessions, a town-wide survey and several meetings with the Fields Committee, a planning program has been developed that is intended to address the unmet recreational needs within the Town. While assessing redevelopment of existing athletic facilities is included in the Master Plan, Gale has also been tasked with a feasibility study for the currently undeveloped Main Street Parcel.

Based on results of the field evaluation and needs assessment, there is currently an unresourced demand for athletic fields. The Master Plan provides details of the analysis, which concluded that the Town has a deficit of five to six (5-6) Multi-Purpose Rectangular (MPR) athletic fields. Additionally, sensing sessions and a community-wide survey provided feedback from Town residents that additional walking, running and multi-use trails are desired. Additionally, results indicated that there is a perceived need for additional lighted athletic fields, an ice-skating facility, additional field maintenance

procedures, an indoor recreation complex and a dog park. The intent of the Master Plan is to provide a planning program that accomplishes the recreational needs of the community. A combination of redevelopment at existing facilities and a proposed new development at the Main Street parcel is intended to better meet the existing recreational needs in the Town.

Gale developed a schematic design for the Main Street Recreation Complex as part of the Master Plan. The development can be broken down into three components or main areas: (1) Active Recreation (soccer, lacrosse, basketball, etc.), (2) Passive Recreation (walking, jogging, biking, dog-walking, etc.), and (3) Access Roadway. Because the majority of the area suitable for development is in the northern portion of the parcel, a significant portion of the development will be a roadway to access to the recreational development. The following is a discussion of each of the proposed development areas. Refer to Enclosure 6 for the schematic level concept plans for each alternative.

3.1 Main Street Parcel – Active Recreation Components – Option 1

The active recreation complex is proposed at the northern portion of the parcel and will be or is to be accessible from the proposed roadway off Main Street. The complex is proposed to include MPR athletic fields, tennis and basketball courts, an ice-skating rink, a central amenities building, playground areas, multi-use paths and parking areas. The following is a discussion of each of these components.

Multi-Purpose Fields. The proposed layout provides for three (3) multi-purpose athletic fields, sized to accommodate Massachusetts Interscholastic Athletic Association (MIAA) events, including soccer, lacrosse and football, as well as a variety of youth level recreation programs. The layout provides for a minimum of ten-foot (10') safety zones surrounding the perimeter of each field. Under Option 1, one (1) of the multi-purpose fields is proposed as synthetic turf while the other two (2) fields are proposed as natural turf fields. While the decision of natural versus synthetic turf can be determined at a later date, the schematic design and results of the Master Plan for Option 1 assume that two (2) of the three (3) fields will be natural turf. A synthetic turf field can accommodate greater than 500 uses per year, while a well-maintained natural turf field can accommodate a maximum of 250 uses per year and still maintain an adequate playing surface.

The dimensions of the multi-purpose fields are as follows:

MPR Field 1 – Synthetic Turf:	210' x 360'
MPR Field 2 – Natural Turf:	210' x 345'
MPR Field 3 – Natural Turf:	210' x 330'

Hard Courts. A tennis court and basketball court are proposed to be developed within the Recreation Complex to provide a variety of active recreation options to community users. While tennis and basketball were not the leading results of the recreational needs survey, they are relatively inexpensive and provide a recreational use that meets the needs of a wide range of recreation users. Additionally, there are few tennis and basketball facilities in the Town and the majority of those facilities are reaching the end of their useful lives, including the tennis court facility at Newhall Park.

The courts are proposed in a north-south orientation, which is optimal for tennis and basketball use. A path is provided to the courts for pedestrian access from the parking lots and multi-use trails. Both courts are proposed with a ten-foot (10') vinyl-coated chain link fence and acrylic surfacing. Lights are not proposed at the tennis/basketball complex.

Ice Skating Rink. Based on results of the Master Plan Needs Assessment, an ice-skating or roller-hockey rink is desired within the Town. Currently, a Town owned and operated ice-skating facility does not exist within the Town. The proposed Recreation Complex includes a seasonal, outdoor skating/roller hockey rink sized adequately for public use at 85' x 175'.

Parking. The schematic includes parking to accommodate 289 parking stalls. Gale uses the following calculation to determine parking needs for athletic field and recreational facilities:

- Calculating Parking for 1 Field:
 $40 \text{ players (2 teams)} * 2 * 1.5 \text{ spectators} * 60\% = 72 \text{ spaces}$

The Main Street Recreational Complex proposes three (3) multi-purpose fields, which will require approximately 216 spaces based on the above calculation. Additionally, an extra 73 spaces are proposed to accommodate users of the basketball, tennis, skating rink and trails. We feel that the proposed parking is adequate to accommodate users of the active recreation portion of the parcel.

Spectator Seating. The schematic layout provides a quantity of 186 seats at the synthetic turf field, plus an additional 93 seats at each of the natural turf athletic fields. The spectator seating is proposed as a forty-foot (40') long, five (5) row, aluminum seating system intended to be installed on a concrete pad. Two (2) units are proposed at the synthetic turf field and one (1) unit at the natural turf fields.

Amenities Building. An amenities building is proposed in a location central to the athletic fields, hard court spaces, playground and trails, and is intended to provide concessions, storage and restrooms. The building, as proposed, is 1,800 square feet and includes an overhead garage door and open storage area, six (6) female restroom facilities, three (3) male restroom facilities and a concessions facility appropriate for packaged goods and the use of small appliances only. The area surrounding the amenities building is proposed to include picnic tables, benches and queuing areas for spectators.

Playground. This schematic layout provides for two (2) age-appropriate play areas, one (1) designated for two to five (2-5) year olds, the other for six to twelve (6-12) year olds. The playgrounds are proposed to include pre-fabricated playground structures, based on National Playground Safety Institute standards, and include four-foot (4') vinyl-coated chain link fence, gates and seating areas for playground users.

Pedestrian Circulation. Bituminous concrete walkways are proposed to provide access to the facilities from each of the parking lots. Additionally, an eight-foot (8') wide walking path is proposed to loop around the facility and provide circulation to each facility, as well as connections to some of the existing paths and the abandoned railroad easement path. The walkways and trails within this portion of the recreation complex total approximately 6,000 linear feet, or 1.1 miles.

3.2 Main Street Parcel – Active Recreation Components – Option 2

Because of the geometrical constraints of the property and the significant amount of wetlands minimizing the developable area, there are a limited number of development alternatives possible to meet the build-out needs of the parcel. Option 1 of the Main Street Parcel redevelopment is intended to be paired with Option 1 for the High School and Middle School redevelopment. Therefore, the needs of the planning program will determine the build-out for each strategy. Option 1 of the Main Street complex, assuming redevelopment of the High School and Middle School Option 1 strategies requires that an additional two to three (2-3) fields be provided to meet the planning program. Therefore, Option 1 of the Main Street complex proposes one (1) synthetic turf field and two (2) natural turf fields.

Option 2 of the Main Street complex is intended to be paired with Option 2 for the High School and Middle School, and will require an additional five (5) fields be provided through development of the Main Street Parcel. Therefore, under Option 2, two (2) of the multi-purpose fields are proposed to be synthetic turf and one (1) of the multi-purpose fields will be natural turf.

The Option 2 layout proposes identical program elements to Option 1, including three multi-purpose fields, a tennis court, basketball court, skating rink, amenities building, playgrounds and pathways. The main difference in Option 2, outside of the synthetic versus natural turf, is a central parking area and a relocated tennis and basketball complex.

Based on the redevelopment alternative(s) chosen for the High School and Middle School, the planning program will determine what capacity of development will be required of an undeveloped parcel, such as the Main Street Parcel. Options 1 and 2 of the Main Street Recreation Complex provide alternatives that could accomplish the goals of the planning program at the Main Street Parcel.

3.3 Main Street Parcel – Passive Recreation Components

Along the southern property line of the parcel lies an upland area, of which approximately seven (7) acres exists outside of all wetland and buffer zones. Because of the significant amount of trails existing along this portion of the property today, and because this area of the parcel is narrow and not ideal for the development of multi-purpose fields, passive recreation opportunities are proposed here.

The passive recreation area is accessed via a driveway that intersects the Main Street Recreation Complex's driveway. The driveway leads to a parking area sized to accommodate fifty (50) patrons. From the parking area, visitors have access to the corridor parkway, dog parks, gardening plots and trail network, all of which are discussed in additional detail below.

Multi-Use Trails. The most compelling need resulting from the community-wide Needs Assessment Survey was determined to be additional walking, biking, running, jogging and multi-purpose trails. Based on this need, the passive recreation area is proposed to include a series of trails, including a one (1) mile long cross country loop, marked walking paths and cross-country biking trails.

The main multi-use trail is proposed to begin in the open space of the corridor parkway, adjacent to the proposed parking lot. After a short distance, the trail will tie into an existing gravel path, which is proposed to be paved, and follow the path for approximately 800'. The trail continues along the western portion of the parcel, looping around an existing hill that provides approximately fifteen feet (15') in elevation change. The trail is proposed, at twelve feet (12') wide, to accommodate running, walking and biking in each direction and is intended to provide marked trail distances, as well as seating areas along the path. The trail is primarily flat, with a few areas of mild slopes. The path loops back around the passive recreation area and totals one (1) mile upon its return to the corridor parkway at the parking lot.

In addition to the multi-use trail in the southern portion of the parcel, a connector trail is proposed to be constructed across the wetlands to connect the southern and northern areas of the parcel. The trail is proposed as an eight-foot (8') wide gravel path for cross-country running, walking and biking, and as an access point between the active and passive recreation areas. The trail would require permitting to allow its construction through the wetlands, for a length of approximately 530'.

Dog Park. A dog park of just under one (1) acre in size is proposed within the Passive Recreation Area. The park is divided into two (2) areas, one (1) for large dogs and one (1) for small dogs. The park is enclosed with six-foot (6') perimeter fencing and includes landscaping trees, rocks and shrubs and is proposed to be surfaced with three-quarter inch (3/4") crushed stone. The park is accessible via the driveway and parking lot in the passive recreation area and also by the trail system connecting the active and passive recreation areas.

Gardening Plots. In an effort to provide recreational opportunities for all age groups and recreational interests, a community gardening plot is proposed. The proposed area is approximately 7,300 square feet and contains 48 plots of approximately 120 square feet each, as well as walking paths between them. The gardening area is enclosed with four-foot (4') chain link fencing.

Open Space / Picnic Areas. Through the center of the passive recreation area, a corridor parkway is proposed to provide some open space areas ideal for walking, sitting or having picnics. The treeline would be opened up to provide open space where benches, paved walkways and landscaping are proposed. The area of the park is just over an acre and is situated between the multi-use trail loop, providing access to the trail at several points in the park.

The passive recreation area is intended to provide a variety of recreation opportunities outside of the active recreation programming proposed in the northern portion of the complex. With adequate parking, lighting, multi-purpose trails and open space, the southern portion of the facility will accommodate those passive recreation needs ascertained from the community-wide survey.

3.4 Grading and Drainage

The active recreation site will be primarily composed of natural and synthetic turf fields, hard court space, pedestrian walkways, parking lots and landscaping. As compared to the existing site, which contains varying topography ranging from one to thirty percent (1% - 30%) slopes, the proposed grade will be generally flat.

Natural turf fields are proposed to be crowned and sloped at a 1.5% – 2% slope, synthetic turf fields at 0.5%, and hard court spaces ranging between 0.5 and 1% percent slopes. The parking lots are proposed to be sloped between 1.5% and 2%. Other than the proposed drainage areas, including bio-retention and detention basins, the proposed limits of work will be generally flat.

The active and passive recreation sites will require a significant amount of earthwork to achieve the proposed grades for the athletic fields and parking lots, primarily consisting of excavation and earthwork cuts. There are several drumlins, as well as gradually sloping topography, located throughout the property where the recreation complex is proposed. Gale performed a cut/fill analysis to determine the extent of earthwork required to achieve proposed grades at the recreation areas, excluding the earthwork associated with the access roadway. The result of the analysis is a net cut of approximately 34,300 cubic yards. As will be discussed in a later section, an earthwork analysis on the access roadway was also completed, resulting in a net fill. Based on the results of the test pits and the NRCS soil information, the excavated materials will likely be suitable for use as common fill for the proposed roadway. Refer to Section 4 for additional information related to the cut/fill analysis of the proposed access roadway.

The drainage system for the recreation complex will include subsurface drainage for each of the multi-purpose fields, as well as bio-retention areas, subsurface detention chambers, detention ponds, conveyance structures and pipes to mitigate peak flows and meet State Stormwater Standards. The proposed synthetic turf fields will mainly drain vertically through the infill surface and the openly graded crushed stone drainage layer. Stormwater will infiltrate into the subgrade material beneath the stone base and provide recharge to groundwater. The stormwater that does not infiltrate will be transported by flat panel drains to perforated collector pipes located in stone trenches at the sidelines, further promoting groundwater recharge. Water from the collector pipes will be released at a controlled rate into the proposed drainage system. The synthetic turf fields provide a significant amount of groundwater recharge and peak flow attenuation, assisting to offset the potential stormwater impacts created by the proposed impervious areas.

The natural turf fields will consist of a sand-based, engineered root zone to allow stormwater to infiltrate and reach a four inch (4") drainage layer, consisting of crushed stone, beneath the fields. Stormwater that does not infiltrate will be transported through the proposed drainage system, to the proposed bio-retention and/or detention ponds, which will release stormwater to the wetlands at a controlled rate.

The larger parking facilities will facilitate drainage through subsurface detention chambers and bio-retention areas for treatment to meet Stormwater Standards for water quality and peak rate attenuations. Water quality and treatment of new impervious runoff will be achieved through vegetated filter strips, deep-sump hooded catch basin structures and bio-retention areas.

All runoff from the site will be contained, treated and released at a controlled rate to the existing wetlands to attenuate peak flows. All Massachusetts Stormwater Standards will be required to be met upon development of the parcel.

3.5 Utilities

As described in a previous section, existing utilities accessible from within the parcel are limited. Provisions for electric, water, sanitary and gas services will be required upon development of the parcel. As the site development is essentially isolated within the northern portion of the parcel, utility services will be installed concurrently with the roadway construction.

3.5.1 Electric

Gale consulted with Verne G. Norman Associates, Inc. (VGNA) to determine the requirements for electric service to the Recreation Complex for athletic field lighting, site lighting and service to the proposed amenities building. Refer to Enclosure 10 for information on the recommendations by VGNA. A summary of the required electrical service is provided below.

Electrical service would be provided by the Reading Electric Light Company. Single phase power is currently available on Main Street, at the location of the proposed complex entrance. Three phase power would not be readily available at the proposed facility entrance, but is located approximately 0.67 miles southwest of the site, on Main Street, adjacent to the Sagamore Golf Course. Musco Lighting has confirmed that single phase lighting will be sufficient to power the sports lighting, as the three phase power would be a substantial cost, given the existing service location. The anticipated electrical load includes 5.0 kilowatts (KW) for roadway lighting, 5.0 KW for parking lighting, 150 KW for sports lighting, and 25 KW for the concessions building, for a total electrical load of 185 KW. The site secondary electrical service would be 120/240 volt single phase, three wires, rated at 1000 amperes.

It is recommended that LED lighting for the roadway and parking lighting be considered to reduce the operating and maintenance costs.

3.5.2 Water

Potable water service is not currently provided to the parcel. The proposed development would require water for irrigation and potable water service to the amenities building. The LWD operates a pumping station, adjacent to Elm Street in North Reading, which is located approximately one half (1/2) mile from the proposed development. Gale understands that the LWD owns a series of drilled wells located throughout portions of the LWD parcel. Water service to the proposed development will likely require drilled wells for irrigation and potable water, estimated to cost approximately \$14,000 - \$20,000 for each well and pump. The cost of construction will vary, depending on drilling depths and geology. The Town currently operates drilled wells at nearly every field location and effectively runs irrigation from

these wells. Maintenance of the irrigation system and wells will be the responsibility of the DPW.

3.5.3 Sanitary Sewer

The Town does not currently have a town-wide sanitary sewer system. Therefore, a septic system compliant with Title 5 regulations will be required to treat wastewater from the amenities building. In the majority of areas where test pits were conducted, the separation from groundwater and classification of the subsurface and parent materials will likely be suitable for the installation of a traditional septic system, including a septic tank, gravity distribution system and soil absorption system (SAS) or leaching field. Prior to the design of the septic system, a series of test pits will be required to confirm material classifications and depth to groundwater.

3.5.4 Natural Gas

Natural gas service is not currently provided to the site. Development of an amenities building will require gas service, unless the Town chooses to operate the building seasonally. Residents and businesses in the Town currently obtain natural gas service from National Grid. It is assumed that a natural gas main is currently installed on Main Street, as several adjacent residential homes and commercial buildings on Main Street are provided with natural gas service. The service will be required extended from Main Street, an approximate distance of 1900 linear feet from the proposed development. The gas line will be installed by National Grid and such work will be performed concurrently with the construction of the access roadway.

SECTION 4.0 - DETAILED DESIGN – ACCESS ROADWAY

In addition to developing a schematic design of the recreation complex, Gale was tasked with designing a roadway to provide access from Main Street to the development. The Town does not own property with frontage on Main Street. However, an adjacent undeveloped parcel owned by Bostik does have frontage on Main Street. Because the Town does not own the property that has frontage on Main Street, an Access Agreement is being drafted to provide the Town with permission to construct and use a roadway on the property owned by Bostik. The following is a discussion of the proposed roadway design. Refer to Enclosure 7 for associated plans.

4.1 Layout

Because of the extensive amount of wetlands and associated buffer zones existing within the parcel, options for the layout of the roadway are limited. The road is proposed as a twenty-six foot (26') wide bituminous concrete roadway, as required by the *Rules and Regulations of the Planning Board Governing the Subdivision of Land in Lynnfield, Massachusetts* (Subdivision Regulations). The cross section of the roadway includes a twelve inch (12") compacted, processed gravel subbase, a two and one half inch (2 1/2") bituminous concrete pavement binder course, and a one and one half inch (1 1/2") bituminous concrete pavement top course. The road is proposed to include a Cape Cod berm along both edges of pavement, as well as a 5-foot (5') wide bituminous concrete sidewalk on its eastern side.

The roadway starts at a proposed curb cut opening in Main Street and enters the Bostik parcel known as Map 9, Lot 192, in a primarily straight and northerly direction, with a 100' radius beginning approximately 60' from the entrance on Main Street. The road continues onto the Bostik parcel, recorded as Map 5, Lot 1584, where it bends at a 136 degree radius, in a westerly direction, until it reaches the LWD parcel. Due to the extensive limits of the wetland and associated buffer zones, a wetland crossing is required where the Bostik parcel meets the LWD parcel. The road continues along the eastern property line of the LWD parcel for approximately 280', until it turns west with a 100' radius. A second wetland crossing is proposed, where the road meets the site of the active recreation development. The total length of the roadway is approximately 1,825 feet (1,825') and contains a sidewalk, two (2) wetland crossings, two (2) retaining walls and site lighting. Disturbance of these areas will require wetland replication, typically at an area ratio of 2:1 (Replication Area: Disturbed Area). The retaining walls and utilities will be discussed in later sections of this report.

4.2 Grading and Drainage

The existing topography through the Bostik parcels, where the roadway is proposed to begin, is sloped at an approximate 9% slope, with the high point at Main Street and the grades decreasing in the northerly direction. This condition occurs through both Bostik properties within which the road is proposed. Through the LWD combined parcel, the slopes flatten out to between 2% and 6% and couple of small hills and valleys exist within the parcel.

The grading of the roadway is proposed to begin with the leveling of an area of approximately seventy feet (70') in length and sloped at 1.5%. The Subdivision Regulations require that the leveling of an area of at least twenty-five feet (25') in length be provided. The grade of the proposed roadway continues at a 7.5% downward slope, through the Bostik properties, complying with the requirement for a maximum slope of 9% based on the Subdivision Regulations. The slope decreases to 6% and then to 1.35% through the LWD property, where it meets the active

recreation complex. Although a 9% slope is allowed within the Town Subdivision Regulations, Gale does not recommend slopes greater than 7.5%. A slope of 6% would be ideal to achieve appropriate safety and queuing conditions.

Due to the two (2) required wetland crossings, retaining walls are proposed along the edges of roadway to limit the impact on the wetland. The larger of the two (2) retaining walls, at approximately 400' in length and eighteen feet (18') at its maximum height, is located between Station 5+00 and 9+00, along the eastern side of the road. The smaller retaining wall, along the west side of the roadway, is approximately 150' in length and fifteen feet (15') at its maximum height.

Drainage of the roadway is proposed to be achieved through a pipe network consisting of precast concrete catch basins, manholes and reinforced concrete pipe. The drainage systems will outfall to a proposed detention basin, sized to attenuate peak flows during the 2-, 10-, and 100-year storms.

The drainage system proposed within the roadway is primarily through catch basins and conveyance structures. Two (2) detention basins are proposed for stormwater collection, water quality and peak rate attenuation, prior to releasing to the existing wetlands. The first detention basin (DB-1) will be located approximately at roadway station 13+00 and will service the first 1300' of the roadway. DB-1 has been preliminarily sized for the 100-year storm event, at approximately 17,000 cubic feet in volume. An overflow spillway will be provided toward the adjacent wetlands. The other detention basin (DB-2) will be located where the roadway meets the recreation complex at station 18+00, and will service the final 550' of the roadway. DB-2 will be approximately 12,000 cubic feet in volume, preliminarily sized to accommodate the 100-year storm.

4.3 Earthwork

Construction of the access roadway will require a significant amount of earthwork to achieve the leveling area and slopes described in the previous section and to be consistent with the Subdivision Regulations. Based on the earthwork volume calculations between the existing grade and the proposed roadway grade, an estimated 28,700 cubic yards of fill is required to achieve the proposed grades. If the Town were relying on the import of offsite materials, this would equate to a cost of nearly \$350,000. However, the active and passive recreation sites will also require a significant amount of earthwork to achieve proposed grades for the parking lots and athletic fields, primarily consisting of excavation and earthwork cuts. There are several drumlins or hills located throughout the property where the recreation complex is proposed. Based on test pits performed throughout the site, the materials within six to eight feet (6'-8') of existing grade appear to be sandy, well-draining material and will likely be suitable for use as common fill. The proposed recreation complex site was graded schematically, with the intent to achieve a balanced site. The final cut/fill analysis of the site, including the recreation areas and the roadway areas, results in a net cut of 5,600 cubic yards,

resulting in excess material. Therefore, it is recommended that, prior to the start of construction of the access roadway, the recreation areas be brought to the proposed subgrade to allow the Town to use the excavated material from the recreation sites for fill beneath the proposed roadway. This will require significant tree clearing, erosion control and stabilization measures. During construction, the excavated materials will be tested and approved as suitable fill for the subgrade of the roadway prior to installation.

4.4 Utilities

As described in previous sections, no utility services are currently provided to the undeveloped LWD parcel. As discussed, electric service, natural gas and storm drainage utilities will be installed during construction of the roadway. In addition, the utility requirements for athletic lighting, irrigation and potable water, and the amenities building, roadway and sidewalk will be required to contain site lighting. Single phase electric service is proposed to be provided for the site lighting requirements. Refer to Section 3.5 for additional information on utility provisions for the proposed development.

4.5 Traffic Impact Assessment

A Traffic Impact Assessment was conducted by Vanasse & Associates, Inc. (VAI) for Main Street to determine potential traffic impacts caused by the Main Street Recreation Complex access drive and parking areas. Refer to Enclosure 8 for the full Traffic Assessment Report. It was determined that the proposed facility will create an additional 934 vehicle trips on the average weekday and 294 vehicle trips on weekends and weekday afternoons. It is estimated that these additional trips will create a minimal delay of fifteen (15) seconds or less, with vehicle queuing of zero to one (0-1) cars at the intersection of the proposed driveway and Main Street during peak operation hours. Using a traffic analysis software, and the 2018 build conditions, it was determined that the proposed facility would operate under a "B" Grade Level of Service for normal field utilization. It is recommended that a plan be created with the Lynnfield Police Department for any tournament or special event uses where traffic conditions may require a police traffic detail.

A parking assessment for the facility was conducted during the study to determine the minimum required parking demand. Parking demand calculations were conducted in accordance with the Institution of Traffic Engineers (ITE) land use code for the average 85th percentile parking demands of soccer fields at similar facilities. Based on the 85th percentile, an average of 60.5 parking spaces is required per field, with a total of five (5) fields assumed (including tennis and basketball). The calculated 85th percentile peak parking demand, assuming all five fields are in use simultaneously for the weekday/afternoon period, is 302 spots and 326 spots for the Saturday mid-day peak period. The proposed facility includes 339 total parking spots, which exceeds the maximum 85th percentile requirement of 326 spots.

The proposed access road for the facility was analyzed for sight line safety at the intersection of Main Street and for the safety and size of the proposed roadway. An average vehicle speed study was conducted on Main Street for both northbound and southbound traffic. The current posted speed limit for northbound and southbound traffic is 25 miles per hour (mph) and 35 mph, respectively. The 85th percentile actual vehicular speed for northbound and southbound traffic is 39 mph and 42 mph, respectively. The 85th percentile travel speed is used for sight line minimums for safety purposes. Based on a speed of 45 mph, the driveway access road would require a 360 foot (360') sight line for both northbound and southbound traffic. The sight lines at the proposed curb cut were measured to be 360 feet (360') for northbound traffic and 650 feet (650') for southbound traffic. The proposed sightlines both meet or exceed the minimum required for vehicular travel at 45 mph. For safe travel to and from the facility at Main Street, it is recommended that the access drive be a minimum of twenty-four feet (24') in width, with a leveling area not to exceed 2% in grade, with a minimum distance of 100 feet. These recommendations have been met.

SECTION 5.0 - PERMITTING IMPLICATIONS

The Main Street Recreation Complex will require permitting through the Lynnfield Board of Appeals and Conservation Commission. A summary of the authorities having jurisdiction is tabulated below. A discussion on the permitting follows.

Lynnfield Zoning Board of Appeals		
Site Plan Approval		Town of Lynnfield Zoning Bylaws require that Site Plan Approval be submitted and approved by the Zoning Board of Appeals for uses that do not conform to permitted uses. While public recreational use is permitted within Single Residence District D, it is anticipated that Site Plan Approval will be required due to the size of the project, parking requirements and proposed change in use.
Conservation Commission		
No-Disturb Zone	25'	There shall be a No-Disturb Zone with a minimum depth of twenty-five (25) feet measured horizontally from the border of the Resource Area. Vegetation in the No-Disturb Zone shall not be cut or trimmed in any manner. Prohibited activities within the No-Disturb Zone include grading, landscaping, planting, harvesting, mowing, clearing, cutting, trimming, filling, depositing, composting, excavating, construction, fencing, and installation of roads, driveways and walkways.

No-Build Zone	50'	There shall be a No-Build Zone with a minimum depth of fifty (50) feet measured horizontally from the border of the Resource Area. Prohibited activities within the No-Build Zone include, but are not limited to, construction of any structure, installation of any impervious surface and any work requiring a building permit.
Massachusetts Department of Environmental Protection (MA DEP)		
Buffer Zone	100'	Any activity other than minor activities identified in 310 CMR 10.02(2)(b)1., proposed or undertaken within 100 feet of an area specified in 310 CMR 10.02(1)(a), which will alter an Area Subject to Protection, is subject to regulation and requires the filing of a Notice of Intent. Minor Activities: unpaved pedestrian walkways for private use, fencing, pruning, planting of native trees, etc.
Ipswich River Watershed Association (IRWA)		
Ipswich River Watershed Association (IRWA)		IRWA's policy and advocacy efforts focus on ensuring that state water policies, water withdrawal permits and regulatory decisions are protective of ecosystem health and include prudent water conservation measures. IRWA also comments on proposed projects that have a significant potential to impact the Ipswich River.

5.1 Zoning Board of Appeals / Planning Board

Submission for an application for Site Plan Approval will likely be required, although the regulations are somewhat vague regarding what triggers submission of a Site Plan Approval Application. However, typical projects of this size that impact traffic, use, stormwater, parking, etc. require filing with the Planning Board and/or Zoning Board of Appeals. We recommend that an informal pre-application meeting be scheduled with the Planning Board and/or Zoning Board of Appeals to determine what the requirements will be in regards to their jurisdiction over the project.

5.2 Conservation Commission / MA DEP

Due to the extensive amount of bordering vegetated wetlands and the associated 25', 50' and 100' buffers, filing of a Notice of Intent (NOI) with the Conservation Commission will certainly be required. There are also two (2) resource areas, the Ipswich River and the Mills Brook, which have a 200' Riverfront Protection Buffer associated with them. In addition to the work that is proposed within the 100' buffer that will require filing of an NOI, the design proposes to create wetland crossings, which requires filling a portion of the wetlands. This activity certainly requires filing of an NOI with the Conservation Commission and the Massachusetts Department of Environmental Protection (MADEP).

Prior to filing a NOI, an Abbreviated Notice of Resource Area Delineation (ANRAD) is required to be submitted to the Conservation Commission to provide the Commission with data regarding the wetland delineation process that was followed in the delineation of the wetlands. The Commission reviews the information, hires a third-party reviewer to review the delineation and holds hearings to determine if the delineation will be accepted for a period of three (3) years or if changes need to be made to the wetland delineation prior to its acceptance and approval.

Gale submitted an ANRAD and presented the information at the initial public hearing, in front of the Conservation Commission, on December 11, 2012. The Fields Committee has since decided to postpone the ANRAD process until a decision is made whether or not development of the parcel will be pursued. This was done in an effort to save money required for the fee for the third-party reviewer, if in the event this project does not go forward. Please refer to Enclosure 5 for the ANRAD application.

5.3 Ipswich River Watershed Association (IRWA)

The Ipswich River is located in the northeast corner of the parcel. Associated with the river is a 200' Riverfront Protection Buffer. Although the proposed design is not within this buffer zone, which is under the jurisdiction of the MADEP, we recommend that a meeting be held with the IRWA to determine if there is any jurisdiction over the project and its components. It is likely that, although the IRWA advocates for the protected rivershed, the authorities having jurisdiction are the MADEP and the Lynnfield Conservation Commission. An informal meeting with the IRWA will be scheduled to provide an overview of the project and allow the IRWA to provide any feedback or comments that may affect the development.

SECTION 6 - ESTIMATED COSTS OF CONSTRUCTION

A schematic level cost estimate was created for both Option 1 and Option 2 of the Main Street Recreation Parcel. Both cost estimates have been broken down into sections for the active recreation areas, passive recreation areas and construction of the access roadway. Because the cost estimates are schematic, they are subject to change with the evaluation design, development and construction.

Option 1 is estimated to cost \$6,189,000, including the active recreation area, the passive recreation area and the access roadway. The active recreation area for Option 1, which includes a synthetic turf field with lights, two (2) natural turf fields, one (1) basketball court, an amenities building, one (1) playground with two (2) play areas, three (3) parking lots, access drives and landscaping across the entire area, would cost approximately \$4,050,000. The passive recreation area, which includes a trail network, a dog park, an

open space and an access drive, would cost approximately \$764,000. The main access drive to the facility would cost approximately \$1,375,000. The access drive is such a significant cost of the project due to the length of the road (1850'), the amount of earthwork required, wetland crossings, retaining walls and utility runs. While earthwork is a significant portion of the cost, a savings is provided through use of fill materials from the recreation site.

Option 2 is estimated at approximately \$6,675,220, including the active recreation area, the passive recreation area and the access roadway. The active recreation area for Option 2, which includes two (2) synthetic turf fields with lights, one (1) natural turf field, one (1) basketball court, an amenities building, one (1) playground with two (2) play areas, three (3) parking lots, access drives and landscaping across the entire area, would cost approximately \$4,537,000. Identical to Option 1, the passive recreation area, which includes a trail network, a dog park, parking and an access drive, would cost approximately \$764,000 and the main access roadway would cost approximately \$1,375,000.

Refer to Enclosure 9 for detailed schematic cost estimates of the proposed Recreation Complex.

SECTION 7 - CONCLUSIONS AND RECOMMENDATIONS

The LWD parcels located off Main Street in Lynnfield, MA consist of approximately 98.5 acres of forested land, with well-draining sandy soils, varying topography, moderate depths to groundwater and an extensive amount of wetland resource areas. With the exception of the substantial amount of wetland areas and the lack of right-of-way frontage, the site is essentially ideal for development of a recreation complex. However, the extensive resource areas and the earthwork, wetland crossings and area associated with the proposed access roadway from Main Street, may make this development cost prohibitive for the Town.

The area of development proposed for the recreation complex affords the Town an opportunity to develop several new MPR fields, hard court space, a seasonal skating area, an extensive trail network, gardening plots, open space and a dog park to accommodate the recreational needs of the Town. Based on the results of the Master Plan, this would be the ideal development to meet the Town's needs relating to recreational demand.

Gale recommends that if the Town is not able to pursue development of the Main Street Recreation Complex, whether due to access, wetland resource areas and/or associated costs, an alternative location should be researched for development of a recreation complex to achieve the components of the planning program proposed at the Main Street Complex. The Master Plan provides details of the recreational demands, needs assessment survey results and proposed developments. While the Main Street Recreational Complex may not be feasible for development at the LWD Main Street Parcel, a feasibility study should be completed at an alternative location.

Enclosure 1
Existing Conditions Plan

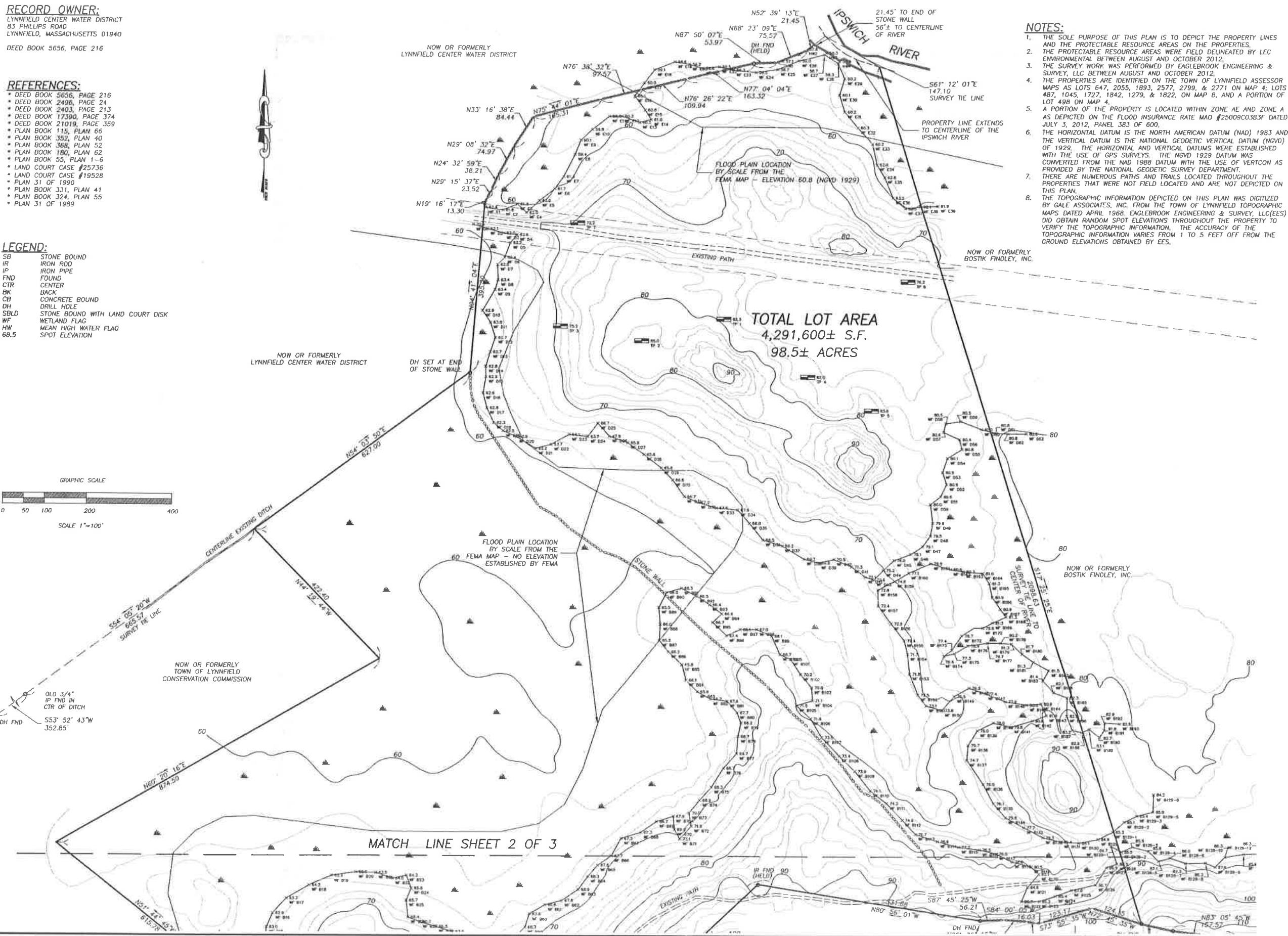
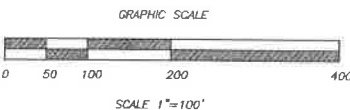
RECORD OWNER:
LYNNFIELD CENTER WATER DISTRICT
83 PHILLIPS ROAD
LYNNFIELD, MASSACHUSETTS 01940
DEED BOOK 5656, PAGE 216

REFERENCES:

- DEED BOOK 5656, PAGE 216
- DEED BOOK 2496, PAGE 24
- DEED BOOK 2403, PAGE 213
- DEED BOOK 17390, PAGE 374
- DEED BOOK 21019, PAGE 359
- PLAN BOOK 115, PLAN 66
- PLAN BOOK 352, PLAN 40
- PLAN BOOK 368, PLAN 52
- PLAN BOOK 180, PLAN 62
- PLAN BOOK 55, PLAN 1-6
- LAND COURT CASE #25736
- LAND COURT CASE #19528
- PLAN 31 OF 1990
- PLAN BOOK 331, PLAN 41
- PLAN BOOK 324, PLAN 55
- PLAN 31 OF 1989

LEGEND:

- SB STONE BOUND
- IR IRON ROD
- IP IRON PIPE
- FND FOUND
- CTR CENTER
- SK BACK
- CB CONCRETE BOUND
- DH DRILL HOLE
- SBLD STONE BOUND WITH LAND COURT DISK
- WF WETLAND FLAG
- HW MEAN HIGH WATER FLAG
- 68.5 SPOT ELEVATION



NOTES:

1. THE SOLE PURPOSE OF THIS PLAN IS TO DEPICT THE PROPERTY LINES AND THE PROTECTABLE RESOURCE AREAS ON THE PROPERTIES.
2. THE PROTECTABLE RESOURCE AREAS WERE FIELD DELINEATED BY LEC ENVIRONMENTAL BETWEEN AUGUST AND OCTOBER 2012.
3. THE SURVEY WORK WAS PERFORMED BY EAGLEBROOK ENGINEERING & SURVEY, LLC BETWEEN AUGUST AND OCTOBER 2012.
4. THE PROPERTIES ARE IDENTIFIED ON THE TOWN OF LYNNFIELD ASSESSOR MAPS AS LOTS 647, 2055, 1893, 2577, 2799, & 2771 ON MAP 4; LOTS 487, 1045, 1727, 1842, 1279, & 1822, ON MAP B, AND A PORTION OF LOT 498 ON MAP 4.
5. A PORTION OF THE PROPERTY IS LOCATED WITHIN ZONE AE AND ZONE A AS DEPICTED ON THE FLOOD INSURANCE RATE MAO #25009C0383F DATED JULY 3, 2012, PANEL 383 OF 600.
6. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM (NAD) 1983 AND THE VERTICAL DATUM IS THE NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF 1929. THE HORIZONTAL AND VERTICAL DATUMS WERE ESTABLISHED WITH THE USE OF GPS SURVEYS. THE NGVD 1929 DATUM WAS CONVERTED FROM THE NAD 1983 DATUM WITH THE USE OF VERTCON AS PROVIDED BY THE NATIONAL GEODETIC SURVEY DEPARTMENT.
7. THERE ARE NUMEROUS PATHS AND TRAILS LOCATED THROUGHOUT THE PROPERTIES THAT WERE NOT FIELD LOCATED AND ARE NOT DEPICTED ON THIS PLAN.
8. THE TOPOGRAPHIC INFORMATION DEPICTED ON THIS PLAN WAS DIGITIZED BY GALE ASSOCIATES, INC. FROM THE TOWN OF LYNNFIELD TOPOGRAPHIC MAPS DATED APRIL 1968. EAGLEBROOK ENGINEERING & SURVEY, LLC(EES) DID OBTAIN RANDOM SPOT ELEVATIONS THROUGHOUT THE PROPERTY TO VERIFY THE TOPOGRAPHIC INFORMATION. THE ACCURACY OF THE TOPOGRAPHIC INFORMATION VARIES FROM 1 TO 5 FEET OFF FROM THE GROUND ELEVATIONS OBTAINED BY EES.



EAGLEBROOK

EAGLEBROOK ENGINEERING
& SURVEY, LLC

491 MAPLE STREET, SUITE 304
DANVERS, MASS. 01923
TEL: (978) 777-0494

LYNNFIELD RECREATION PARK
LOCATED IN
LYNNFIELD, MASSACHUSETTS
PREPARED FOR
GALE ASSOCIATES, INC.
163 LIBBEY PARKWAY
WEYMOUTH, MA.

STAMP:



DATE:

OCTOBER 10, 2012

REVISIONS:

NO.	DATE:	DESCRIPTION:
1	10/25/12	ADD TEST PITS, TOPO, AND WETLAND FLAGS

DRAWN BY: MJJ

CHECKED BY: KCK

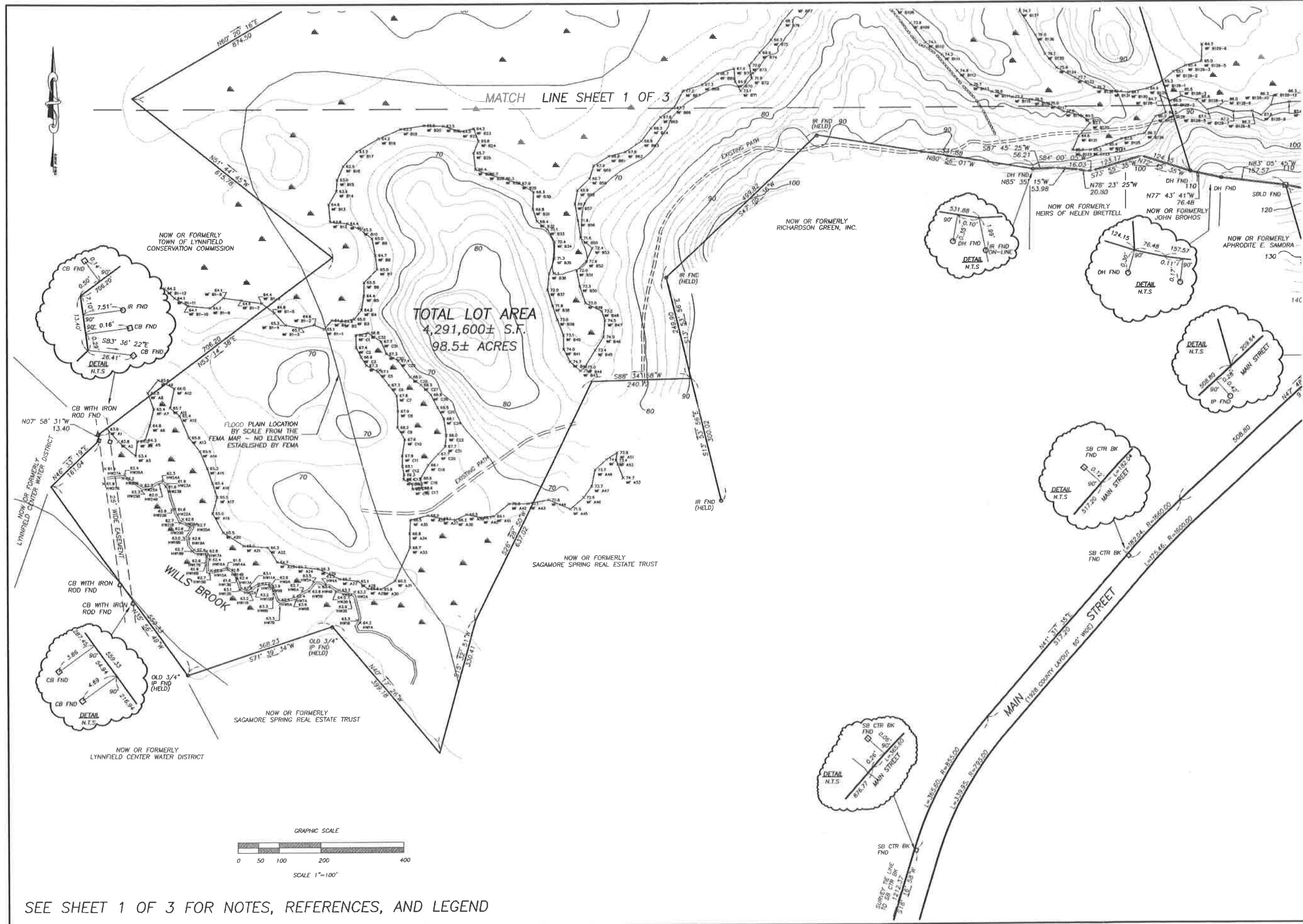
SCALE: AS NOTED

PROJECT NO. 12-016

TITLE:

SURVEY
PLAN
S-1

SHEET No. 1 OF 3



EAGLEBROOK

EAGLEBROOK ENGINEERING
& SURVEY, LLC

491 MAPLE STREET, SUITE 304
DANVERS, MASS. 01923
TEL: (978) 777-0494

LYNNFIELD RECREATION PARK
LOCATED IN
LYNNFIELD, MASSACHUSETTS
PREPARED FOR
GALE ASSOCIATES, INC.
163 LIBBEY PARKWAY
WEYMOUTH, MA.

STAMP:



DATE:

OCTOBER 10, 2012

REVISIONS:

NO.	DESCRIPTION	DATE
1	ADD TEST PITS, TOPO, AND WETLAND FLAGS	10/25/12

DRAWN BY: MJJ

CHECKED BY: KCK

SCALE: AS NOTED

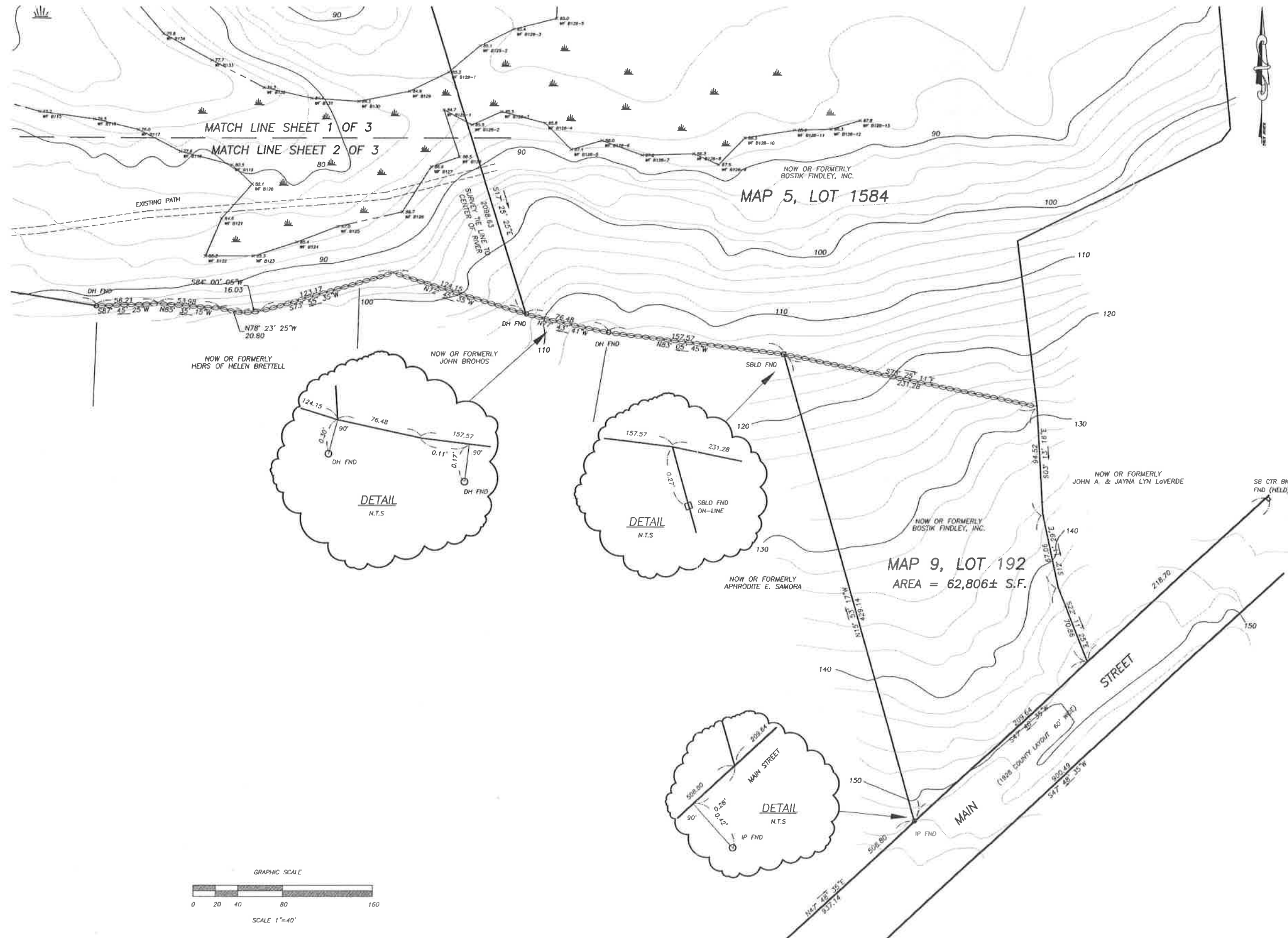
PROJECT NO. 12-016

TITLE:

**SURVEY
PLAN**

S-2

SHEET No. 2 OF 3



EAGLEBROOK

EAGLEBROOK ENGINEERING
& SURVEY, LLC

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TEL: (978) 777-0494

LYNNFIELD RECREATION PARK
LOCATED IN
LYNNFIELD, MASSACHUSETTS
PREPARED FOR
GALE ASSOCIATES, INC.
163 LIBBEY PARKWAY
WEYMOUTH, MA.

STAMP:



DATE:
OCTOBER 10, 2012

REVISIONS:

NO.	DESCRIPTION	DATE
1	ADD TEST PITS, TOPO, AND WETLAND FLAGS	10/25/12

DRAWN BY: MJJ
CHECKED BY: KCK
SCALE: AS NOTED

PROJECT NO. 12-016

TITLE:
**SURVEY
PLAN**
S-3

SHEET No. 3 OF 3

SEE SHEET 1 OF 3 FOR NOTES, REFERENCES, AND LEGEND

Enclosure 2
NRCS Web Soil Survey

Soil Map—Essex County, Massachusetts, Southern Part; and Middlesex County, Massachusetts



MAP LEGEND

Area of Interest (AOI)		
Area of Interest (AOI)		
Soils		
Soil Map Units		
Special Point Features		
Blowout		Very Stony Spot
Borrow Pit		Wet Spot
Clay Spot		Other
Closed Depression		
Gravel Pit		
Gravelly Spot		
Landfill		
Lava Flow		
Marsh or swamp		
Mine or Quarry		
Miscellaneous Water		
Perennial Water		
Rock Outcrop		
Saline Spot		
Sandy Spot		
Severely Eroded Spot		
Sinkhole		
Slide or Slip		
Sodic Spot		
Spoil Area		
Stony Spot		
Special Line Features		
Gully		
Short Steep Slope		
Other		
Political Features		
Cities		
Water Features		
Streams and Canals		
Transportation		
Rails		
Interstate Highways		
US Routes		
Major Roads		
Local Roads		

MAP INFORMATION

Map Scale: 1:7,350 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,840 to 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Essex County, Massachusetts, Southern Part
Survey Area Data: Version 9, Feb 26, 2010

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 12, Feb 26, 2010

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 7/7/2003

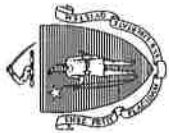
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Essex County, Massachusetts, Southern Part (MA606)			
Map Unit Symbol	Map Unit Name	Acres In AOI	Percent of AOI
1	Water	1.0	0.5%
32A	Wareham loamy sand, 0 to 3 percent slopes	1.0	0.5%
43A	Scarboro mucky loamy fine sand, 0 to 1 percent slopes	17.4	9.4%
53A	Freetown muck, ponded, 0 to 1 percent slopes	6.2	3.3%
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	3.2	1.7%
73A	Whitman loam, 0 to 3 percent slopes, extremely stony	17.2	9.3%
255B	Windsor loamy sand, 3 to 8 percent slopes	23.1	12.5%
301C	Montauk fine sandy loam, 8 to 15 percent slopes, very stony	24.1	13.0%
306B	Paxton fine sandy loam, 3 to 8 percent slopes, very stony	5.5	2.9%
306C	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	1.0	0.5%
306D	Paxton fine sandy loam, 15 to 25 percent slopes, very stony	9.1	4.9%
311B	Woodbridge fine sandy loam, 3 to 8 percent slopes, very stony	32.7	17.6%
323B	Poquonock loamy sand, 3 to 8 percent slopes, very stony	17.7	9.5%
323C	Poquonock loamy sand, 8 to 15 percent slopes, very stony	14.3	7.7%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	11.4	6.1%
616A	Fluvaquents, frequently flooded, 0 to 3 percent slopes	0.1	0.0%
Subtotals for Soil Survey Area		184.9	99.7%
Totals for Area of Interest		185.5	100.0%

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	Map Unit Name	Acres In AOI	Percent of AOI
1	Water	0.3	0.1%
36A	Saco mucky silt loam, 0 to 1 percent slopes	0.3	0.2%
Subtotals for Soil Survey Area		0.6	0.3%
Totals for Area of Interest		185.5	100.0%

Enclosure 3
Geotechnical Test Pit Logs



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number:

1 (Refer to Existing Conditions)

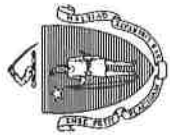
Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3-0	0	10yr3/1	-	-	-	loam	-	-	blocky	friable	
0-6	Bw1	10yr5/8	-	-	-	sandy loam	-	-	gr	fr/loose	
6-18	Bw2	10yr5/8	-	-	-	med sand	-	20%	-	loose	
18-30	Bw3(BC)	10yr4/6	-	-	-	fine sand	-	10%	-	loose	
30-96	C1	10yr6/4	-	-	-	fine sand	-	25%	-	loose	

Additional Notes:

No standing water, weeping, or redox

Large rocks 18"-30" between B₁ and C₁

Dense rock deposits at 8' depth



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number:

2 (Refer to Existing Conditions Plan)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
3-0	0	10yr3/1	-	-	-	loamy	-	10%	gr	friable	
0-7	Bw1	10yr5/6	-	-	-	loamy sand	-	20%	blocky/gr	friable	
7-25	Bw2	10yr6/4	-	-	-	fine-med sand	-	25%	dense in place	firm	
25-84	C1	10yr6/3	-	-	-	fine sand	-	25%	dense in place	firm	

Additional Notes:

Very bony, dense → backhoe refusal @ 7'

No redox, standing water, or weeping

Bw₁ - C₁: loose in hand, firm in place



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number:

3 (Refer to Existing Conditions Plan)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8	0	10yr3/1	-	-	-	loam	-	-	gr	fr/loose	
8-20	Bw1	10yr6/6	-	-	-	loamy sand	-	10%	blocky/gr	loose	
20-30	Bw2	10yr6/4	-	-	-	fine sand	-	20-30%	boney/ dense	firm	
30-	Cd	10yr7/4	-	-	-	fine sand	-	-	dense	loose	

Additional Notes:

Very cobbles, large stones, compact glacial fill

No groundwater, redox, or weeping

2 boulders > 1 cy at bottom



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number:

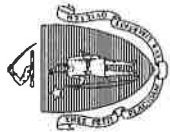
4 (Refer to Existing Conditions Plan)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	0	10yr3/2	-	-	-	sandy loam	-	-	gr	fr	
10-28	Bw1	10yr5/8	-	-	-	loams sand	-	-	single grain	loose	
28-75	Bw2	10yr7/2	-	-	-	fine sand	-	0-5%	firm	loose	
75-102	Cd	10yr6/2	-	-	-	fine-med sand	-	5-10%	firm	loose	

Additional Notes:

No ledge observed, but very dense, boney, + rocky makes excavation difficult. Clear distinction bt Bw₂ + Cd

No standing water, redox, or weeping



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number:

5 (Refer to Existing Conditions Plan)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Of	10yr3/2	-	-	-	loam/o	-	-	single grain	loose	
6-20	Bw1	10yr6/8	-	-	-	loamy sand	-	-	single grain	loose	
20-55	Bw2	10yr7/2	-	-	-	fine beach sand	-	-	single grain	loose	
55-108	Cd	10yr5/2	-	-	-	fine-med beach	-	10%	firm	loose	

Additional Notes:

Loose until Cd, which is very dense

No redox, standing water, or weeping



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number: 6 (Refer to Existing Conditions Plan)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-24	0	10yr2/1	-	-	-	crunchy	-	-	gr	loose	
24-40	Bw1	10yr5/4	-	-	-	fine sand	-	5%	firm	loose	
40-46	Bc	10yr7/2	-	-	-	fine sand	-	10%	single grain	loose	
46-96	Cd	10yr8/2	-	-	-	fine sand	-	10%	dense	-	

Additional Notes:

Very thick O layer → inconsistent thru pit

Many large boulders

Dense excavation, No groundwater observed



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Continued)

Deep Observation Hole Number:

7 (Refer to Existing Conditions Plan)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-12	0	10yr4/2	-	-	-	loam	-	-	gr	fr	
12-30	Bw1	10yr6/6	-	-	-	loamy sand	-	5%	single grain	loose	
30-54	Bc	10yr6/3	-	-	-	fine-med sand	-	20%	single grain	firm	
54-84	Cd	10yr6/2	-	-	-	fine-med sand	-	boulders at refusal	single grain	firm	

Additional Notes:

Cd very compact and dense. Large boulders
No redox, standing water, or weeping

Enclosure 4

Environmental Resource Assessment Report

November 20, 2012

Email

John M. Perry, P.E.
Gale Associates, Inc.
163 Libbey Parkway
Weymouth, MA 02189

**Re: Wetland Resource Area Analysis
Lynnfield Recreation Park
Land off Main Street
Lynnfield, Massachusetts**

[LEC File #: GAI\12-224.01]

Dear Mr. Perry:

LEC Environmental Consultants, Inc., (LEC) is pleased to submit this Wetland Resource Area Analysis Report documenting methods and findings associated with a wetland delineation conducted on several lots located on Main Street in Lynnfield, Massachusetts. The purpose of the wetland delineation was to identify the boundaries of Wetland Resource Areas protected under the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40), its implementing *Regulations* (310 CMR 10.00), and the *Lynnfield Environmental Bylaw* (Chapter 9) and associated *Rules and Regulations*.

The subject property boundaries, site topography, and wetland flagging locations are depicted on the *Lynnfield Recreation Park Plan*, prepared by Eaglebrook Engineering and Surveying, LLC, dated October 25, 2012.

1. General Site Description

The site consists of several undeveloped parcels (see Note 4 on the *Plans* for Assessor's reference) totaling approximately 98.5 acres located west off Main Street in the northern portion of Lynnfield, Massachusetts. The parcels are owned by the Town of Lynnfield Center Water District, with the exception of Map 9, Lot 192 and Map 5, Lot 1584 which are privately owned. Map 9, Lot 192 contains frontage on Main Street and does not contain any Wetland Resource Areas.

The site includes extensive forested uplands and forested wetlands with a network of cart paths and trails traversing the site. ATV use of the cart paths and trails is evident. An abandoned railroad easement extends across the northern portion of the property. The northern limits of the site extend to the centerline of the Ipswich River while Will's Brook flows across the southern portion of the site. Each of these rivers is identified as a perennial stream.

Property to the east consists of undeveloped uplands and scattered single-family dwellings along Main Street, while an industrial building exists to the northeast. Property to the west is primarily town-owned undeveloped forested wetlands and uplands while property to the south/southeast is occupied by a golf course.

The forested upland is defined by a mixed canopy of red oak (*Quercus rubra*), white oak (*Quercus alba*), eastern white pine (*Pinus strobus*), and red maple (*Acer rubrum*), with scattered individuals of sassafras (*Sassafras albidum*) and swamp tupelo (*Nyssa sylvatica*). The upland understory is comprised of witch hazel (*Hammamelis virginiana*), sweet pepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), dangleberry (*Gaylussacia frondosa*), black huckleberry (*Gaylussacia baccata*), and arrowwood (*Viburnum dentatum*), with entanglements of greenbrier (*Smilax rotundifolia*). Groundcover consists of tree clubmoss (*Lycopodium obscurum*), teaberry (*Gaultheria procumbens*), and hay-scented fern (*Dennstaedtia punctilobula*).

According to the Essex County Soil Survey, the site includes areas mapped as Whitman loam, extremely stony; Scarboro mucky loamy fine sand; Windsor loamy sand; Paxton fine sandy loam, very stony; Woodbridge fine sandy loam, very stony; and Poquonock loamy sand, very stony. Overall the site is defined by glacial till with stony soils and scattered boulders at the surface.

1.1 Floodplain Designation

According to FEMA Flood Insurance Rate Map for the Town of Lynnfield dated July 3, 2012 (*Community Panel 25009C0383F*), the site contains extensive areas mapped as Zone A, *Areas subject to inundation by the 1% annual chance flood*. The extent of Zone A is roughly coincident with the extent of BVW on the property. The upland portions of the property are mapped as Zone X, *Areas determined to be outside the 100-year flood plain*.

1.2 Massachusetts Natural Heritage & Endangered Species Program Designation

According to the 13th edition of the Massachusetts Natural Heritage Atlas (valid from October 1, 2008) published by the Natural Heritage & Endangered Species Program (NHESP), the property is not located within an *Estimated or Priority Habitat for Rare Species*. According to the MassGIS datalayers, there are no certified or potential vernal pools on the site.

2. Wetland Delineation Methodology

The extent of the Bordering Vegetated Wetlands (BVW) was determined through observations of the existing plant communities, using the "fifty percent criteria" to determine dominance of wetland/upland vegetation, the interpretation of soil characteristics, and other indicators of wetland hydrology in accordance with the criteria enumerated within 310 CMR 10.55 (2), the Handbook prepared by the Massachusetts Department of Environmental Protection, entitled *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995), as well as the *Field Indicators for Identifying Hydric Soils in New England* (April 2004). The boundaries are demarcated in the field with blaze orange surveyor's flagging tape embossed with the words "LEC Resource Area Boundary" in bold, black print and numbered A1-A53, B1-B193, C1-C32, D1-D63, and E1-E39.

In addition, LEC demarcated the Mean Annual High Water (MAHW) to the Ipswich River and Will's Brook in accordance with 310 CMR 10.58 (2) (a) (2). MAHW was demarcated with blue flagging tape numbered MAHW 1-4 along the Ipswich River and MAHW 1A-27A/1B-27B along Will's Brook.

3. Wetland Resource Area Descriptions

Wetland Resource Areas located on or adjacent to the property include BVW, Riverfront Area, and Bank. The site may also contain Bordering Land Subject to Flooding (BLSF) as described below. A brief description of each Wetland Resource Area follows.

3.1 BVW

BVW is defined at 310 CMR 10.55 (2) (a) *as freshwater wetlands that border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants.*

The property contains extensive forested BVW areas associated with a series of intermittent streams as well as the perennial streams. The BVW canopy typically consists of red maple (*Acer rubrum*) and eastern white pine (*Pinus strobus*), with scattered individuals of red oak (*Quercus rubra*), white oak (*Quercus alba*), and swamp tupelo (*Nyssa sylvatica*). The understory is variably dense, with some very dense areas dominated by sweet pepperbush, while other areas are more open allowing conspicuous patches of cinnamon fern (*Osmunda cinnamomeo*), goldthread (*Coptis trifolia*), and sphagnum moss (*Sphagnum* spp.) to thrive. Other species observed in the BVW include highbush blueberry (*Vaccinium corymbosum*), arrowwood (*Viburnum dentatum*), swamp azalea (*Rhododendron viscosum*), witch hazel (*Hamamelis virginiana*), royal fern (*Osmunda regalis*), and sensitive fern (*Onoclea sensibilis*).

The C-series wetland flagging is a smaller, seemingly isolated system separated from the larger BVW areas. The wetland does contain evidence of flow that may be considered an intermittent stream; however, the overland does not appear to have created an incised channel and thus categorizing the area as BVW (as we have) bordering on an intermittent stream may be disputed. In any case, the Lynnfield Bylaw protects isolated wetlands so the C-series wetland is a protected Wetland Resource Area under that statute regardless of whether or not it borders on a stream.

3.2 Riverfront Area

According to 310 CMR 10.58(2)(a)(3), Riverfront Area is defined as *the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away.*

The Mean Annual High-Water (MAHW) Line to perennial streams is delineated in the field to establish the limits of Riverfront Area. MAHW was delineated in accordance with definition in 310 CMR 10.58 (2)(a)2. - *the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions shall be used to determine the mean annual high-water line. Bankfull indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, top of pointbars, changes in bank materials, or bank undercuts.*

Riverfront Area is associated with a small segment of the Ipswich River on the northern portion of the site and with Will's Brook on the southern portion of the property. In each case, the 200-foot Riverfront Area comprises forested uplands and forested wetlands.

3.3 Bank

Bank is defined at 310 CMR 10.54(2)(a) as *the portion of land surface which normally abuts and confines a water body. The upper boundary of a bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a bank is the mean annual low flow level.*

Bank is associated with the perennial streams described above and is coincident with the delineated MAHW line. Additional Bank is associated with numerous intermittent streams contained within the BVW.

3.4 Bordering Land Subject to Flooding

According to 310 CMR 10.57(2)(a)(1), BLSF is *an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.*

BLSF exists in those portions of the property where the 100-year flood plain extends beyond the BVW boundary (i.e. into the upland). Further review of the actual extent of the flood plain would be necessary to determine the extent of BLSF on the property.

4. Regulatory Implications

The site contains Bordering Vegetated Wetlands, Bank, and Riverfront Area; Wetland Resource Areas protected under the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40), its implementing *Regulations* (310 CMR 10.00), and the *Lynnfield Environmental Bylaw* (Chapter 9) and associated *Rules and Regulations*. As described above, the site may also contain BLSF. Any proposed activity or alteration within the above-referenced Wetland Resource Areas or their Buffer Zones will require filing the necessary permit applications with the Lynnfield Conservation Commission and the Massachusetts Department of Environmental Protection (DEP).

Sincerely,

LEC Environmental Consultants, Inc.

Mark L. Manganello (ss)

Mark L. Manganello

Assistant Director of Ecological Services

Enclosure 5

Abbreviated Notice of Resource Area Delineation (ANRAD) Application



Abbreviated Notice of Resource Area Delineation Town of Lynnfield, MA

N o v e m b e r 2 1 , 2 0 1 2

table of contents

Section 1.0	WPA Form 4A – Abbreviated Notice of Resource Area Delineation
Section 2.0	Property Description
Section 3.0	Map and Parcel Information
Section 4.0	Wetland Resource Area Analysis
Section 5.0	USGS Map
Section 6.0	Certified Abutters List

enclosures

- Enclosure 1 – Survey Plan Sheet S-1
- Enclosure 2 – Survey Plan Sheet S-2
- Enclosure 3 – Survey Plan Sheet S-3



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

**WPA Form 4A – Abbreviated Notice of
Resource Area Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

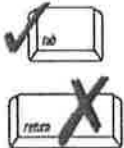
City/Town

A. General Information

1. Project Location (**Note:** electronic filers will click on button for GIS locator):

N/A LYNNFIELD 01940
a. Street Address b. City/Town c. Zip Code
Latitude and Longitude: 42d34'12.69" N 71d02'26.75" W
See attached list d. Latitude e. Longitude
See attached list
f. Assessors Map/Plat Number g. Parcel /Lot Number

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



2. Applicant:

Bill Gustus
a. First Name b. Last Name
Town of Lynnfield
c. Organization
55 Summer Street
d. Mailing Address
Lynnfield MA 01940
e. City/Town f. State g. Zip Code
781-334-9410 781-334-9419 william-gustus@town.lynnfield.ma.us
h. Phone Number i. Fax Number j. Email Address

3. Property owner (if different from applicant):

Lynnfield Center Water District
a. First Name b. Last Name
c. Organization
842 Salem Street
d. Mailing Address
Lynnfield MA 01940
e. City/Town f. State g. Zip Code
781-598-4223 781-598-8819 lwd@lwdma.us
h. Phone Number i. Fax Number j. Email Address

Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

4. Representative (if any):

John Perry
a. Contact Person First Name b. Contact Person Last Name
Gale Associates, Inc.
c. Organization
163 Libbey Industrial Parkway
d. Mailing Address
Weymouth MA 02189
e. City/Town f. State g. Zip Code
781-335-6465 781-335-6467 JMP@gainc.com
h. Phone Number i. Fax Number j. Email Address

5. Total WPA Fee Paid (from attached ANRAD Wetland Fee Transmittal Form):

\$0 \$0 \$0
a. Total Fee Paid b. State Fee Paid c. City/Town Fee Paid

Fees will be calculated for online users.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
**WPA Form 4A – Abbreviated Notice of
Resource Area Delineation**
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

B. Area(s) Delineated

1. Bordering Vegetated Wetland (BVW) 15,350 LF
Linear Feet of Boundary Delineated
2. Check all methods used to delineate the Bordering Vegetated Wetland (BVW) boundary:
 - a. ☐ MassDEP BVW Field Data Form (attached)
 - b. ☒ Other Methods for Determining the BVW boundary (attach documentation):
 1. ☒ 50% or more wetland indicator plants
 2. ☐ Saturated/inundated conditions exist
 3. ☐ Groundwater indicators
 4. ☐ Direct observation
 5. ☒ Hydric soil indicators
 6. ☐ Credible evidence of conditions prior to disturbance
3. Indicate any other resource area boundaries that are delineated:
1,190 LF

a. Resource Area <u>Wills Brook</u>	b. Linear Feet Delineated
c. Resource Area	d. Linear Feet Delineated

C. Additional Information

Applicants must include the following plans with this Abbreviated Notice of Resource Area Delineation. See instructions for details. **Online Users:** Attach the Document Transaction Number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ ANRAD (Delineation Plans only)
2. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
3. ☒ Plans identifying the boundaries of the Bordering Vegetated Wetlands (BVW) (and/or other resource areas, if applicable).
4. ☒ List the titles and final revision dates for all plans and other materials submitted with this Abbreviated Notice of Resource Area Delineation.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
**WPA Form 4A – Abbreviated Notice of
Resource Area Delineation**
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

D. Fees

The fees for work proposed under each Abbreviated Notice of Resource Area Delineation must be calculated and submitted to the Conservation Commission and the Department (see Instructions and Wetland Fee Transmittal Form).

1. ☒ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to the attached Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4A – Abbreviated Notice of
Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

E. Signatures

I certify under the penalties of perjury that the foregoing Abbreviated Notice of Resource Area Delineation and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

I hereby grant permission, to the Agent or member of the Conservation Commission and the Department of Environmental Protection, to enter and inspect the area subject to this Notice at reasonable hours to evaluate the wetland resource boundaries subject to this Notice, and to require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

I acknowledge that failure to comply with these certification requirements is grounds for the Conservation Commission or the Department to take enforcement action.


1. Signature of Applicant

11-20-12
2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

11-20-12
6. Date

For Conservation Commission:

Two copies of the completed Abbreviated Notice of Resource Area Delineation (Form 4A), including supporting plans and documents; two copies of the ANRAD Wetland Fee Transmittal Form; and the city/town fee payment must be sent to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Abbreviated Notice of Resource Area Delineation (Form 4A), including supporting plans and documents; one copy of the ANRAD Wetland Fee Transmittal Form; and a copy of the state fee payment must be sent to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery. (E-filers may submit these electronically.)

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

ANRAD

Property Owner: Lynnfield Water District

Prepared by Gale Associates, Inc.

November 21, 2012



PROPERTY DESCRIPTION

The Lynnfield Center Water District (LWD) property is bounded to the North by the Ipswich River, to the West by Conservation Commission land, to the South by the Sagamore Golf Club, and to the East by land owned by Bostik Findley, Inc. The property consists of twelve (12) parcels owned by the LWD and is approximately 98.5 acres in size. The property does not contain frontage on any right of way, but is located just north of Main Street and south of Elm Street. The property can be accessed from Elm Street at the entrance to the existing LWD pumping station and through the abandoned railroad easement running through the property from east to west.

ANRAD
Property Owner: Lynnfield Water District
Prepared by Gale Associates, Inc.
November 21, 2012



MAP AND PARCEL INFORMATION

<u>Map</u>	<u>Parcel</u>
8	487
8	1279
8	1045
8	1727
8	1822
8	1842
4	647
4	2055
4	1893
4	2771
4	2799
4	2577

November 20, 2012

Email

John M. Perry, P.E.
Gale Associates, Inc.
163 Libbey Parkway
Weymouth, MA 02189

**Re: Wetland Resource Area Analysis
Lynnfield Recreation Park
Land off Main Street
Lynnfield, Massachusetts**

[LEC File #: GAI12-224.01]

Dear Mr. Perry:

LEC Environmental Consultants, Inc., (LEC) is pleased to submit this Wetland Resource Area Analysis Report documenting methods and findings associated with a wetland delineation conducted on several lots located on Main Street in Lynnfield, Massachusetts. The purpose of the wetland delineation was to identify the boundaries of Wetland Resource Areas protected under the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40), its implementing *Regulations* (310 CMR 10.00), and the *Lynnfield Environmental Bylaw* (Chapter 9) and associated *Rules and Regulations*.

The subject property boundaries, site topography, and wetland flagging locations are depicted on the *Lynnfield Recreation Park Plan*, prepared by Eaglebrook Engineering and Surveying, LLC, dated October 25, 2012.

1. General Site Description

The site consists of several undeveloped parcels (see Note 4 on the *Plans* for Assessor's reference) totaling approximately 98.5 acres located west off Main Street in the northern portion of Lynnfield, Massachusetts. The parcels are owned by the Town of Lynnfield Center Water District, with the exception of Map 9, Lot 192 and Map 5, Lot 1584 which are privately owned. Map 9, Lot 192 contains frontage on Main Street and does not contain any Wetland Resource Areas.

The site includes extensive forested uplands and forested wetlands with a network of cart paths and trails traversing the site. ATV use of the cart paths and trails is evident. An abandoned railroad easement extends across the northern portion of the property. The northern limits of the site extend to the centerline of the Ipswich River while Will's Brook flows across the southern portion of the site. Each of these rivers is identified as a perennial stream.

Property to the east consists of undeveloped uplands and scattered single-family dwellings along Main Street, while an industrial building exists to the northeast. Property to the west is primarily town-owned undeveloped forested wetlands and uplands while property to the south/southeast is occupied by a golf course.

The forested upland is defined by a mixed canopy of red oak (*Quercus rubra*), white oak (*Quercus alba*), eastern white pine (*Pinus strobus*), and red maple (*Acer rubrum*), with scattered individuals of sassafras (*Sassafras albidum*) and swamp tupelo (*Nyssa sylvatica*). The upland understory is comprised of witch hazel (*Hammamelis virginiana*), sweet pepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), dangleberry (*Gaylussacia frondosa*), black huckleberry (*Gaylussacia baccata*), and arrowwood (*Viburnum dentatum*), with entanglements of greenbrier (*Smilax rotundifolia*). Groundcover consists of tree clubmoss (*Lycopodium obscurum*), teaberry (*Gaultheria procumbens*), and hay-scented fern (*Dennstaedtia punctilobula*).

According to the Essex County Soil Survey, the site includes areas mapped as Whitman loam, extremely stony; Scarboro mucky loamy fine sand; Windsor loamy sand; Paxton fine sandy loam, very stony; Woodbridge fine sandy loam, very stony; and Poquonock loamy sand, very stony. Overall the site is defined by glacial till with stony soils and scattered boulders at the surface.

1.1 Floodplain Designation

According to FEMA Flood Insurance Rate Map for the Town of Lynnfield dated July 3, 2012 (*Community Panel 25009C0383F*), the site contains extensive areas mapped as Zone A, *Areas subject to inundation by the 1% annual chance flood*. The extent of Zone A is roughly coincident with the extent of BVW on the property. The upland portions of the property are mapped as Zone X, *Areas determined to be outside the 100-year flood plain*.

1.2 Massachusetts Natural Heritage & Endangered Species Program Designation

According to the 13th edition of the Massachusetts Natural Heritage Atlas (valid from October 1, 2008) published by the Natural Heritage & Endangered Species Program (NHESP), the property is not located within an *Estimated or Priority Habitat for Rare Species*. According to the MassGIS datalayers, there are no certified or potential vernal pools on the site.

2. Wetland Delineation Methodology

The extent of the Bordering Vegetated Wetlands (BVW) was determined through observations of the existing plant communities, using the "fifty percent criteria" to determine dominance of wetland/upland vegetation, the interpretation of soil characteristics, and other indicators of wetland hydrology in accordance with the criteria enumerated within 310 CMR 10.55 (2), the Handbook prepared by the Massachusetts Department of Environmental Protection, entitled *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995), as well as the *Field Indicators for Identifying Hydric Soils in New England* (April 2004). The boundaries are demarcated in the field with blaze orange surveyor's flagging tape embossed with the words "LEC Resource Area Boundary" in bold, black print and numbered A1-A53, B1-B193, C1-C32, D1-D63, and E1-E39.

In addition, LEC demarcated the Mean Annual High Water (MAHW) to the Ipswich River and Will's Brook in accordance with 310 CMR 10.58 (2) (a) (2). MAHW was demarcated with blue flagging tape numbered MAHW 1-4 along the Ipswich River and MAHW 1A-27A/1B-27B along Will's Brook.

3. Wetland Resource Area Descriptions

Wetland Resource Areas located on or adjacent to the property include BVW, Riverfront Area, and Bank. The site may also contain Bordering Land Subject to Flooding (BLSF) as described below. A brief description of each Wetland Resource Area follows.

3.1 BVW

BVW is defined at 310 CMR 10.55 (2) (a) as *freshwater wetlands that border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants.*

The property contains extensive forested BVW areas associated with a series of intermittent streams as well as the perennial streams. The BVW canopy typically consists of red maple (*Acer rubrum*) and eastern white pine (*Pinus strobus*), with scattered individuals of red oak (*Quercus rubra*), white oak (*Quercus alba*), and swamp tupelo (*Nyssa sylvatica*). The understory is variably dense, with some very dense areas dominated by sweet pepperbush, while other areas are more open allowing conspicuous patches of cinnamon fern (*Osmunda cinnamomeo*), goldthread (*Coptis trifolia*), and sphagnum moss (*Sphagnum* spp.) to thrive. Other species observed in the BVW include highbush blueberry (*Vaccinium corymbosum*), arrowwood (*Viburnum dentatum*), swamp azalea (*Rhododendron viscosum*), witch hazel (*Hamamelis virginiana*), royal fern (*Osmunda regalis*), and sensitive fern (*Onoclea sensibilis*).

The C-series wetland flagging is a smaller, seemingly isolated system separated from the larger BVW areas. The wetland does contain evidence of flow that may be considered an intermittent stream; however, the overland does not appear to have created an incised channel and thus categorizing the area as BVW (as we have) bordering on an intermittent stream may be disputed. In any case, the Lynnfield Bylaw protects isolated wetlands so the C-series wetland is a protected Wetland Resource Area under that statute regardless of whether or not it borders on a stream.

3.2 Riverfront Area

According to 310 CMR 10.58(2)(a)(3), Riverfront Area is defined as *the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away.*

The Mean Annual High-Water (MAHW) Line to perennial streams is delineated in the field to establish the limits of Riverfront Area. MAHW was delineated in accordance with definition in 310 CMR 10.58 (2)(a)2. - *the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions shall be used to determine the mean annual high-water line. Bankfull indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, top of pointbars, changes in bank materials, or bank undercuts.*

Riverfront Area is associated with a small segment of the Ipswich River on the northern portion of the site and with Will's Brook on the southern portion of the property. In each case, the 200-foot Riverfront Area comprises forested uplands and forested wetlands.



3.3 Bank

Bank is defined at 310 CMR 10.54(2)(a) as *the portion of land surface which normally abuts and confines a water body. The upper boundary of a bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a bank is the mean annual low flow level.*

Bank is associated with the perennial streams described above and is coincident with the delineated MAHW line. Additional Bank is associated with numerous intermittent streams contained within the BVW.

3.4 Bordering Land Subject to Flooding

According to 310 CMR 10.57(2)(a)(1), BLSF is *an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.*

BLSF exists in those portions of the property where the 100-year flood plain extends beyond the BVW boundary (i.e. into the upland). Further review of the actual extent of the flood plain would be necessary to determine the extent of BLSF on the property.

4. Regulatory Implications

The site contains Bordering Vegetated Wetlands, Bank, and Riverfront Area; Wetland Resource Areas protected under the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40), its implementing *Regulations* (310 CMR 10.00), and the *Lynnfield Environmental Bylaw* (Chapter 9) and associated *Rules and Regulations*. As described above, the site may also contain BLSF. Any proposed activity or alteration within the above-referenced Wetland Resource Areas or their Buffer Zones will require filing the necessary permit applications with the Lynnfield Conservation Commission and the Massachusetts Department of Environmental Protection (DEP).

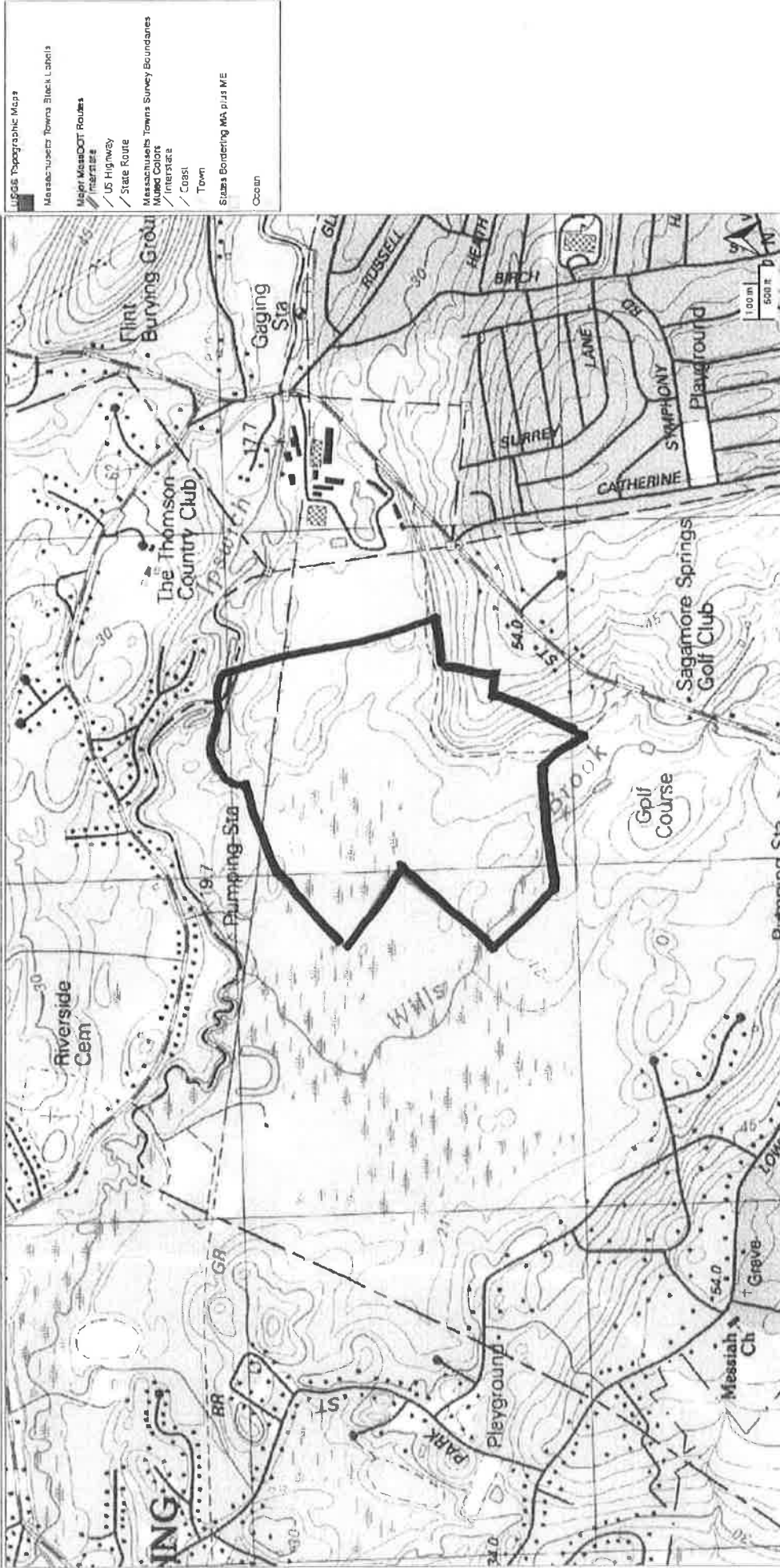
Sincerely,

LEC Environmental Consultants, Inc.

Mark L. Manganello (ss.)

Mark L. Manganello
Assistant Director of Ecological Services

Lynnfield Water District Property



— Approximate property lines

09/24/2012

12:47:20PM

LYNNFIELD

Abiters List

Page 1 of 1

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
0002 0000 2555	LOWELL ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 0498	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 0647	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 1091	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 1893	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 2055	6 REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 2399	REAR MAIN ST	LYNNFIELD TOWN OF	CONSERVATION COMMISSION	TOWN HALL	LYNNFIELD	MA	01940
0004 0000 2577	REAR LOWELL ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 2771	REAR MAIN ST BMRR SOUTH	LYNNFIELD TOWN OF	CONSERVATION COMMISSION	TOWN HALL	LYNNFIELD	MA	01940
0004 0000 2799	REAR MAIN ST BMRR SOUTH	LYNNFIELD TOWN OF	CONSERVATION COMMISSION	TOWN HALL	LYNNFIELD	MA	01940
0005 0000 0147	REAR MAIN ST	BOSTIK FINDLEY, INC.		11320 WATERTOWN PLANK	WATERTOWN	MA	01940
0005 0000 0817	REAR MAIN ST	BOSTIK FINDLEY, INC.		11320 WATERTOWN PLANK	WATERTOWN	MA	01940
0005 0000 1584	REAR MAIN ST	BOSTIK FINDLEY, INC.		11320 WATERTOWN PLANK	WATERTOWN	MA	01940
0008 0000 0487	REEDY MEADOW	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 0914	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 1045	MIDDLETON HILL	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 1279	REAR MAIN ST	LYNNFIELD TOWN OF	CONSERVATION COMMISSION	TOWN HALL	LYNNFIELD	MA	01940
0008 0000 1325	1482 REAR MAIN ST	RICHARDSON GREEN		PO BOX 499	MIDDLETON	MA	01949
0008 0000 1431	1466 MAIN ST	BRETTELL HELEN M	BRETTELL NORMAN F	1466 MAIN ST	LYNNFIELD	MA	01940
0008 0000 1535	REAR MAIN ST	LYNNFIELD CTR WATER		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 1599	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 1727	MIDDLETON HILL	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 1822	MIDDLETON HILL	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0008 0000 1842	MIDDLETON HILL	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0012 0000 0466	1282 MAIN ST	SAGAMORE SPRING REALTY TRU	LUFF, LUFF & THOMPSON T	1282 MAIN ST	LYNNFIELD	MA	01940
	Town of North Reading			235 North Street	N. Reading	MA	01864-1258
	MBTA Director of Real Estate			10 Park Plaza	Boston	MA	02116

End of Report

LOWELL ST	0002 0000 2555 LUC: 903	REAR MAIN ST	0005 0000 0147 LUC: 132	REAR MAIN ST	0008 0000 1599 LUC: 903
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		BOSTIK FINDLEY, INC. 11320 WATERTOWN PLANK RD ATTN: NANCY BAKER WAUWATOSA, WI 53226-3413		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940	
REAR MAIN ST	0004 0000 0498 LUC: 903	REAR MAIN ST	0005 0000 0817 LUC: 132	MIDDLETON HILL	0008 0000 1727 LUC: 903
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		BOSTIK FINDLEY, INC. 11320 WATERTOWN PLANK RD ATTN: NANCY BAKER WAUWATOSA, WI 53226-3413		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940	
REAR MAIN ST	0004 0000 0647 LUC: 903	REAR MAIN ST	0005 0000 1584 LUC: 132	MIDDLETON HILL	0008 0000 1822 LUC: 903
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		BOSTIK FINDLEY, INC. 11320 WATERTOWN PLANK RD ATTN: NANCY BAKER WAUWATOSA, WI 53226-3413		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940	
REAR MAIN ST	0004 0000 1091 LUC: 903	REEDY MEADOW	0008 0000 0487 LUC: 903	MIDDLETON HILL	0008 0000 1842 LUC: 903
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940	
REAR MAIN ST	0004 0000 1893 LUC: 903	REAR MAIN ST	0008 0000 0914 LUC: 903	1282 MAIN ST	0012 0000 0466 LUC: 018
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		SAGAMORE SPRING REALTY TRUST LUFF, LUFF & THOMPSON TRUST 1282 MAIN ST LYNNFIELD, MA 01940	
6 REAR MAIN ST	0004 0000 2055 LUC: 903	MIDDLETON HILL	0008 0000 1045 LUC: 903	Town of North Reading 235 North Street North Reading, MA 01864-1258	
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940			
REAR MAIN ST	0004 0000 2399 LUC: 903	REAR MAIN ST	0008 0000 1279 LUC: 903		
LYNNFIELD TOWN OF CONSERVATION COMMISSION TOWN HALL LYNNFIELD, MA 01940		LYNNFIELD TOWN OF CONSERVATION COMMISSION TOWN HALL LYNNFIELD, MA 01940		MBTA Director of Real Estate 10 Park Plaza Boston, MA 02116	
REAR LOWELL ST	0004 0000 2577 LUC: 903	1462 REAR MAIN ST	0008 0000 1325 LUC: 601		
LYNNFIELD CTR WATER DIST 83 PHILLIPS ROAD LYNNFIELD, MA 01940		RICHARDSON GREEN PO BOX 499 MIDDLETON, MA 01949			
REAR MAIN ST BMRR SOUTH	0004 0000 2771 LUC: 903	1466 MAIN ST	0008 0000 1431 LUC: 101		
LYNNFIELD TOWN OF CONSERVATION COMMISSION TOWN HALL LYNNFIELD, MA 01940		BRETTELL HELEN M BRETTELL NORMAN F 1466 MAIN ST LYNNFIELD, MA 01940			
REAR MAIN ST BMRR SOUTH	0004 0000 2799 LUC: 903	REAR MAIN ST	0008 0000 1535 LUC: 903		
LYNNFIELD TOWN OF CONSERVATION COMMISSION TOWN HALL LYNNFIELD, MA 01940		LYNNFIELD CTR WATER 83 PHILLIPS ROAD LYNNFIELD, MA 01940			

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419

LYNNFIELD BOARD
OF ASSESSORS

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
☐ Board of Health
☒ Conservation Commission
☐ Planning Board
☐ Other _____

If this form is not complete it will be returned.

Fee: \$5.00 for first five pages \$1.00 each consecutive page

Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 8 Parcel # 1045

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST
(No. & Street)

LYNNFIELD, MA
(City/Town & State)

Applicant's Telephone 781-334-2128

CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING
DAYS

-----Assessors Use Only-----

Certified by: Marie Gardner

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph:781-334-9450 Fax:781-334-9419

LYNNFIELD BOARD
OF ASSESSORS

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

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☐ Board of Health
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☐ Planning Board
☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 8 Parcel # 1727

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST

(No. & Street)

LYNNFIELD MA

(City/Town & State)

Applicant's Telephone 781-334-3128

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Date: 9/24/12

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BOARD OF ASSESSORS
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Lynnfield, MA 01940
Ph:781-334-9450 Fax:781-334-9419

LYNNFIELD BOARD
OF ASSESSORS

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☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 8 Parcel # 1279'

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST.

(No. & Street)

LYNNFIELD, MA

(City/Town & State)

Applicant's Telephone 781-334-3128

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Certified by: Marie Gaudin

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph:781-334-9450 Fax:781-334-9419

LYNNFIELD BOARD
OF ASSESSORS

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
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☐ Planning Board
☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 8 Parcel # 1842

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST

LYNNFIELD, MA

(No. & Street)

(City/Town & State)

Applicant's Telephone 781-334-3128

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Certified by: Marie Gardner

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419

LYNNFIELD BOARD
OF ASSESSORS

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
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☐ Other _____

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Property owner of record:

Lynnfield Center Water District

Address of Property: _____

Assessor's Map #

8

Parcel #

1822'

Name of Applicant (print)

TOWN OF LYNNFIELD

Applicant Address

55 SUMMER ST

(No. & Street)

LYNNFIELD, MA

(City/Town & State)

Applicant's Telephone

781-334-3128

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Certified by:

Maie Gardner

Date:

9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
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Lynnfield, MA 01940
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LYNNFIELD BOARD
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☐ Board of Appeals
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☐ Planning Board
☐ Other

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Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 8 Parcel # 487

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST.
(No. & Street)

LYNNFIELD, MA
(City/Town & State)

Applicant's Telephone 781-334-3128

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Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
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Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419

LYNNFIELD BOARD
OF ASSESSORS

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☐ Planning Board
☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 4 Parcel # 2799

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST

(No. & Street)

LYNNFIELD, MA

(City/Town & State)

Applicant's Telephone 781-334-3128

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DAYS

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Certified by: Marie Gardner

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

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☐ Board of Appeals
☐ Board of Health
☒ Conservation Commission
☐ Planning Board
☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: N/A

Assessor's Map # 4 Parcel # 2055'

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST.
(No. & Street)

LYNNFIELD MA
(City/Town & State)

Applicant's Telephone 781-334-3128

CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING
DAYS

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Certified by: Marie Gardner

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419

RECEIVED

LYNNFIELD BOARD
OF ASSESSORS

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
☐ Board of Health
☒ Conservation Commission
☐ Planning Board
☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 4 Parcel # 647'

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST.
(No. & Street)

Lynnfield, MA
(City/Town & State)

Applicant's Telephone 781-334-3128

CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING
DAYS

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Certified by: Marie Gardner

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419

LYNNFIELD BOARD
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REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

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☒ Conservation Commission
☐ Planning Board
☐ Other _____

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Fee: \$5.00 for first five pages \$1.00 each consecutive page

Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 4 Parcel # 2771

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST

LYNNFIELD, MA

(No. & Street)

(City/Town & State)

Applicant's Telephone 781-334-3128

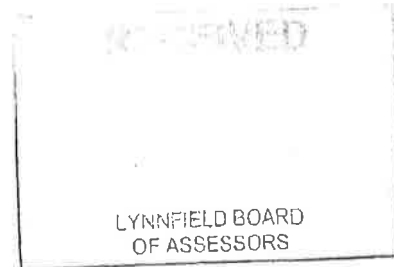
CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING
DAYS

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Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
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Lynnfield, MA 01940
Ph: 781-334-9450 Fax: 781-334-9419



REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
☐ Board of Health
☒ Conservation Commission
☐ Planning Board
☐ Other _____

If this form is not complete it will be returned.

Fee: \$5.00 for first five pages \$1.00 each consecutive page

Property owner of record: Lynnfield Center Water District

Address of Property: _____

Assessor's Map # 4 Parcel # 2577

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST.
(No. & Street)

LYNNFIELD, MA

(City/Town & State)

Applicant's Telephone 781-334-3128

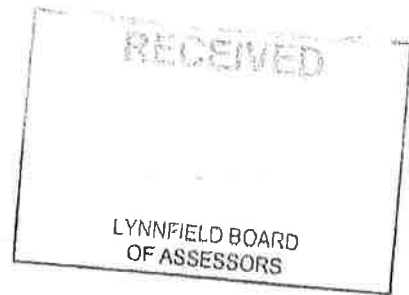
CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING
DAYS

-----Assessors Use Only-----

Certified by: Maie Gardner

Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph:781-334-9450 Fax:781-334-9419



REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
☐ Board of Health
☒ Conservation Commission
☐ Planning Board
☐ Other _____

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Property owner of record: Lynnfield Center Water District

Address of Property: N/A

Assessor's Map # 4 Parcel # 1893

Name of Applicant (print) TOWN OF LYNNFIELD

Applicant Address 55 SUMMER ST

(No. & Street)

LYNNFIELD, MA

(City/Town & State)

Applicant's Telephone 781-334-3128

CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING DAYS

-----Assessors Use Only-----

Certified by: Marie Gardner

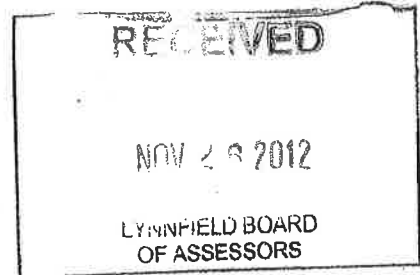
Date: 9/24/12

TOWN OF LYNNFIELD
BOARD OF ASSESSORS
55 Summer Street
Lynnfield, MA 01940
Ph:781-334-9450 Fax:781-334-9419

REQUEST FOR CERTIFICATION OF ABUTTER'S LIST

To be submitted to (check one)

☐ Board of Appeals
☐ Board of Health
☒ Conservation Commission
☐ Planning Board
☐ Other _____



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Fee: \$5.00 for first five pages \$1.00 each consecutive page

Property owner of record: _____

Address of Property: _____

Assessor's Map # _____

Parcel # _____

Name of Applicant (print) _____

Applicant Address _____

(City/Town & State)

Applicant's Telephone _____

CERTIFIED LIST WILL BE PROVIDED WITHIN SEVEN TO TEN WORKING DAYS

-----Assessors Use Only-----

Certified by: _____

Date: _____

05-1584

LYNNFIELD

Abutters List

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
0004 0000 0647	REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0004 0000 2055	6 REAR MAIN ST	LYNNFIELD CTR WATER DIST		83 PHILLIPS ROAD	LYNNFIELD	MA	01940
0005 0000 0147	REAR MAIN ST	BOSTIK FINDLEY, INC.		11320 WATERTOWN PLANK	WAUWATOSA	WI	53226-3413
0005 0000 0817	REAR MAIN ST	BOSTIK FINDLEY, INC.		11320 WATERTOWN PLANK	WAUWATOSA	WI	53226-3413
0005 0000 1584	REAR MAIN ST	BOSTIK FINDLEY, INC.		11320 WATERTOWN PLANK	WAUWATOSA	WI	53226-3413
0009 0000 0147	5 JANET WAY	BOGHOS JOHN		5 ROOSEVELT ROAD	WAKEFIELD	MA	01880
0009 0000 0185	1500 MAIN ST	SAMORA RAYMOND	SAMORA APHRODITE E	1500 MAIN ST	LYNNFIELD	MA	01940
0009 0000 0192	1506 MAIN ST	BOSTIK FINDLEY, INC		11320 WATERTOWN PLANK	WAUWATOSA	WI	53226-3413
0009 0000 0244	1508 MAIN ST	LAVERDE JOHN A	LAVERDE JAYNA LYN T/E	1508 MAIN ST	LYNNFIELD	MA	01940
0009 0000 0818	1 JANET WAY	BOGHOS JOHN		5 ROOSEVELT ROAD	WAKEFIELD	MA	01880
	Town of N Reading			235 North St	N Reading	MA	01864-1258
	Town of Middleton			48 So Main St	Middleton	MA	01949

End of Report

05-1584

LUC: 903

LYNNFIELD CTR WATER DIST
83 PHILLIPS ROAD
LYNNFIELD MA 01940

LUC: 903

LYNNFIELD CTR WATER DIST
83 PHILLIPS ROAD
LYNNFIELD MA 01940

LUC: 132

BOSTIK FINDLEY, INC.
11320 WATERTOWN PLANK RD
ATTN: NANCY BAKER
WAUWATOSA WI 53226-3413

LUC: 132

BOSTIK FINDLEY, INC.
11320 WATERTOWN PLANK RD
ATTN: NANCY BAKER
WAUWATOSA WI 53226-3413

LUC: 132

BOSTIK FINDLEY, INC.
11320 WATERTOWN PLANK RD
ATTN: NANCY BAKER
WAUWATOSA WI 53226-3413

LUC: 131

BOGHOS JOHN
5 ROOSEVELT ROAD
WAKEFIELD MA 01880

LUC: 101

SAMORA RAYMOND
SAMORA APHRODITE E
1500 MAIN ST
LYNNFIELD MA 01940

LUC: 130

BOSTIK FINDLEY, INC
11320 WATERTOWN PLANK RD
ATTN: NANCY BAKER
WAUWATOSA WI 53226-3413

LUC: 101

LAVERDE JOHN A
LAVERDE JAYNA LYN T/E
1508 MAIN ST
LYNNFIELD MA 01940

LUC: 101

BOGHOS JOHN
5 ROOSEVELT ROAD
WAKEFIELD MA 01880

TOWN OF NORTH READING
235 NORTH STREET
NORTH READING MA 01864-1258

TOWN OF MIDDLETON
48 SOUTH MAIN STREET
MIDDLETON MA 01949

09-0192

LYNNFIELD

Abutters List

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
0005 0000 1584	REAR MAIN ST	BOSTIK FINDLEY, INC		11320 WATERTOWN PLANK	WAUWATOSA	WI	53226-3413
0009 0000 0185	1500 MAIN ST	SAMORA RAYMOND	SAMORA APHRODITE E	1500 MAIN ST	LYNNFIELD	MA	01940
0009 0000 0192	1506 MAIN ST	BOSTIK FINDLEY, INC		11320 WATERTOWN PLANK	WAUWATOSA	WI	53226-3413
0009 0000 0244	1508 MAIN ST	LAVERDE JOHN A	LAVERDE JAYNA LYN T/E	1508 MAIN ST	LYNNFIELD	MA	01940
0009 0000 0863	1477 MAIN ST	PETERSON SARA E	PETERSON KENNETH E	1477 MAIN ST	LYNNFIELD	MA	01940
0009 0000 0866	1455 MAIN ST	RUSSO MARIO, T/E	RUSSO MARIA S, T/E	1455 MAIN ST	LYNNFIELD	MA	01940
0009 0000 0943	1489 MAIN ST	ROY JOSEPH G JR	ROY EDITH A	1489 MAIN ST	LYNNFIELD	MA	01940

End of Report

LUC: 132

BOSTIK FINDLEY, INC

11320 WATERTOWN PLANK RD
ATTN: NANCY BAKER
WAUWATOSA WI 53226-3413

LUC: 101

SAMORA RAYMOND
SAMORA APHRODITE E
1500 MAIN ST

LYNNFIELD MA 01940

LUC: 130

BOSTIK FINDLEY, INC

11320 WATERTOWN PLANK RD
ATTN: NANCY BAKER
WAUWATOSA WI 53226-3413

LUC: 101

LAVERDE JOHN A
LAVERDE JAYNA LYN T/E
1508 MAIN ST

LYNNFIELD MA 01940

LUC: 101

PETERSON SARA E
PETERSON KENNETH E
1477 MAIN ST

LYNNFIELD MA 01940

LUC: 101

RUSSO MARIO, T/E
RUSSO MARIA S, T/E
1455 MAIN ST

LYNNFIELD MA 01940

LUC: 101

ROY JOSEPH G JR
ROY EDITH A
1489 MAIN ST

LYNNFIELD MA 01940

Enclosure 6

Conceptual Schematics – Recreation Complex

Development Option 1

LYNNFIELD RECREATION PROJECT OPTION 1

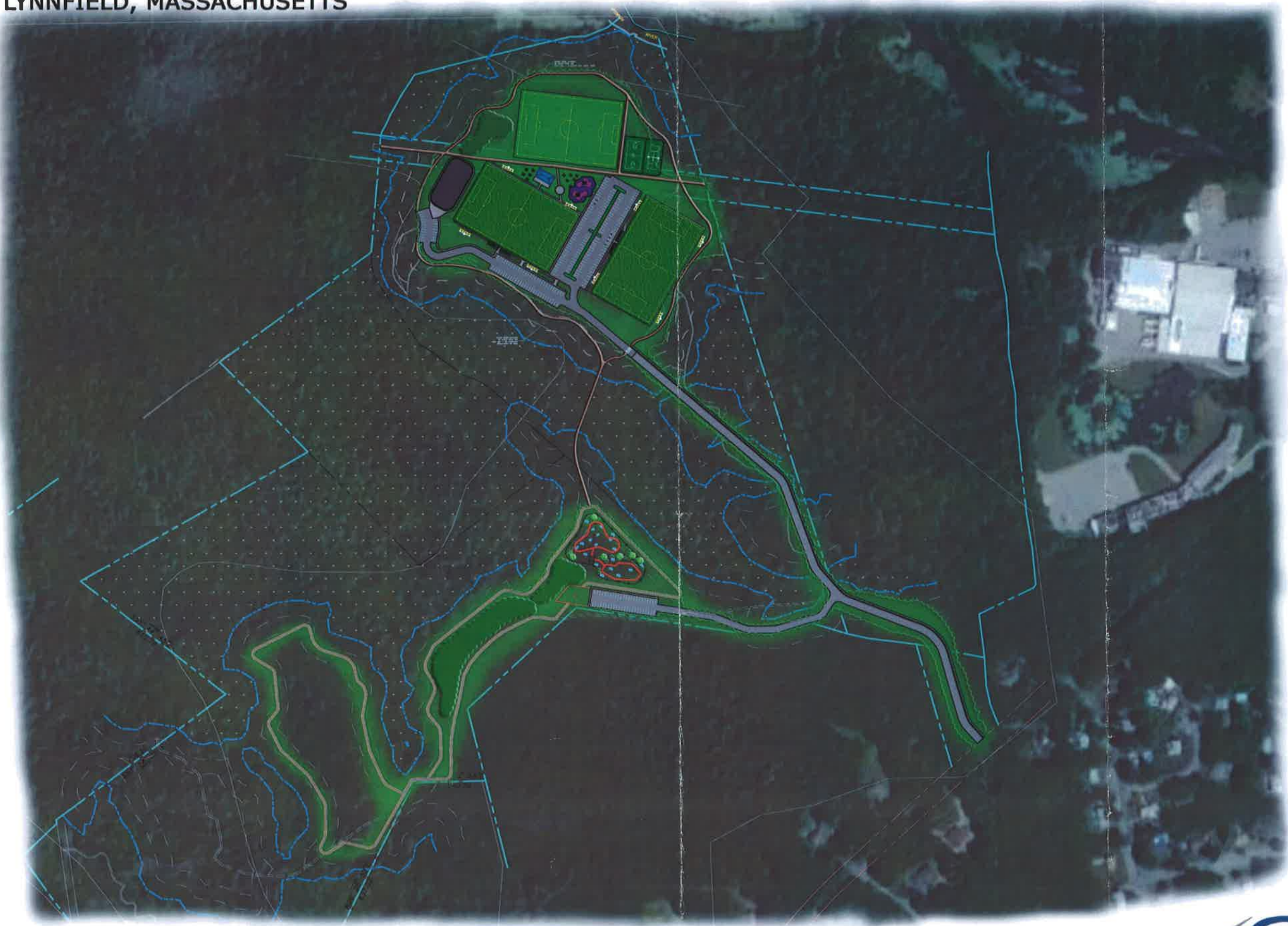
LYNNFIELD, MASSACHUSETTS



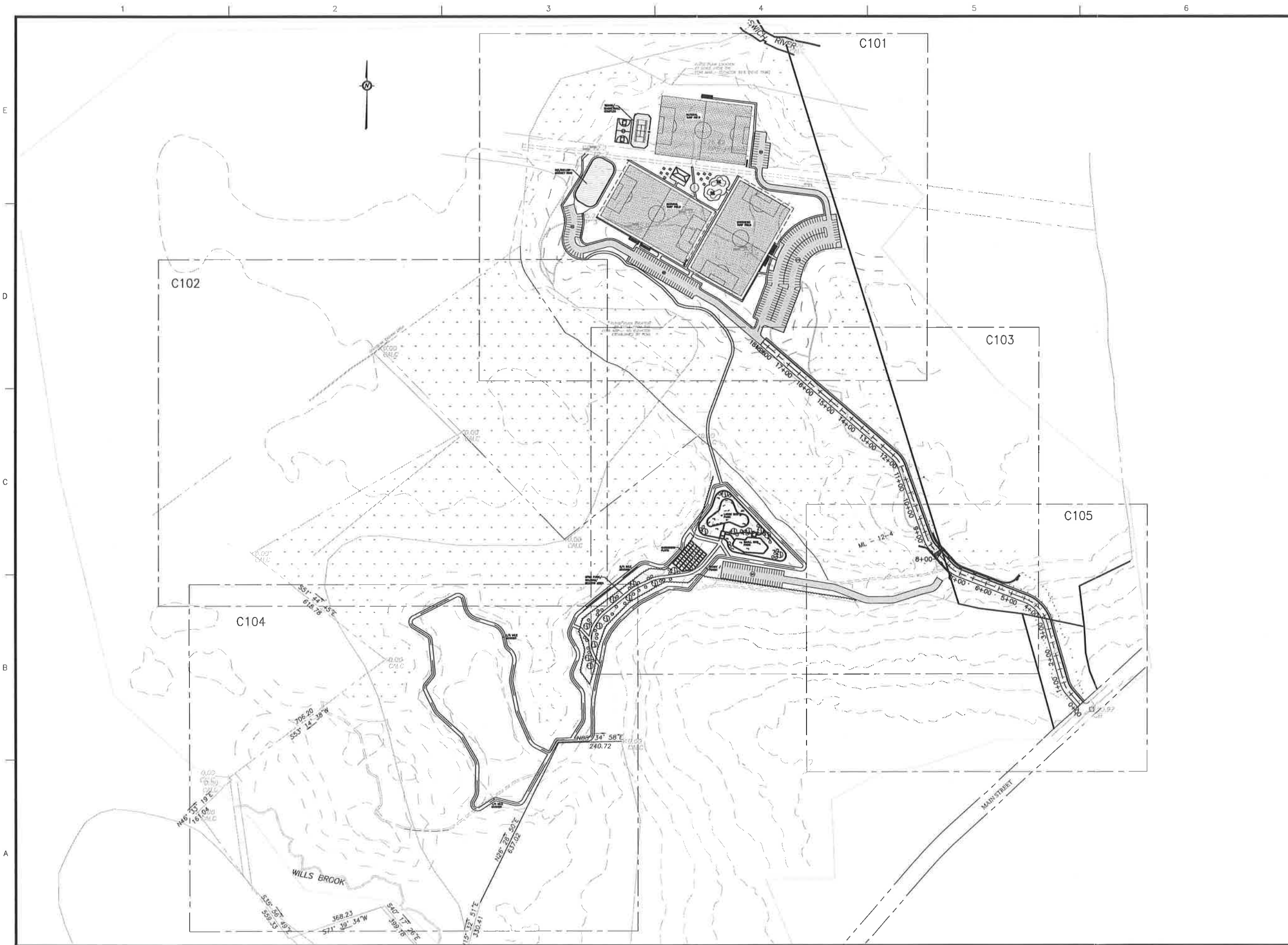
Development Option 2


LYNNFIELD RECREATION PROJECT OPTION 2

LYNNFIELD, MASSACHUSETTS



Enclosure 7
Access Roadway Plans





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PROJECT

LYNNFIELD RECREATION PARK
FEASIBILITY STUDY
MAIN STREET PARCELS
LYNNFIELD, MASSACHUSETTS

OWNER

TOWN OF LYNNFIELD
55 SUMMER ST
LYNNFIELD, MASSACHUSETTS 01940

REVISIONS		
NO.	DATE	DESCRIPTION

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DESIGNED BY	LAB/JMP
DRAWN BY	LAB/VAH
CHECKED BY	JMP
DATE	2-14-2013
DRAWING SCALE	1"=150'-0"

GRAPHIC SCALE

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150'

300'

SHEET TITLE

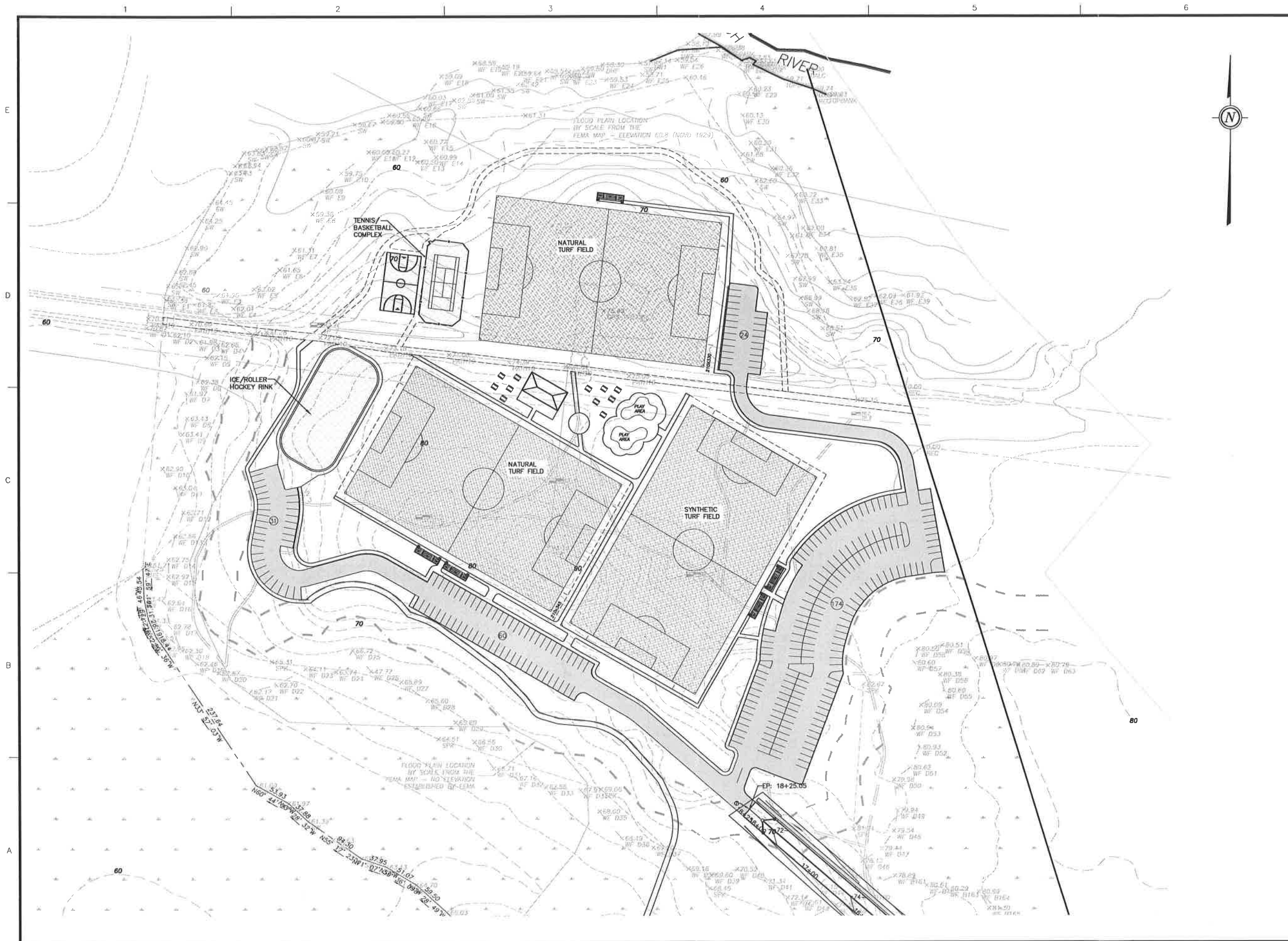
SITE LAYOUT
KEY SHEET


DRAWING NO.

C100

PROJECT NO.

715630





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FEASIBILITY STUDY
MAIN STREET PARCELS
LYNNFIELD, MASSACHUSETTS

OWNER
TOWN OF LYNNFIELD
55 SUMMER ST
LYNNFIELD, MASSACHUSETTS 01940

REVISIONS		
NO.	DATE	DESCRIPTION

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DESIGNED BY	LAB/JMP
DRAWN BY	WAH
CHECKED BY	JMP
DATE	2-14-2013
DRAWING SCALE	1"=60'-0"

GRAPHIC SCALE

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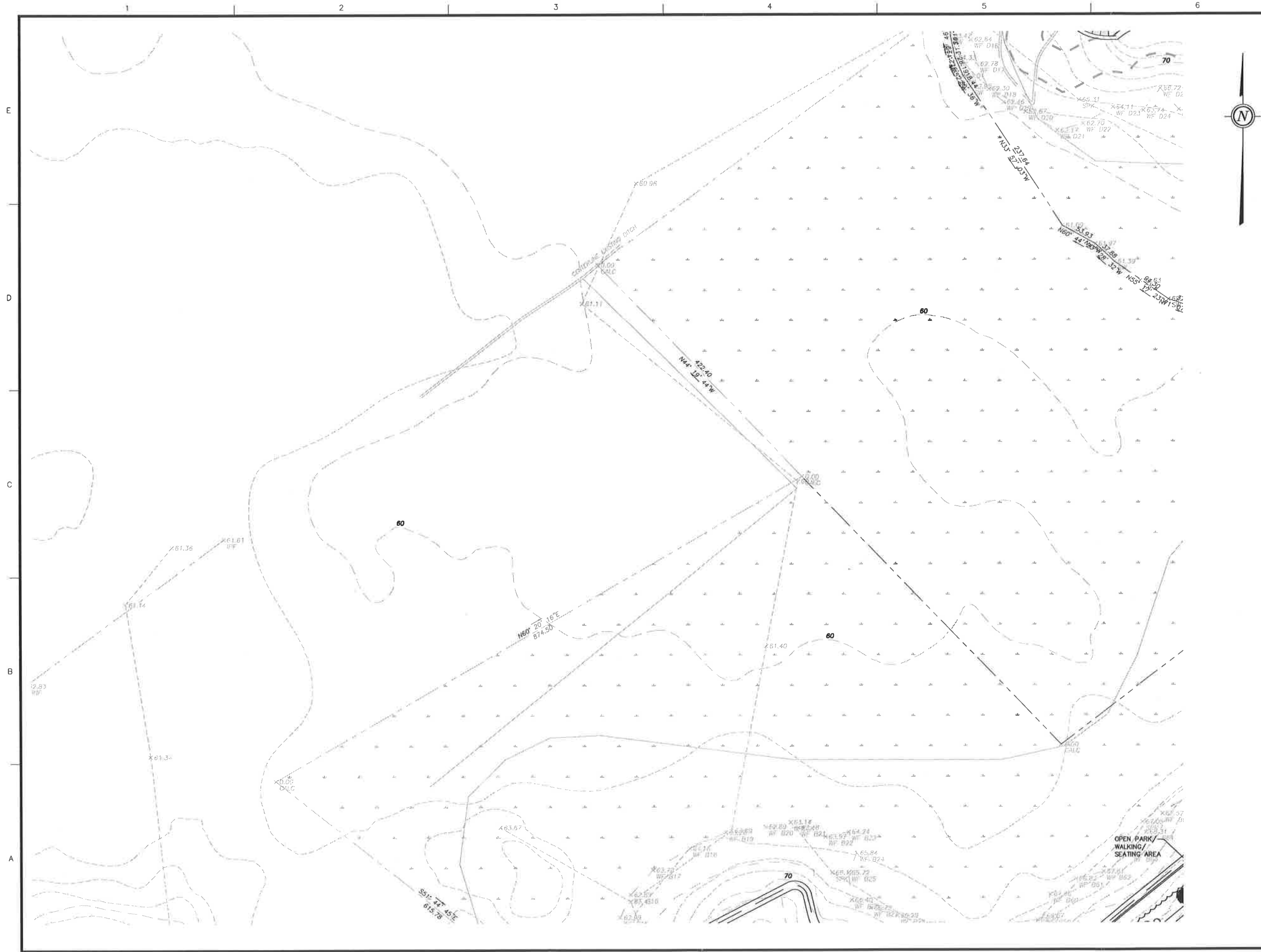
SHEET TITLE

PROPOSED
LAYOUT
PLAN
SHEET 1 OF 5

DRAWING NO.

C101

PROJECT NO. 715630



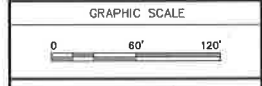
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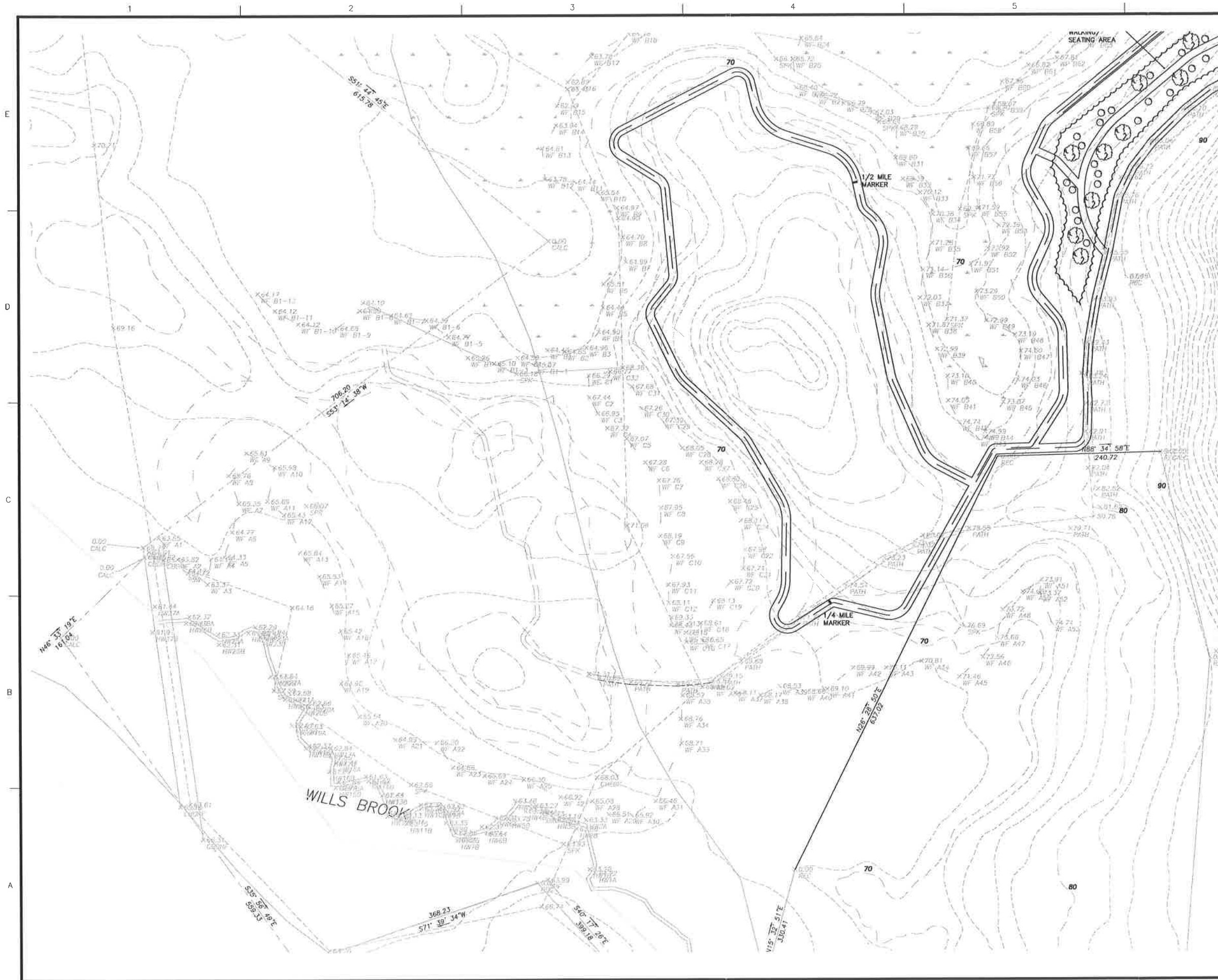
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	TOWN OF LYNNFIELD 55 SUMMER ST LYNNFIELD, MASSACHUSETTS 01940

REVISIONS		
NO.	DATE	DESCRIPTION

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CHECKED BY	JMP
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DRAWING SCALE	1"=60'-0"



SHEET TITLE	
PROPOSED LAYOUT PLAN SHEET 2 OF 5	
DRAWING NO.	C102
	PROJECT NO 715630



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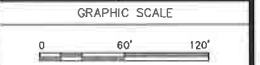
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LYNNFIELD RECREATION PARK
FEASIBILITY STUDY
MAIN STREET PARCELS
LYNNFIELD, MASSACHUSETTS

OWNER
TOWN OF LYNNFIELD
55 SUMMER ST
LYNNFIELD, MASSACHUSETTS 01940

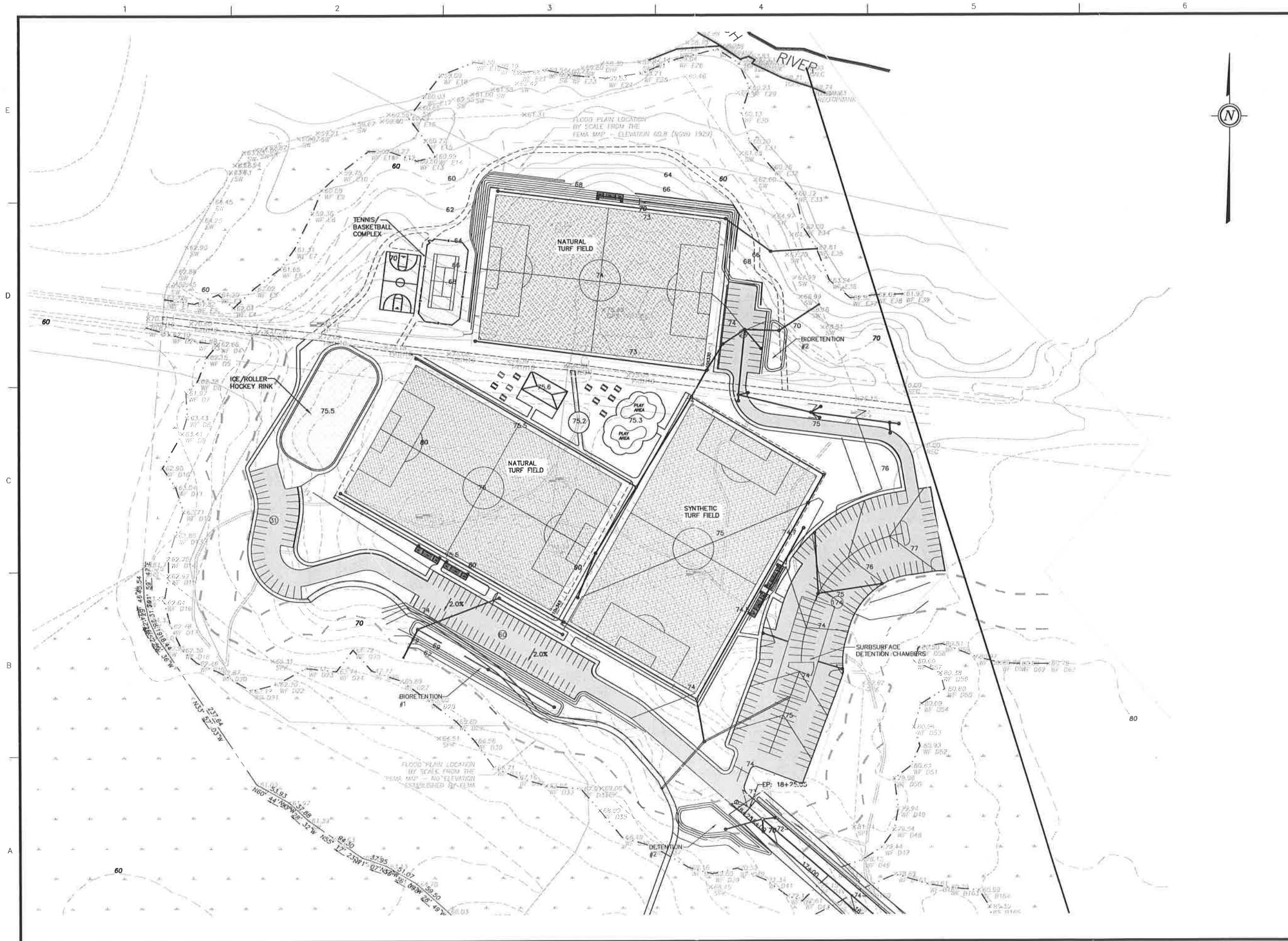
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NO.	DATE	DESCRIPTION


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CHECKED BY	JMP
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DRAWING SCALE	1"=60'-0"



SHEET TITLE
PROPOSED
LAYOUT
PLAN
SHEET 4 OF 5

DRAWING NO.	C104
PROJECT NO.	715630

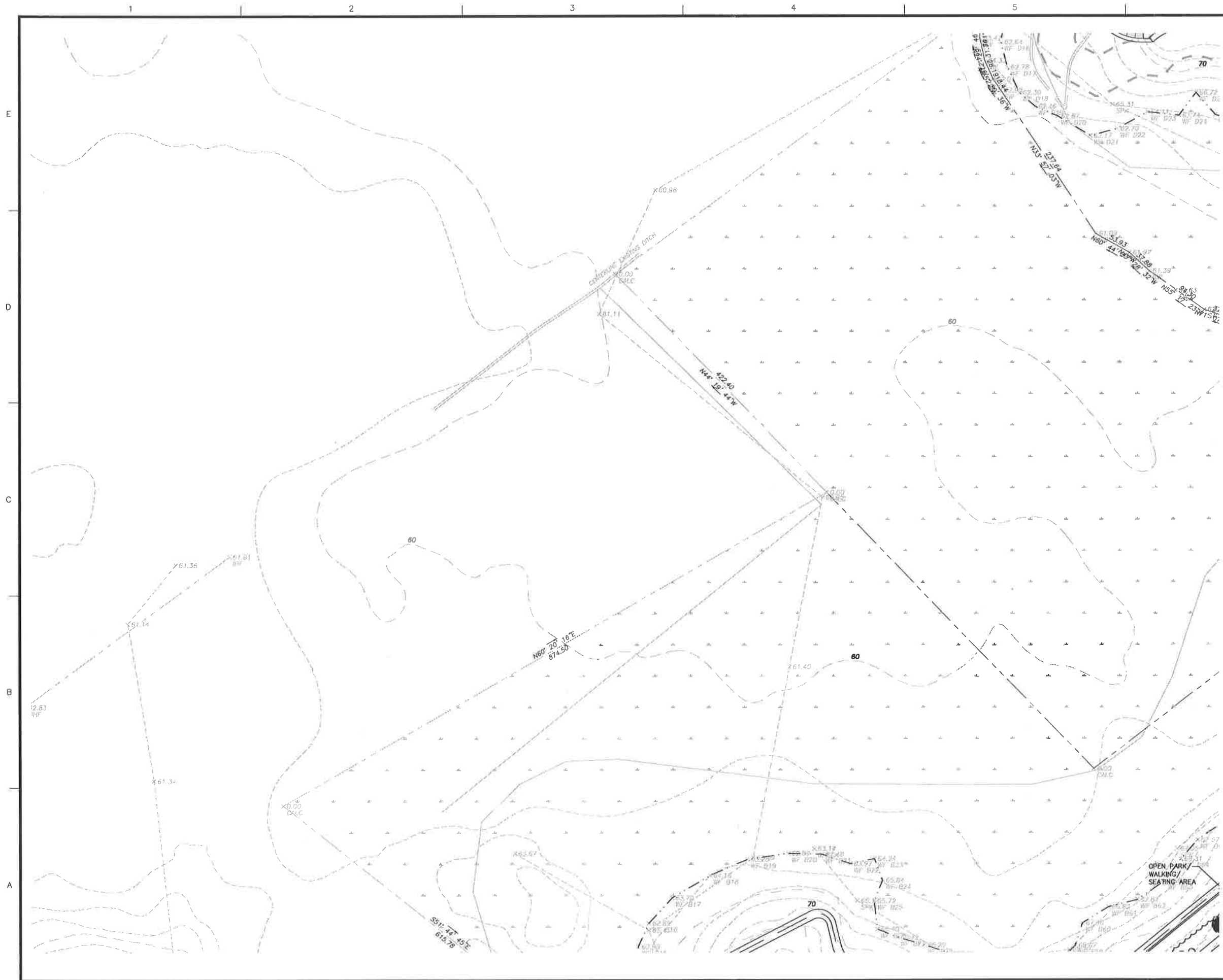




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PROJECT		OWNER	
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REVISIONS			
NO.	DATE	DESCRIPTION	
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SCHEMATIC GRADING & DRAINAGE PLAN			
SHEET 1 OF 5			
DRAWING NO.			
C106			
PROJECT NO. 715630			



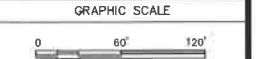
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Boston Baltimore Orlando San Francisco

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PROJECT
LYNNFIELD RECREATION PARK
FEASIBILITY STUDY
MAIN STREET PARCELS
LYNNFIELD, MASSACHUSETTS
OWNER
TOWN OF LYNNFIELD
55 SUMMER ST
LYNNFIELD, MASSACHUSETTS 01940

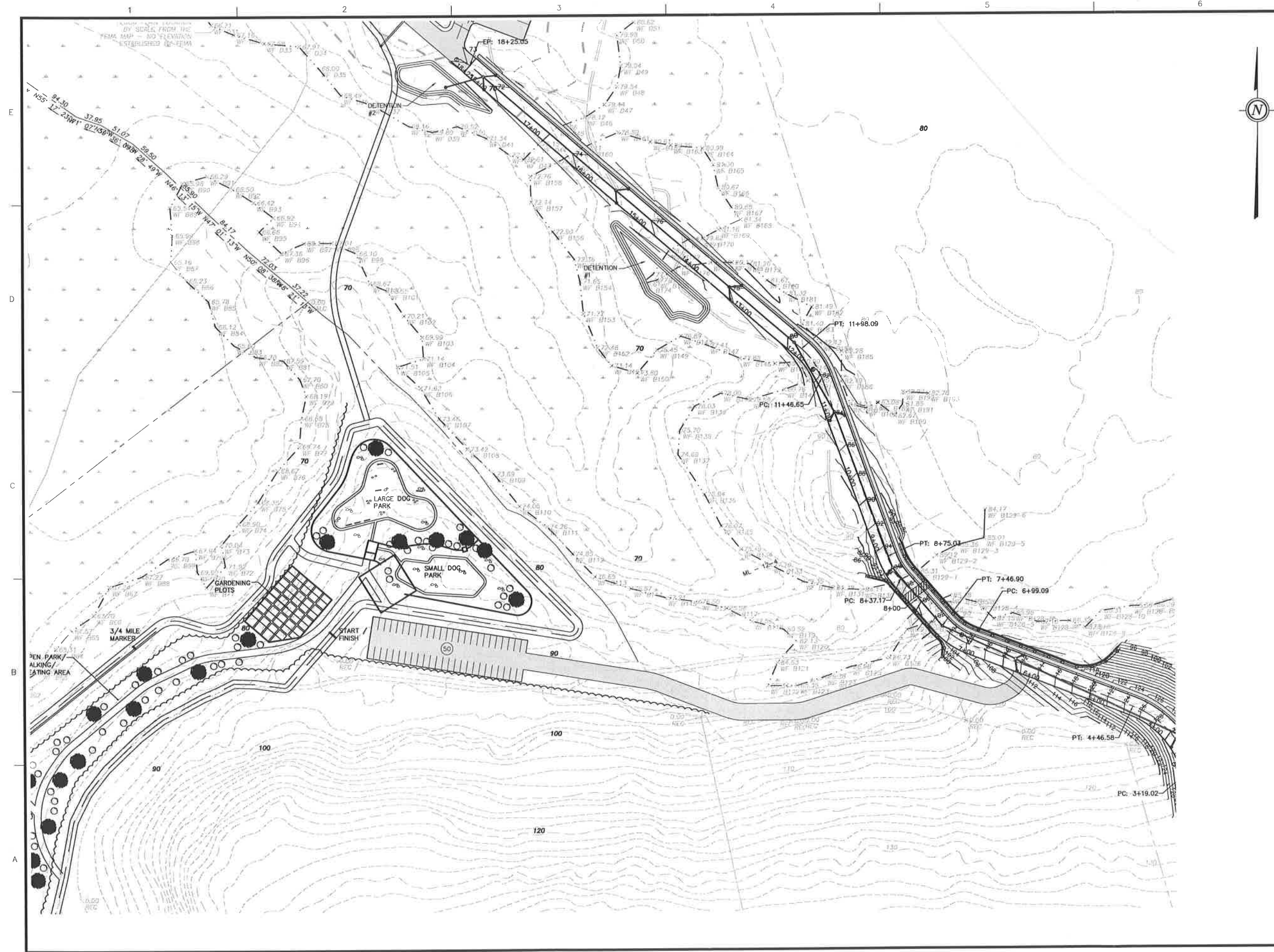
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NO.	DATE	DESCRIPTION

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DATE	2-14-2013
DRAWING SCALE	1"=60'-0"



SHEET TITLE
PROPOSED
GRADING
PLAN
SHEET 2 OF 5

DRAWING NO.
C107
PROJECT NO 715030



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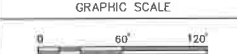
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PROJECT
**LYNNFIELD RECREATION PARK
FEASIBILITY STUDY
MAIN STREET PARCELS
LYNNFIELD, MASSACHUSETTS**

OWNER
**TOWN OF LYNNFIELD
55 SUMMER ST
LYNNFIELD, MASSACHUSETTS 01940**

REVISIONS		
NO.	DATE	DESCRIPTION

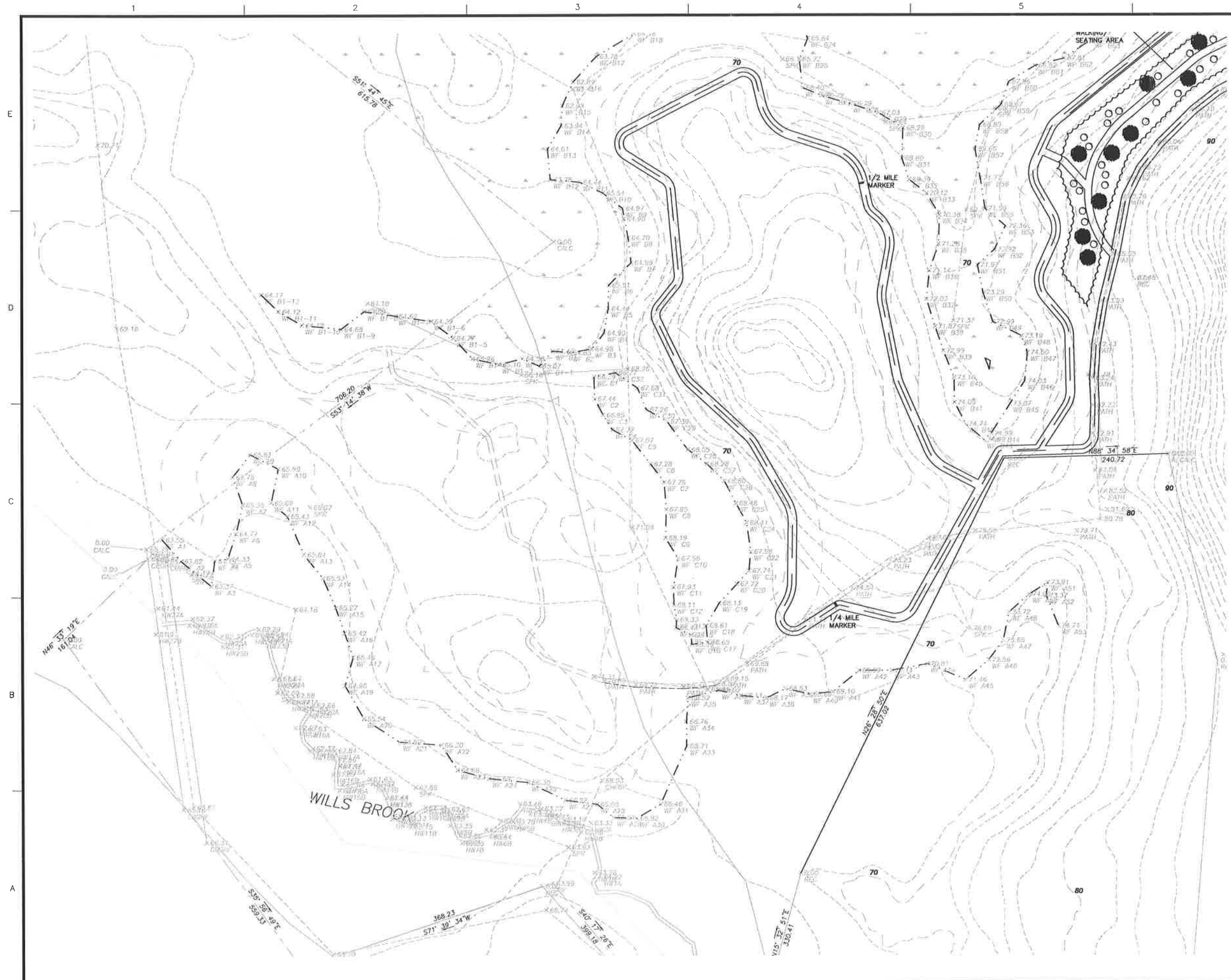
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DESIGNED BY	LAB/JMP
DRAWN BY	WAH
CHECKED BY	JMP
DATE	2-14-2013
DRAWING SCALE	1"=60'-0"



SHEET TITLE
**GRADING &
DRAINAGE PLAN**

SHEET 3 OF 5

DRAWING NO.
C108
PROJECT NO. 715630



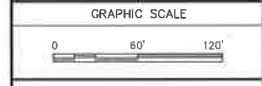
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	OWNER TOWN OF LYNNFIELD 55 SUMMER ST LYNNFIELD, MASSACHUSETTS 01940

REVISIONS		
NO.	DATE	DESCRIPTION

CADD FILE	
DESIGNED BY	LAB/JMP
DRAWN BY	WAH
CHECKED BY	JMP
DATE	2-14-2013
DRAWING SCALE	1"=60'-0"



SHEET TITLE	
PROPOSED GRADING PLAN SHEET 4 OF 5	
DRAWING NO.	C109
PROJECT NO.	715630



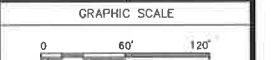
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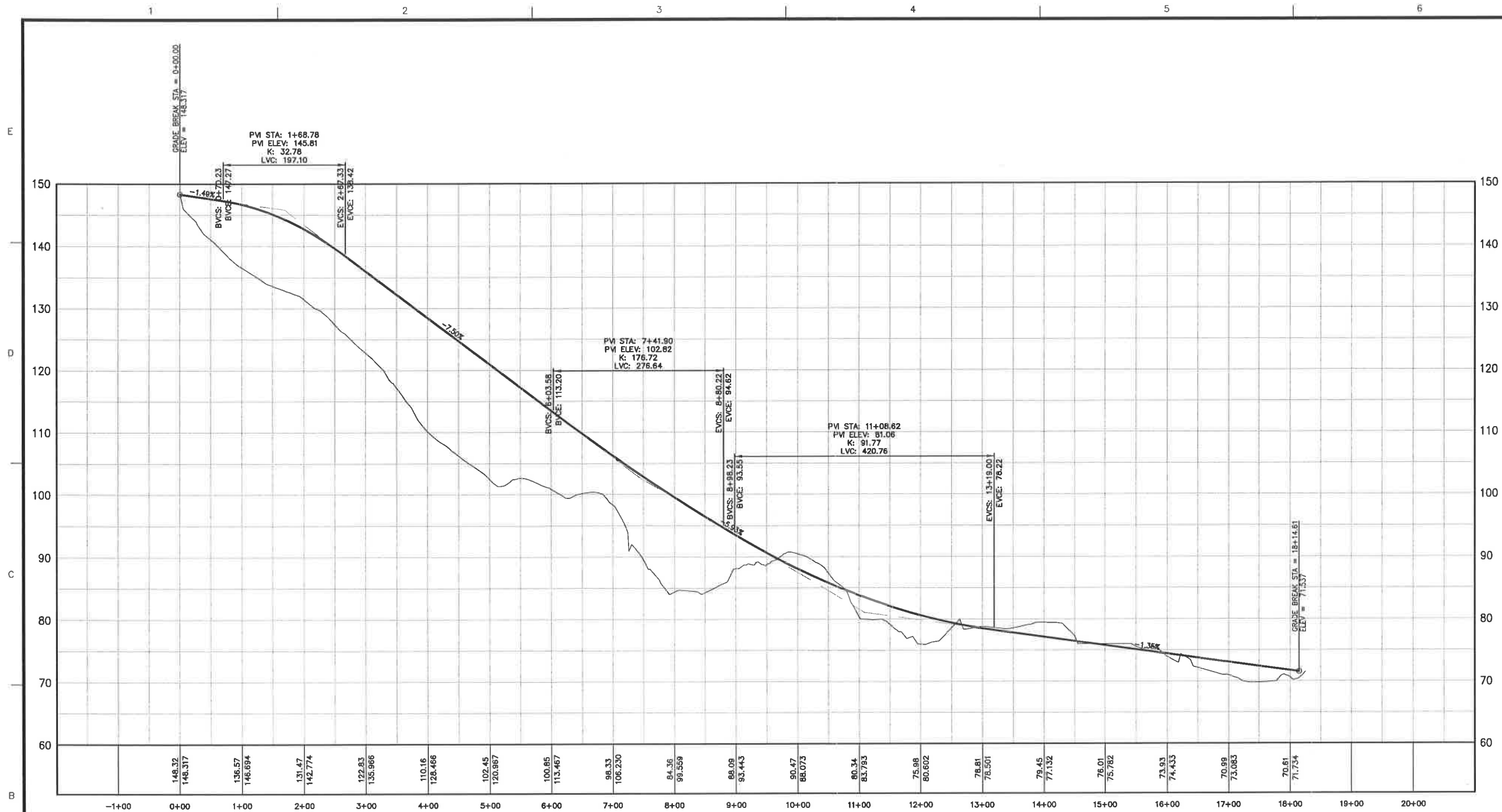
PROJECT	LYNNFIELD RECREATION PARK FEASIBILITY STUDY MAIN STREET PARCELS LYNNFIELD, MASSACHUSETTS
	TOWN OF LYNNFIELD 55 SUMMER ST LYNNFIELD, MASSACHUSETTS 01940

REVISIONS		
NO.	DATE	DESCRIPTION

CADD FILE	
DESIGNED BY	LAB/JMP
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CHECKED BY	JMP
DATE	2-14-2013
DRAWING SCALE	1"=60'-0"



SHEET TITLE	
GRADING & DRAINAGE PLAN	
SHEET 5 OF 5	
DRAWING NO.	C110
	PROJECT NO 715630



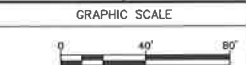
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	OWNER TOWN OF LYNNFIELD 55 SUMMER ST LYNNFIELD, MASSACHUSETTS 01940

REVISIONS		
NO.	DATE	DESCRIPTION

CADD FILE	
DESIGNED BY	LAB/JMP
DRAWN BY	WAH
CHECKED BY	JMP
DATE	2-14-2013
DRAWING SCALE	AS NOTED



SHEET TITLE


PROFILE
SHEET

DRAWING NO.	C300
PROJECT NO.	715830

Enclosure 8
Traffic Impact Assessment Report

MEMORANDUM

TO: Mr. John M. Perry, P.E.
Project Manager
Gale Associates, Inc.
163 Libbey Parkway
Weymouth, MA 02189

FROM: Mr. Jeffrey S. Dirk, P.E., PTOE, FITEC 
Principal
Vanasse & Associates, Inc.
10 New England Business Center Drive
Suite 314
Andover, MA 01810-1066
(978) 474-8800 x830
jdirk@rdva.com

DATE: January 30, 2013

RE: 6305

SUBJECT: Traffic Impact Assessment
Proposed Recreation Facilities
Lynnfield, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Traffic Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed recreation park and playing fields to be located along the west side of Main Street and proximate to the Middleton town line in Lynnfield, Massachusetts (hereafter referred to as the "Project"). This study evaluates the following specific areas as they relate to the Project: i) current and projected future traffic volumes; ii) potential impacts on the surrounding roadway network; iii) access and circulation for vehicles, pedestrians and bicyclists along Main Street and at the proposed Project site driveway; and iv) anticipated parking demands.

Based on a review of the findings of this assessment, we have concluded the following with respect to the Project:

1. The Project is expected to generate approximately 934 trips on an average weekday (two-way traffic over the operational day of the Project), with approximately 294 vehicle trips expected during both the weekday afternoon/evening and Saturday midday peak hours;
2. All movements at the Project site driveway intersection with Main Street were shown to operate with minimal delay (less than 15 seconds) and vehicle queuing (0 to 1 vehicle) during the peak-hours;
3. Sufficient parking will be provided within the Project site to accommodate anticipated demands under typical field use;
4. No discernible safety deficiencies were noted within the study area based on a review of the motor vehicle crash history along Main Street proximate to the Project site; and
5. Lines of sight to and from the Project site driveway intersection with Main Street were found to meet or exceed the required minimum distance for the intersection to function in a safe and efficient manner.



In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner. The following details our assessment of the Project.

PROJECT DESCRIPTION

As proposed, the Project will entail the construction of a field complex and associated recreational facilities to be located along the west side of Main Street and proximate to the Middleton town line in Lynnfield, Massachusetts. As proposed, the Project will contain three (3) soccer/multi-purpose fields, a tennis/basketball complex, an ice/roller hockey rink, two (2) play areas, two (2) dog parks (one small and one large), a gardening area, walking trails and associated amenities. The Project site encompasses approximately 98.5± acres of land and is generally bounded by the Ipswich River and wooded space to the north; Main Street, residential and agricultural properties, and areas of open and wooded space to the south; Bostik, Inc. and open and wooded space to the east; and areas of open and wooded space to the west. At present, the Project site consists of low-lying wetland areas and open and wooded space. Parking will be provided within the Project site to accommodate 339 vehicles in two separate parking area, with access to be provided by way of a single driveway that will intersect the west side of Main Street approximately 600 feet north of Friendship Lane. Figure 1 depicts the Project site location in relation to the existing roadway network.

STUDY METHODOLOGY

This study was prepared in consultation with the Massachusetts Department of Transportation (MassDOT) and the Town of Lynnfield; was performed in general accordance with the Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs (EEA)/MassDOT Guidelines for Environmental Impact Report/Environmental Impact Statement Traffic Impact Assessments (TIAs), and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; public transportation services; observations of traffic flow; and collection of daily and peak period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A five-year time horizon from the current year (2013) was selected for analyses consistent with state guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.



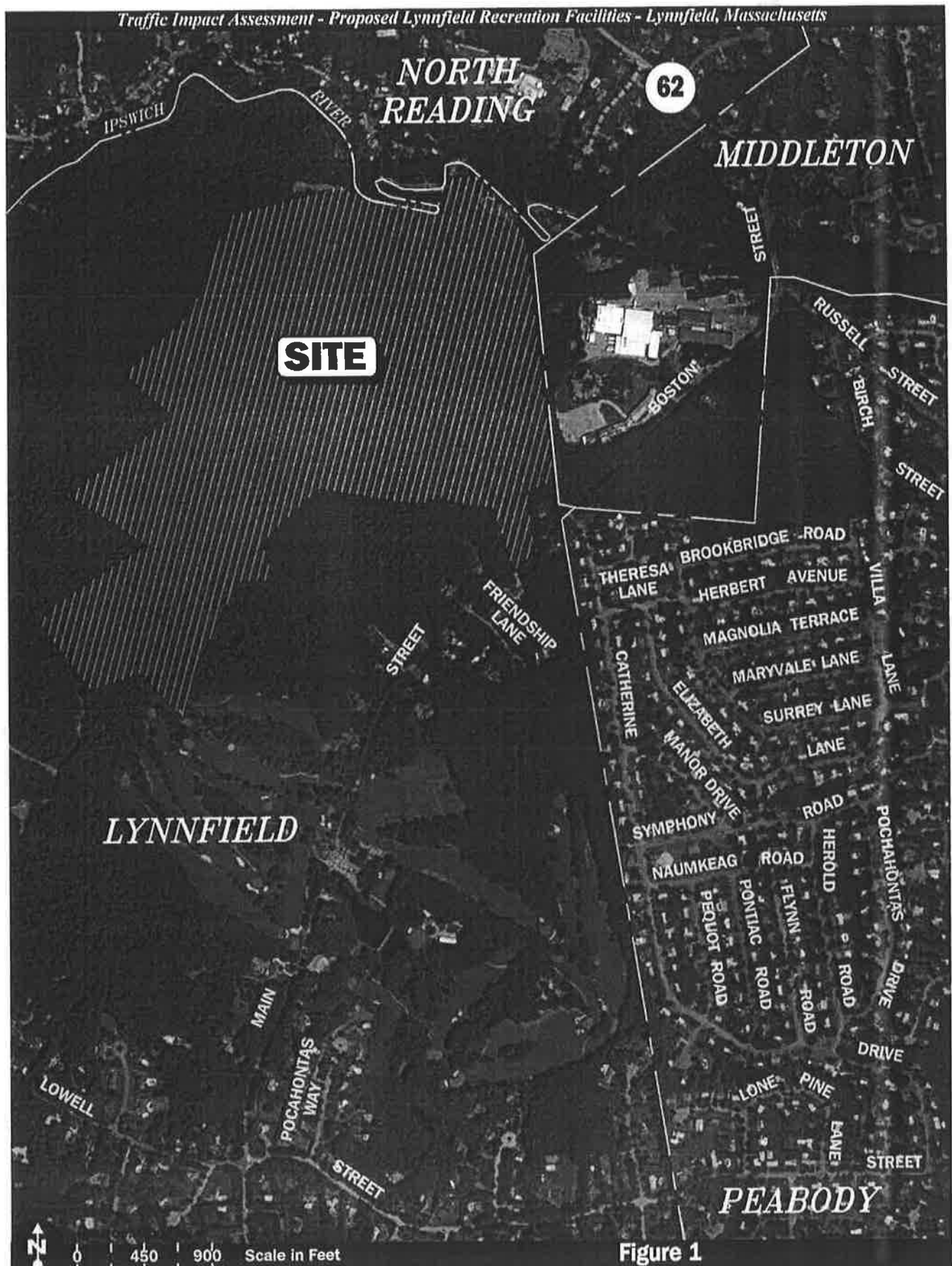


Figure 1

Site Location Map

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in December 2012 and January 2013. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area for the Project consisted of the Main Street corridor proximate to the Project site.

The following describes existing conditions within the study area.

Roadway

Main Street

Main Street is a two lane, urban minor arterial roadway under Town jurisdiction that traverses the Town of Lynnfield in a general north-south direction and provides access to Route 62 to the north of the Project site and to Interstate 95 (I-95)/Route 128 to the south. Within the study area, Main Street provides two 13 to 14-foot wide travel lanes separated by a double-yellow centerline with no marked shoulders provided. A sidewalk is currently provided continuously along the south (east) side of Main Street within the study area. Illumination is provided by way of street lights mounted on wood poles. The posted speed limit along Main Street proximate to the Project site is 25 miles per hour (mph) in the northbound direction and 35 mph southbound. Land use along Main Street within the study area consists of the Project site, Bostik Inc., the Sagamore Spring Golf Club, residential properties, and areas of wooded space.

Existing Traffic Volumes

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts were completed on Main Street in the vicinity of the Project site in December 2012 over a continuous 48-hour period between Friday, December 7th and Saturday, December 8th, inclusive. It is expected that the peak utilization of the recreational facilities will occur during the weekday afternoon/evening (3:00 to 6:00 PM) and during the Saturday midday period (11:00 AM to 2:00 PM). As such, these time periods were selected for analysis purposes as they would be representative of the peak traffic volume hours for both the Project and the adjacent roadway network.

Traffic Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, MassDOT weekday seasonal factors for Group 6 roadways (urban arterials, collectors and rural arterials, the MassDOT functional classification for Main Street) were reviewed.¹ Based on a review of this data, it was determined that traffic volumes for the month of December are approximately 3 percent above average-month conditions. As such, the traffic volume data that forms the basis of this assessment was not adjusted downward in order to provide a conservative (above-average) analysis condition. The 2012 Existing traffic volumes are summarized in Table 1, with the weekday evening and Saturday midday peak hour traffic volumes graphically depicted on Figure 2.

¹MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2007 Weekday Seasonal Factors, Group 6 – Urban Arterials, Collectors and Rural Arterials.



WEEKDAY EVENING PEAK HOUR

SITE

STREET
←172
MAIN
300→

SATURDAY MIDDAY PEAK HOUR

SITE

STREET
←209
MAIN
193→



Not To Scale



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Figure 2

**2012 Existing
Peak Hour Traffic Volumes**

Table 1
2012 EXISTING TRAFFIC VOLUMES

Location	Weekday Evening Peak-Hour				Saturday Midday Peak-Hour			
	AWT ^a	VPH ^b	K Factor ^c	Directional Distribution ^d	Saturday ^e	VPH	K Factor	Directional Distribution
Main Street, south of Friendship Lane	5,840	472	8.1	63.6% NB	4,670	402	8.6	52.0% SB

^aAverage weekday traffic in vehicles per day.

^bVehicles per hour.

^cPercent of daily traffic occurring during the peak hour.

^dPercent traveling in peak direction.

^eAverage Saturday traffic in vehicles

NB = northbound; SB = southbound.

As can be seen in Table 1, Main Street in the vicinity of the Project site was found to accommodate approximately 5,840 vehicles on an average weekday (24-hour, two-way volume), with approximately 472 vehicles per hour (vph) during the weekday evening peak-hour. On a Saturday, Main Street was found to accommodate approximately 4,670 vehicles, with approximately 402 vph during the Saturday midday peak-hour.

A review of the peak-period traffic counts indicates that the weekday evening peak-hour generally occurs between 4:00 and 5:00 PM, with the Saturday midday peak-hour generally occurring between 12:00 and 1:00 PM.

Pedestrian and Bicycle Facilities

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in January 2013. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of existing and planned future bicycle facilities. A sidewalk is provided continuously along the south (east) side of Main Street within the study area.

At present, no formal existing bicycle facilities were identified within the immediate study area. Further, Main Street does not currently provide sufficient width to accommodate bicycle travel in a shared travelled-way configuration (i.e., motor vehicles and bicyclists sharing the roadway).²

Public Transportation

Public transportation services are not directly provided to the Project site or to the Town of Lynnfield; however, the Massachusetts Bay Transportation Authority (MBTA) (Commuter Rail) serves the surrounding Towns of Reading and Wakefield. Reading Station on the Haverhill branch of the MBTA Commuter Rail Line is located at 35 Lincoln Street in Reading to the southwest of the Project site and Wakefield Station on the Haverhill branch is located at 225 North Avenue in Wakefield to the southwest of the Project site (both stations are within a 15 minute driving distance of the Project site), and provide service to North Station in Boston. The MBTA Commuter Rail schedules and fare information are provided in the Appendix.

²A 14-foot travel lane is the minimum width required to accommodate both bicyclists and motor vehicles within the same travel lane without requiring that the motor vehicle cross the centerline to pass a bicyclist.

Spot Speed Measurements

Vehicle travel speed measurements were performed on Main Street in the vicinity of the Project site over a continuous 48-hour period in conjunction with the ATR counts. Table 2 summarizes the vehicle travel speed measurements.

Table 2
VEHICLE TRAVEL SPEED MEASUREMENTS

	Main Street	
	Northbound	Southbound
Mean Travel Speed (mph)	34	38
85 th Percentile Speed (mph)	39	42
Posted Speed Limit (mph)	25	35

mph = miles per hour.

As can be seen in Table 2, the mean (average) vehicle travel speed along Main Street in the vicinity of the Project site was found to be approximately 36 mph. The 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 40 mph, or approximately 15 mph above the posted speed limit in the northbound direction (25 mph) and 5 mph above the posted speed limit in the southbound direction (35 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances, and is often used in establishing posted speed limits.

Motor Vehicle Crash Data

Motor vehicle crash information for Main Street in the vicinity of the Project site was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent three-year period available (2008 through 2010, inclusive) in order to examine motor vehicle crash trends occurring within the study area. Based on a review of the MassDOT data, no motor vehicle crashes were reported to have occurred at or proximate to this section of Main Street over the three-year review period. As such, *the MassDOT data did not indicate a discernible safety deficiency with respect to the segment of Main Street proximate to the Project site.*



FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2018, which reflects a five-year planning horizon from the current year (2013) consistent with State traffic study guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2018 under No-Build conditions include all existing traffic and general background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2018 No-Build traffic volumes reflect 2018 Build traffic volume conditions with the Project.

Specific Development by Others

The Planning Department of the Towns of Lynnfield and Middleton were contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this discussion, there were no developments identified at this time that are expected to result in an increase in traffic within the study area beyond the background traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on a review of this data, it was determined that traffic volumes within the study area have fluctuated over the past several years, ranging from increases of approximately 0.6 percent to decreases of approximately 1.5 percent. On average, traffic volumes were found to have generally decreased by approximately 0.7 percent per year. Based on this review, a 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

MassDOT and the Town of Lynnfield were contacted in order to determine if there were any planned roadway improvement projects expected to be completed within the study area. Based on these discussions, no roadway improvements outside of routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2018 No-Build condition (without the Project) peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2012 Existing peak-hour traffic volumes. The resulting 2018 No-Build weekday evening and Saturday midday peak-hour traffic volumes are depicted on Figure 3.

Project-Generated Traffic

In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)³ were used. The ITE provides trip-generation information for various types of land uses developed as a result of scientific studies that have been conducted over the past 50 plus years, the most recent update of which was published in 2012. Based on a review of the ITE database and the known elements of the Project, it was determined that the ITE did not have trip-

³*Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.

WEEKDAY EVENING PEAK HOUR

SITE

STREET

←183

319→

MAIN

SATURDAY MIDDAY PEAK HOUR

SITE

STREET

←222

205→

MAIN



Not To Scale



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Figure 3

**2018 No-Build
Peak Hour Traffic Volumes**

generation information for a similar type facility. Accordingly, the number of proposed parking spaces (339) was used as the basis to develop the anticipated traffic characteristics of the Project.

Traffic volume projections for the weekday evening and Saturday midday peak hours were developed assuming 75 percent utilization of the parking spaces provided and then increased by approximately 10 percent of the available parking supply (approximately additional 40 vehicle trips) to account for drop-off/pick-up activities (i.e., a parent or caregiver that may drop-off/pick-up a child for practice or a game). The directional distribution between entering and exiting traffic was developed based on a review of ITE Land Use Code (LUC) 412, *County Park*. Table 3 summarizes the anticipated traffic characteristics of the Project, with the detailed trip-generation calculations included in the Appendix.

Table 3
TRIP GENERATION SUMMARY

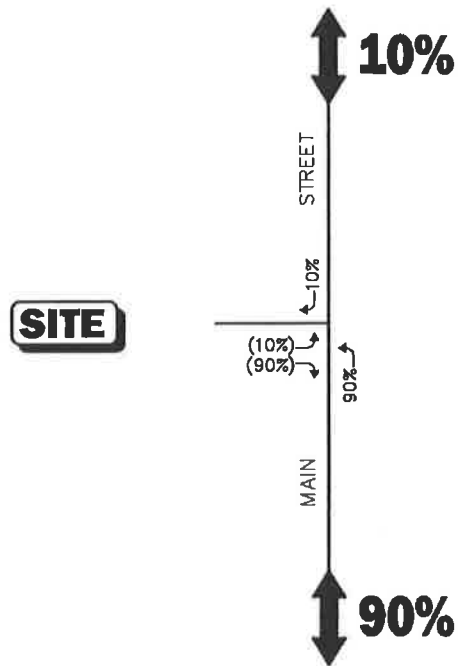
Time Period/Direction	Vehicle Trips
	Proposed Recreation Complex ^a
<i>Average Weekday Daily:</i>	
Entering	467
<u>Exiting</u>	<u>467</u>
Total	934
<i>Weekday Evening Peak Hour:</i>	
Entering	103
<u>Exiting</u>	<u>191</u>
Total	294
<i>Saturday Midday Peak Hour:</i>	
Entering	168
<u>Exiting</u>	<u>126</u>
Total	294

^aBased on the number of parking spaces to be provided for the Project (339) and using ITE LUC 412, *County Park*, for peak hour directional distribution.

As can be seen in Table 3, the Project was shown to generate approximately 934 vehicle trips (two-way traffic over the operational day of the Project, or 467 vehicles entering and 467 exiting) on an average weekday, with approximately 294 vehicle trips (103 vehicles entering and 191 exiting) expected during the weekday afternoon/evening peak-hour and approximately 294 vehicle trips (168 vehicles entering and 126 exiting) expected during the Saturday midday peak-hour.

Trip Distribution and Assignment

The directional distribution of generated trips to and from the Project site was determined based on a review of the location of the Project in relation to the population centers within the Town. The general trip distribution pattern for the Project is graphically depicted on Figure 4, with the peak-hour traffic volumes expected to be generated by the Project assigned onto the study area roadway network as shown on Figure 5.



Not To Scale

Figure 4



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Trip Distribution Map

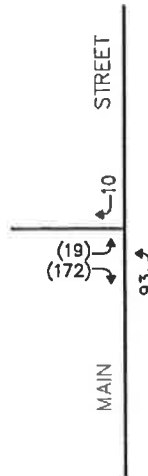
WEEKDAY EVENING PEAK HOUR

Legend:

XX
(XX)

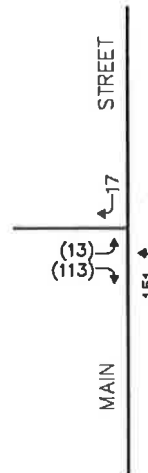
Entering
Exiting

SITE	
In	103
Out	191
Total	294



SATURDAY MIDDAY PEAK HOUR

SITE	
In	168
Out	126
Total	294



Not To Scale



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Transportation Engineers & Planners

Figure 5

**Project-Generated
Peak Hour Traffic Volumes**

Future Traffic Volumes - Build Condition

The 2018 Build condition (with the Project) traffic volumes consist of the 2018 No-Build traffic volumes with the additional traffic expected to be generated by the Project added to them. The 2018 Build weekday evening and Saturday midday peak-hour traffic-volumes are graphically depicted on Figure 6.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the potential impact of the Project on the roadway network, traffic operations and vehicle queue analyses were performed at the intersection of Main Street at the Project site driveway under 2018 Build conditions. The results of the intersection capacity and vehicle queue analyses are summarized in Table 5, with the detailed analysis results presented in the Appendix.

In brief, six levels of service are defined for each type of facility. They are given letter designations ranging from "A" to "F", with a level-of-service (LOS) "A" representing the best operating conditions and a LOS "F" representing congested or constrained operations. A LOS "E" is representative of a transportation facility that is operating at its design capacity with a LOS "D" generally defined as the limit of "acceptable" traffic operations. Since the level-of-service of a traffic facility is a function of the flows placed upon it, such a facility may operate at a wide range of levels of service depending on the time of day, day of week, or period of the year. The Synchro© intersection capacity analysis software, which is based on the analysis methodologies and procedures presented in the 2010 *Highway Capacity Manual* (HCM)⁴, was used to complete the level-of-service and vehicle queue analyses for the unsignalized study intersection.

Table 5
LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/Peak Hour/Movement	2018 Build			
	Demand ^a	Delay	LOS	Queue 95 th
Main Street at the Project Site Driveway				
<i>Weekday Evening:</i>				
Project Site Driveway EB LT/RT	191	11.8	B	1
Main Street NB LT/TH	412	1.8	A	1
Main Street SB TH/RT	193	0.0	A	0
<i>Saturday Midday:</i>				
Project Site Driveway EB LT/RT	126	12.2	B	1
Main Street NB LT/TH	356	3.5	A	1
Main Street SB TH/RT	239	0.0	A	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

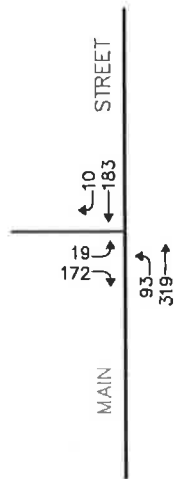
EB = eastbound; NB = northbound; SB = southbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

As can be seen in Table 5, under 2018 Build conditions, the critical movements at the Project site driveway intersection with Main Street (all movements from the Project site driveway) were shown to operate at LOS B during both the weekday evening and Saturday midday peak hours. Vehicle queues at

⁴*Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2010.

WEEKDAY EVENING PEAK HOUR

SITE	
In	103
Out	191
Total	294



SATURDAY MIDDAY PEAK HOUR

SITE	
In	168
Out	126
Total	294

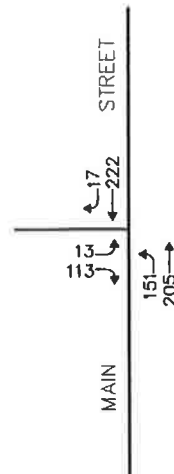


Figure 6

**2018 Build
Peak Hour Traffic Volumes**

the intersection were shown to range from 0 to 1 vehicle during the peak periods, with all movements along Main Street shown to operate at LOS A during the peak periods with vehicle queues of approximately 1 vehicle.

Based on the results of this analysis, it has been concluded that the Project site driveway intersection with Main Street will function with limited delay (less than 15 seconds) and vehicle queuing under normal (typical) field utilization and use of the recreational amenities (i.e., non-tournament or special event conditions). This condition is a direct result of the relatively low volume of conflicting traffic on Main Street during the peak hours and that the majority of vehicles exiting the Project will be turning right, a movement that operates with less delay than a left-turn movement. Under special event conditions, it may be necessary to provide a police detail officer to control traffic at the intersection given the concentrated arrivals and departures that typically occur during such events.

PARKING DEMAND CALCULATIONS

In order to determine the anticipated parking demands of the Project, parking demand data obtained from the ITE⁵ for Land Use Code 488, *Soccer Complex*, a land use with similar amenities to those that will be included as a part of the Project, was used. Table 6 summarizes the average and 85th percentile parking demands observed at recreational facilities similar to those of the Project as represented by the ITE data. The 85th percentile peak demand is typically used as the design value to determine the adequacy of the parking supply.

Table 6
PARKING DEMAND DATA ^a

Time Period	Average Observed Parking Demand (spaces per field)	85 th Percentile Observed Parking Demand (spaces per field)
Weekday Evening	38.30	60.50
Saturday Midday	58.80	65.20

^aBased on ITE LUC 488, *Soccer Complex*.

Applying the ITE parking demand data to the Project (assuming five (5) fields consisting of three (3) multi-purpose fields, an ice/roller hockey rink, and a tennis/basketball court(s)) results in an average peak parking demand for the Project of 192 spaces during the weekday afternoon/evening peak period and 294 spaces during the Saturday midday peak period. The calculated 85th percentile peak parking demand for the Project is 302 spaces during the weekday afternoon/evening peak period and 326 spaces during the Saturday midday peak period. Given that the Project site will include parking for a total of 339 vehicles, this analysis has indicated that sufficient parking will be available to accommodate the anticipated parking demands of the Project during the peak parking demand periods, with additional reserve capacity to accommodate parking demands that may be associated with use of the other non-field related amenities that are to be located within the Project site. It should be noted that these calculations are based on simultaneous use of all facilities that are to be located within the Project site.

⁵*Parking Generation*, 4th Edition; Institute of Transportation Engineers; Washington, D.C.; 2010.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the Project site driveway intersection with Main Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)⁶ requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 8 presents the measured SSD and ISD at the subject intersection.

Table 8
SIGHT DISTANCE MEASUREMENTS

Intersection/Sight Distance Measurement	Required Minimum (Feet) ^a	ISD ^a	Measured (Feet)
Main Street at the Project Site Driveway			
<i>Stopping Sight Distance:</i>			
Main Street approaching from the north	360	--	502
Main Street approaching from the south	360	--	650+
<i>Intersection Sight Distance:</i>			
Looking to the north from the Project Site Driveway	360	430/500 ^b	360
Looking to the south from the Project Site Driveway	360	430/500 ^b	650+

^aRecommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011; and based on a 45 mph approach speed on Main Street.

^bValues shown are the intersection sight distance for a vehicle turning right/left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

As can be seen in Table 8, the available lines of sight at the Project site driveway intersection with Main Street were found to meet or exceed the recommended minimum sight distance requirement for a 45 mph approach speed along Main Street, consistent with the measured 85th percentile vehicle travel speed along this roadway and 10 mph above the posted speed limit in the southbound direction (35 mph) and 20 mph above the posted speed limit in the northbound direction (25 mph).

⁶*A Policy on Geometric Design of Highway and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

VAI has conducted a TIA in order to determine the potential impacts on the transportation infrastructure associated with the proposed recreation park and playing fields to be located along the west side of Main Street and proximate to the Middleton town line in Lynnfield, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) current and projected future traffic volumes; ii) potential impacts on the surrounding roadway network; iii) access and circulation for vehicles, pedestrians and bicyclists along Main Street and at the proposed Project site driveway; and iv) anticipated parking demands.

Based on a review of the findings of this assessment, we have concluded the following with respect to the Project:

1. The Project is expected to generate approximately 934 trips on an average weekday (two-way traffic over the operational day of the Project), with approximately 294 vehicle trips expected during both the weekday afternoon/evening and Saturday midday peak hours;
2. All movements at the Project site driveway intersection with Main Street were shown to operate with minimal delay (less than 15 seconds) and vehicle queuing (0 to 1 vehicle) during the peak-hours;
3. Sufficient parking will be provided within the Project site to accommodate anticipated demands under typical field use;
4. No discernible safety deficiencies were noted within the study area based on a review of the motor vehicle crash history along Main Street proximate to the Project site; and
5. Lines of sight to and from the Project site driveway intersection with Main Street were found to meet or exceed the required minimum distance for the intersection to function in a safe and efficient manner.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner.

Recommendations

The following recommendations are offered for consideration with respect to the design and operation of the Project with specific regard to the proposed driveway and traffic and parking management.

- The Project site driveway should be a minimum of 24 feet in width (28 feet if bicycle accommodations are to be afforded) and accommodate two-way travel, with vehicles exiting the Project site placed under STOP-sign control.
- A leveling area not exceeding 2 percent in grade should be provided on the driveway for a minimum distance of 100 feet (approximately four (4) vehicles) approaching Main Street.
- Consideration should be given to providing a secondary means of access to the field complex for emergency vehicles given the length of the proposed driveway and remote nature of the fields with respect to Main Street. This condition should be reviewed in consultation with the



Lynnfield Police Department and Fire Department with respect to their requirements for response to the Project.

- It is suggested that a sidewalk be provided along one or both sides of the driveway, with consideration to locating a crosswalk for crossing Main Street at the Project site driveway intersection. If a crosswalk is provided, the crossing should include wheelchair ramps and the installation of pedestrian crossing warning signs at and in advance of the crossing (175 feet north and south of the crosswalk location).
- Where provided, pedestrian crossings within the Project site should also include a marked crosswalk, wheelchair ramps and the installation of pedestrian crossing warning signs at the crossing.
- Bicycle racks should be provided at appropriate locations within the Project site.
- Signs and landscaping adjacent to the Project site driveway intersection with Main Street and within the Project site should be designed and maintained so as not to restrict lines of sight.
- Within the Project site, roadways should be designed with appropriate geometry (horizontal and vertical) to accommodate a safe travel speed of 25 mph.
- Centerline pavement markings, where provided, shall consist of a double-yellow line in accordance with the centerline pavement marking standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).⁷
- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the MUTCD.
- A traffic and parking management plan should be developed in consultation with the Lynnfield Police Department for special event conditions such as tournaments, clinics and other such use of the amenities that are to be located within the Project site where the expected attendance level may exceed the available parking supply (339 spaces) or as defined by the Police Department. The management plan should include measures to encourage car/vanpooling, buses and other means of transportation that are designed to reduce the overall traffic and parking demands of the Project. Further, the scheduling of games and practices should also be coordinated in order to stagger the arrival and departure of traffic. For major events, police detail officers may be required in order to manage the flow of traffic and the safety of pedestrians both within the Project site and along Main Street. The use of police details should be at the discretion of the Police Chief and in consultation with the appropriate Town officials.

With implementation of the above recommendations, safe and efficient access will be provided to the Project site and the Project can be constructed with minimal impact on the roadway system.

⁷*Manual on Uniform Traffic Control Devices* (MUTCD); Federal Highway Administration; Washington, DC; 2009.

APPENDIX

AUTOMATIC TRAFFIC RECORDER COUNTS
SEASONAL ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
VEHICLE TRAVEL SPEED DATA
GENERAL BACKGROUND TRAFFIC GROWTH
TRIP-GENERATION CALCULATIONS
CAPACITY ANALYSIS WORKSHEETS

AUTOMATIC TRAFFIC RECORDER COUNTS

Accurate Counts

978-664-2565

Page 1

Location : Main Street
Location : South of Friendship Lane
City/State: Lynnfield, MA

Start Time	07-Dec-12 Fri	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		8	35			2	43				
12:15		9	38			5	40				
12:30		2	34			1	48				
12:45		1	50	20	157	1	41	9	172	29	329
01:00		0	50			0	37				
01:15		5	45			0	34				
01:30		0	37			0	50				
01:45		1	43	6	175	1	50	1	171	7	346
02:00		1	40			2	34				
02:15		0	69			1	36				
02:30		0	50			3	43				
02:45		2	67	3	226	1	42	7	154	10	380
03:00		1	68			0	39				
03:15		1	78			1	58				
03:30		0	65			0	47				
03:45		2	70	4	281	2	44	3	188	7	469
04:00		1	73			2	43				
04:15		0	77			3	39				
04:30		1	73			6	48				
04:45		1	77	3	300	4	42	15	172	18	472
05:00		2	67			11	42				
05:15		2	76			12	48				
05:30		6	68			26	55				
05:45		6	70	16	281	39	43	88	188	104	469
06:00		8	73			49	44				
06:15		11	72			68	38				
06:30		8	59			60	28				
06:45		19	57	46	261	87	32	264	142	310	403
07:00		23	42			81	33				
07:15		17	29			70	32				
07:30		31	40			83	19				
07:45		30	29	101	140	64	34	298	118	399	258
08:00		25	27			53	16				
08:15		30	24			74	19				
08:30		43	25			72	12				
08:45		45	18	143	94	61	25	260	72	403	166
09:00		34	17			54	17				
09:15		33	17			40	14				
09:30		34	20			33	11				
09:45		36	22	137	76	33	13	160	55	297	131
10:00		24	17			30	14				
10:15		32	19			43	22				
10:30		31	14			40	8				
10:45		28	22	115	72	48	5	161	49	276	121
11:00		46	12			51	13				
11:15		35	16			47	13				
11:30		37	9			46	9				
11:45		32	11	150	48	54	4	198	39	348	87
Total		744	2111			1464	1520			2208	3631
Percent		26.1%	73.9%			49.1%	50.9%			37.8%	62.2%

Accurate Counts 978-664-2565

Page 2

Location : Main Street
Location : South of Friendship Lane
City/State: Lynnfield, MA

Start Time	08-Dec-12 Sat	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		18	47			5	50				
12:15		5	47			5	37				
12:30		7	47			6	54				
12:45		7	52	37	193	1	68	17	209	54	402
01:00		0	47			1	49				
01:15		3	43			2	44				
01:30		3	45			0	51				
01:45		1	55	7	190	4	52	7	196	14	386
02:00		3	36			1	35				
02:15		2	37			1	54				
02:30		3	47			0	57				
02:45		1	47	9	167	0	48	2	194	11	361
03:00		1	43			1	42				
03:15		1	46			0	43				
03:30		0	49			1	46				
03:45		0	42	2	180	0	54	2	185	4	365
04:00		1	39			0	50				
04:15		1	39			1	36				
04:30		0	38			1	42				
04:45		0	39	2	155	2	45	4	173	6	328
05:00		3	43			2	39				
05:15		2	53			4	34				
05:30		4	43			11	34				
05:45		3	34	12	173	8	45	25	152	37	325
06:00		1	37			7	46				
06:15		3	47			10	39				
06:30		7	30			12	30				
06:45		4	36	15	150	16	32	45	147	60	297
07:00		9	16			10	28				
07:15		7	28			15	33				
07:30		8	24			12	28				
07:45		16	21	40	89	16	23	53	112	93	201
08:00		17	21			25	23				
08:15		20	23			30	16				
08:30		23	26			34	20				
08:45		23	17	83	87	45	20	134	79	217	166
09:00		29	19			33	19				
09:15		28	17			31	18				
09:30		24	20			35	19				
09:45		41	19	122	75	41	13	140	69	262	144
10:00		25	24			34	15				
10:15		35	24			45	15				
10:30		33	15			32	15				
10:45		44	15	137	78	47	9	158	54	295	132
11:00		52	13			57	18				
11:15		46	15			50	16				
11:30		44	16			55	13				
11:45		40	8	182	52	55	9	217	56	399	108
Total		648	1589			804	1626			1452	3215
Percent		29.0%	71.0%			33.1%	66.9%			31.1%	68.9%
Grand Total		1392	3700			2268	3146			3660	6846
Percent		27.3%	72.7%			41.9%	58.1%			34.8%	65.2%

ADT

ADT 5,253

AADT 5,253

Accurate Counts 978-664-2565

Location : Main Street
Location : South of Friendship Lane
City/State: Lynnfield, MA

Start Time	03-Dec-12	Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	NB	SB
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	*	28	13
01:00	*	*	*	*	*	*	*	20	9	37	17	*	*	6	4
02:00	*	*	*	*	*	*	3	6	1	7	7	*	*	6	4
03:00	*	*	*	*	*	*	3	3	7	9	2	*	*	3	2
04:00	*	*	*	*	*	*	3	4	3	2	2	*	*	3	2
05:00	*	*	*	*	*	*	3	16	15	2	4	*	*	2	10
06:00	*	*	*	*	*	*	46	88	88	12	25	*	*	14	56
07:00	*	*	*	*	*	*	101	264	264	15	45	*	*	30	154
08:00	*	*	*	*	*	*	143	298	40	83	53	*	*	70	176
09:00	*	*	*	*	*	*	137	260	260	122	134	*	*	113	197
10:00	*	*	*	*	*	*	115	160	160	140	140	*	*	130	150
11:00	*	*	*	*	*	*	150	198	182	137	158	*	*	126	160
12:00 PM	*	*	*	*	*	*	157	172	182	217	217	*	*	166	208
01:00	*	*	*	*	*	*	175	171	193	209	209	*	*	175	190
02:00	*	*	*	*	*	*	226	154	190	196	196	*	*	182	184
03:00	*	*	*	*	*	*	281	188	167	194	194	*	*	196	174
04:00	*	*	*	*	*	*	300	172	180	185	185	*	*	230	186
05:00	*	*	*	*	*	*	281	188	155	173	173	*	*	228	172
06:00	*	*	*	*	*	*	261	142	173	152	152	*	*	227	170
07:00	*	*	*	*	*	*	140	118	150	147	147	*	*	206	144
08:00	*	*	*	*	*	*	94	72	89	112	112	*	*	114	115
09:00	*	*	*	*	*	*	76	55	87	79	79	*	*	90	76
10:00	*	*	*	*	*	*	72	49	75	69	69	*	*	75	62
11:00	*	*	*	*	*	*	48	39	78	54	54	*	*	75	52
Lane	0	0	0	0	0	0	2855	2984	2237	2430	2430	0	0	2543	2707
Day	0	0	0	0	0	0	5839	5839	4667	4667	4667	0	0	5250	5250
AM Peak	-	-	-	-	-	-	11:00	07:00	11:00	11:00	11:00	-	-	11:00	11:00
Vol.	-	-	-	-	-	-	150	298	182	217	217	-	-	166	208
PM Peak	-	-	-	-	-	-	16:00	15:00	12:00	12:00	12:00	-	-	15:00	12:00
Vol.	-	-	-	-	-	-	300	188	193	209	209	-	-	230	190

Comb. Total 0 0 0 0 0 0 0 5839 4667 5250

ADT ADT 5,253 AADT 5,253

SEASONAL ADJUSTMENT DATA

MASSACHUSETTS HIGHWAY DEPARTMENT - STATEWIDE TRAFFIC DATA COLLECTION

2007 WEEKDAY SEASONAL FACTORS *

* Note: These are weekday factors. The average of the factors for the year will not equal 1, as weekend data are not considered.

FACTOR GROUP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GROUP 1 - WEST INTERSTATE	0.95	0.91	0.85	0.85	0.87	0.86	0.91	0.96	0.90	0.88	0.90	0.91
GROUP 2 - RURAL MAJOR COLLECTOR (R-5)	1.11	1.07	1.07	0.98	0.92	0.88	0.88	0.86	0.89	0.93	1.01	1.04
GROUP 3A - RECREATIONAL *(1-4) See below	1.26	1.20	1.18	1.04	0.96	0.86	0.78	0.79	0.93	0.99	1.07	1.12
GROUP 3B - RECREATIONAL *(5) See below	1.22	1.18	1.20	1.04	0.96	0.88	0.73	0.74	0.99	1.02	1.12	1.17
GROUP 4 - I-495 INTERSTATE	1.05	1.03	1.03	0.95	0.93	0.87	0.86	0.83	0.89	0.93	0.93	0.96
GROUP 5 - EAST INTERSTATE	1.02	0.99	0.97	0.94	0.95	0.91	0.92	0.92	0.94	0.94	0.98	0.99
GROUP 6 - URBAN ARTERIALS, COLLECTORS & RURAL ARTERIALS (R-2, R-3)	1.03	0.99	0.97	0.92	0.91	0.90	0.92	0.91	0.92	0.93	0.97	0.97
GROUP 7 - I-84 PROXIMITY (STA. 17)	0.84	1.15	1.17	1.08	1.10	1.02	1.01	0.96	1.06	1.06	1.11	1.15
GROUP 8 - I-295 PROXIMITY (STA. 6590)	0.95	1.01	0.96	0.92	0.89	0.88	0.91	0.86	0.91	0.93	0.95	0.92
GROUP 9 - I-195 PROXIMITY (STA. 7)	1.10	1.03	1.00	0.94	0.91	0.87	0.84	0.82	0.88	0.93	1.03	0.99

RECREATIONAL: (ALL YEARS)

**GROUP 3A:

1. CAPE COD (ALL TOWNS)
2. PLYMOUTH(SOUTH OF RTE.3A)

7014, 7079, 7080, 7090, 7091, 7092, 7093, 7094, 7095, 7096, 7097, 7108, 7178

3. MARTHA'S VINEYARD

4. NANTUCKET

**GROUP 3B:

5. PERMANENTS 2 & 169

1066, 1067, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1113, 1114, 1115, 2196, 2197, 2198

Apply I-84 factor to stations: 3290, 3921, 3929

2007 AXLE CORRECTION FACTORS

ROAD INVENTORY FUNCTIONAL CLASSIFICATION

RURAL

1

2

3

0.5,6

URBAN

1

2,3

5

0,6

I-84

0.83

AXLE CORRECTION FACTOR

0.90

0.93

0.98

0.98

0.96

0.97

0.99

0.99

0.83

ROUND OFF

0 - 999.....10

> 1,000.....100

PUBLIC TRANSPORTATION SCHEDULES

Scan the QR code on your smartphone to load the MBTA's mobile web site and receive access to schedules, T-Alerts and service updates.



Bicycles are allowed on trains with the bicycle symbol shown above the train number.

Shaded area indicates peak hour trains.

Saturday and Sunday

VEHICLE TRAVEL SPEED DATA

Accurate Counts 978-664-2565

Location : Main Street
Location : South of Friendship Lane
City/State: Lynnfield, MA
Northbound

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	85th Percent	95th Percent
12/07/12	0	0	0	1	11	5	3	0	0	0	0	0	0	0	20	40	43
01:00	0	0	0	0	4	1	1	0	0	0	0	0	0	0	6	40	43
02:00	0	0	0	0	1	2	0	0	0	0	0	0	0	0	3	39	40
03:00	0	0	0	0	1	2	1	0	0	0	0	0	0	0	4	42	44
04:00	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3	32	34
05:00	0	0	1	1	8	6	0	0	0	0	0	0	0	0	16	38	39
06:00	0	0	1	8	11	20	5	1	0	0	0	0	0	0	46	40	43
07:00	3	0	3	12	32	39	11	1	0	0	0	0	0	0	101	39	43
08:00	5	0	3	6	41	64	20	4	0	0	0	0	0	0	143	40	44
09:00	1	1	1	10	58	48	17	1	0	0	0	0	0	0	137	40	43
10:00	2	1	3	15	46	43	5	0	0	0	0	0	0	0	115	38	40
11:00	3	0	0	22	63	49	11	2	0	0	0	0	0	0	150	39	42
12 PM	5	0	0	13	55	64	17	3	0	0	0	0	0	0	157	40	43
13:00	5	0	1	18	58	68	19	5	1	0	0	0	0	0	175	40	44
14:00	5	0	1	18	76	92	29	4	1	0	0	0	0	0	226	40	44
15:00	12	3	1	17	106	114	27	1	0	0	0	0	0	0	281	39	42
16:00	8	0	1	43	142	88	14	4	0	0	0	0	0	0	300	38	41
17:00	11	0	12	44	128	74	12	0	0	0	0	0	0	0	281	37	40
18:00	11	1	10	69	102	61	6	1	0	0	0	0	0	0	261	37	40
19:00	2	2	6	28	61	39	2	0	0	0	0	0	0	0	140	37	39
20:00	1	2	6	34	32	16	3	0	0	0	0	0	0	0	94	36	39
21:00	0	0	3	17	36	16	4	0	0	0	0	0	0	0	76	37	40
22:00	0	0	2	16	33	18	2	0	1	0	0	0	0	0	72	37	40
23:00	0	0	2	7	26	12	0	0	1	0	0	0	0	0	48	37	40
Total	69	11	61	401	1132	941	209	27	4	0	0	0	0	0	2855		
Percent	2.4%	0.4%	2.1%	14.0%	39.6%	33.0%	7.3%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.	5	1	3	22	63	64	20	4							11:00	150	
PM Peak Vol.	12	3	12	69	142	114	29	5	1						16:00	300	

Accurate Counts 978-664-2565

Location : Main Street
City/State: South of Friendship Lane
City/State: Lynnfield, MA
Northbound

Start	1	16	21	26	31	36	41	46	51	56	61	66	71	76	81	86	91	95th
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95th	Percent
12/08/12	0	0	1	10	19	4	2	1	0	0	0	0	0	0	0	0	0	42
01:00	0	0	1	0	4	1	1	0	0	0	0	0	0	0	0	0	0	43
02:00	0	0	1	3	0	4	1	0	0	0	0	0	0	0	0	0	0	42
03:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	35
04:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	40
05:00	0	0	1	1	5	3	2	0	0	0	0	0	0	0	0	0	0	43
06:00	0	0	1	3	6	5	0	0	0	0	0	0	0	0	0	0	0	39
07:00	0	0	2	3	16	10	9	0	0	0	0	0	0	0	0	0	0	44
08:00	0	0	0	13	32	27	9	2	0	0	0	0	0	0	0	0	0	43
09:00	0	0	0	11	44	57	8	2	0	0	0	0	0	0	0	0	0	42
10:00	1	1	2	11	57	50	12	3	0	0	0	0	0	0	0	0	0	43
11:00	4	0	0	15	70	70	21	2	0	0	0	0	0	0	0	0	0	43
12 PM	2	0	0	10	71	86	21	3	0	0	0	0	0	0	0	0	0	43
13:00	6	0	1	20	62	79	21	1	0	0	0	0	0	0	0	0	0	42
14:00	6	0	0	11	72	59	16	3	0	0	0	0	0	0	0	0	0	43
15:00	4	0	3	16	71	72	13	1	0	0	0	0	0	0	0	0	0	41
16:00	5	0	3	17	70	46	13	1	0	0	0	0	0	0	0	0	0	42
17:00	1	0	3	57	75	29	7	1	0	0	0	0	0	0	0	0	0	40
18:00	0	0	6	31	77	29	7	0	0	0	0	0	0	0	0	0	0	40
19:00	0	0	5	22	42	15	4	1	0	0	0	0	0	0	0	0	0	41
20:00	0	0	0	29	41	15	2	0	0	0	0	0	0	0	0	0	0	39
21:00	1	1	3	15	36	18	1	0	0	0	0	0	0	0	0	0	0	39
22:00	1	1	6	14	29	24	2	1	0	0	0	0	0	0	0	0	0	40
23:00	0	0	0	10	29	9	4	0	0	0	0	0	0	0	0	0	0	41
Total	31	3	39	323	929	714	176	22	0	0	0	0	0	0	0	0	0	2237
Percent	1.4%	0.1%	1.7%	14.4%	41.5%	31.9%	7.9%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM																		
Peak	11:00	10:00	07:00	11:00	11:00	11:00	11:00	10:00										11:00
Vol.	4	1	2	15	70	70	21	3										182
PM																		
Peak	13:00	21:00	18:00	17:00	18:00	12:00	12:00	12:00										12:00
Vol.	6	1	6	57	77	86	21	3										193
Total	100	14	100	724	2061	1655	385	49	4	0	0	0	0	0	0	0	0	5092
Percent	2.0%	0.3%	2.0%	14.2%	40.5%	32.5%	7.6%	1.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
15th Percentile : 28 MPH 50th Percentile : 33 MPH 85th Percentile : 39 MPH 95th Percentile : 42 MPH																		

Stats

10 MPH Pace Speed : 30-39 MPH
 Number in Pace : 3368
 Percent in Pace : 66.1%
 Number of Vehicles > 35 MPH : 2093
 Percent of Vehicles > 35 MPH : 41.1%
 Mean Speed(Average) : 34 MPH

Accurate Counts 978-664-2565

Location : Main Street
Location : South of Friendship Lane
City/State: Lynnfield, MA
Southbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	85th Percent	95th Percent
12/07/12	15	20	25	30	35	40	45	50	55	60	65	70	75	80	9	40	42
01:00	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	1	35
02:00	0	0	0	0	1	3	2	1	0	0	0	0	0	0	0	7	48
03:00	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3	45
04:00	0	0	0	0	1	7	4	2	0	1	0	0	0	0	15	46	56
05:00	0	0	0	0	13	34	31	10	0	0	0	0	0	0	88	44	47
06:00	0	0	0	5	46	135	62	13	2	1	0	0	0	0	264	43	46
07:00	3	0	0	7	41	121	102	21	3	0	0	0	0	0	298	44	47
08:00	3	2	0	2	20	115	91	24	3	0	0	0	0	0	160	44	47
09:00	2	0	0	2	14	77	47	17	0	1	0	0	0	0	161	44	48
10:00	2	0	0	4	16	66	57	13	3	0	0	0	0	0	198	43	46
11:00	3	0	2	3	26	88	61	14	1	0	0	0	0	0	172	45	48
12 PM	2	0	1	1	19	54	75	18	2	0	0	0	0	0	171	43	46
13:00	1	0	0	1	20	87	52	9	1	0	0	0	0	0	154	44	48
14:00	2	0	1	3	16	57	57	16	1	1	0	0	0	0	188	42	45
15:00	6	1	1	3	20	97	53	6	1	0	0	0	0	0	172	42	44
16:00	4	0	0	7	39	79	41	2	0	0	0	0	0	0	188	40	42
17:00	6	1	1	7	52	98	23	0	0	0	0	0	0	0	142	39	42
18:00	6	1	1	8	46	64	16	0	0	0	0	0	0	0	118	40	43
19:00	4	0	1	7	42	48	16	0	0	0	0	0	0	0	72	40	43
20:00	0	2	2	4	30	25	7	2	0	0	0	0	0	0	55	40	43
21:00	1	0	0	1	16	30	6	1	0	0	0	0	0	0	49	41	43
22:00	1	0	0	2	18	19	9	0	0	0	0	0	0	0	39	39	41
23:00	0	0	2	6	12	16	3	0	0	0	0	0	0	0	2984	39	41
Total	46	7	13	76	510	1324	818	169	17	4	0	0	0	0	2984	39	41
Percent	1.5%	0.2%	0.4%	2.5%	17.1%	44.4%	27.4%	5.7%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
AM Peak Vol.	3	2	2	7	46	135	102	24	3	1					298		
PM Peak Vol.	6	2	2	8	52	98	75	18	2	1					188		

Accurate Counts 978-664-2565

Location : Main Street
Location : South of Friendship Lane
City/State: Lynnfield, MA
Southbound

Start	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	85th	95th
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999		Percent	Percent
12/08/12	0	0	1	2	4	8	2	0	0	0	0	0	0	0	17	40	42
01:00	0	0	0	0	4	3	0	0	0	0	0	0	0	0	7	38	40
02:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	33	35
03:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	34	35
04:00	0	0	0	0	2	1	0	0	1	0	0	0	0	0	4	52	54
05:00	0	0	0	1	5	12	6	1	0	0	0	0	0	0	25	42	45
06:00	2	0	0	3	7	20	12	1	0	0	0	0	0	0	45	42	44
07:00	0	0	0	0	8	30	12	3	0	0	0	0	0	0	53	42	46
08:00	3	0	0	0	19	67	35	10	0	0	0	0	0	0	134	43	46
09:00	1	0	0	0	23	72	35	9	0	0	0	0	0	0	140	43	46
10:00	3	1	0	1	31	78	36	8	0	0	0	0	0	0	158	42	45
11:00	5	0	0	0	33	97	67	10	5	0	0	0	0	0	217	43	46
12 PM	6	0	0	8	18	103	60	14	0	0	0	0	0	0	209	43	46
13:00	6	0	0	5	32	94	51	8	0	0	0	0	0	0	196	42	45
14:00	5	0	2	1	35	100	46	4	1	0	0	0	0	0	194	42	45
15:00	2	1	0	7	30	96	45	4	0	0	0	0	0	0	185	42	44
16:00	4	0	0	12	54	80	19	4	0	0	0	0	0	0	173	40	43
17:00	0	0	0	6	57	57	29	2	1	0	0	0	0	0	152	41	44
18:00	3	0	0	5	57	69	13	0	0	0	0	0	0	0	147	39	42
19:00	2	0	0	8	44	49	9	0	0	0	0	0	0	0	112	39	41
20:00	1	0	0	2	26	44	5	1	0	0	0	0	0	0	79	39	42
21:00	1	1	0	6	31	27	3	0	0	0	0	0	0	0	69	38	40
22:00	1	0	0	1	25	17	10	0	0	0	0	0	0	0	54	41	43
23:00	0	0	0	1	19	26	10	0	0	0	0	0	0	0	56	41	43
Total	45	3	4	69	567	1150	505	79	8	0	0	0	0	0	2430		
Percent	1.9%	0.1%	0.2%	2.8%	23.3%	47.3%	20.8%	3.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM																	
Peak	11:00	10:00	00:00	06:00	11:00	11:00	11:00	08:00	11:00						11:00		
Vol.	5	1	1	3	33	97	67	10	5						217		
PM																	
Peak	12:00	15:00	14:00	16:00	17:00	12:00	12:00	12:00	14:00						12:00		
Vol.	6	1	2	12	57	103	60	14	1						209		
Total	91	10	17	145	1077	2474	1323	248	25	4	0	0	0	0	5414		
Percent	1.7%	0.2%	0.3%	2.7%	19.9%	45.7%	24.4%	4.6%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%			

Stats

10 MPH Pace Speed : 34-43 MPH
 Number in Pace : 3646
 Percent in Pace : 67.3%
 Number of Vehicles > 35 MPH : 4074
 Percent of Vehicles > 35 MPH : 75.2%
 Mean Speed(Average) : 38 MPH

Location : Main Street

Northbound, Southbound	15		16		21		26		31		36		41		46		51		56		61		66		71		76		85th		95th	
	Start	Time	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	Percent	
12/07/12	01:00	0	0	0	0	4	12	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	40	43		
	02:00	0	0	0	0	0	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	39	43			
	03:00	0	0	0	0	0	2	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	43	47			
	04:00	0	0	1	0	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	43	45			
	05:00	0	0	0	0	2	2	7	4	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	18	45	54			
	06:00	0	0	1	1	1	1	40	31	31	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	44	47			
	07:00	6	0	3	19	73	160	160	113	22	22	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	310	42	46			
	08:00	8	2	3	8	61	179	179	111	28	28	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	399	43	46			
	09:00	3	1	1	12	72	125	125	64	18	18	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	297	42	46			
	10:00	4	1	3	19	62	109	137	72	16	16	1	0	0	0	0	0	1	3	0	0	0	0	0	0	0	276	42	46			
11:00	6	0	2	25	89	137	137	72	21	21	1	0	0	0	0	0	1	2	0	0	0	0	0	0	0	348	42	45				
12 PM	7	0	1	14	74	118	118	92	21	21	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	329	43	46			
13:00	1	1	0	1	19	78	155	71	14	14	2	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0	346	42	45			
14:00	7	0	2	21	92	149	149	86	20	20	2	1	0	0	0	0	1	2	1	0	0	0	0	0	0	0	380	42	46			
15:00	18	4	2	20	126	211	211	80	7	7	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	469	41	44			
16:00	12	0	1	50	181	167	167	55	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	472	40	43			
17:00	17	1	13	51	180	172	172	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	469	39	41			
18:00	17	2	11	77	148	125	125	22	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	403	38	41			
19:00	6	2	7	35	103	87	87	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	258	38	41			
20:00	1	1	4	38	62	41	41	10	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	166	38	41			
21:00	1	1	0	3	18	52	46	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131	39	42			
22:00	1	1	0	2	18	37	37	11	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	121	39	42			
23:00	0	0	0	4	13	38	28	3	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	87	38	41			
Total	115	18	74	477	1642	2265	1027	196	21	21	0.4%	4	0	0	0	0	0	0	4	0.1%	0	0	0	0	0	0	0	5839				
Percent	2.0%	0.3%	1.3%	8.2%	28.1%	38.8%	17.6%	3.4%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
AM	08:00	08:00	07:00	11:00	11:00	08:00	07:00	08:00	07:00	07:00	07:00	04:00																08:00				
Peak																																
Vol.	8	2	3	25	89	179	113	28	3	3	3	1							1								403					
PM																																
Peak	15:00	15:00	17:00	18:00	16:00	15:00	12:00	12:00	12:00	12:00	12:00	14:00																16:00				
Vol.	18	4	13	77	181	211	92	21	2	2	2	1							1								472					

Accurate Counts 978-664-2565

Location : Main Street
City/State: Lynnfield, MA
Northbound, Southbound

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	75	76	79	85th Percent	95th Percent
12/08/12	0	0	2	12	23	12	4	1	0	0	0	0	0	0	0	0	38	42
01:00	0	0	1	0	8	4	1	0	0	0	0	0	0	0	0	0	38	41
02:00	0	0	2	3	1	4	1	0	0	0	0	0	0	0	0	0	39	42
03:00	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	34	35
04:00	0	0	0	0	2	3	0	0	1	0	0	0	0	0	0	0	49	53
05:00	0	0	1	2	10	15	8	1	0	0	0	0	0	0	0	0	42	44
06:00	2	0	1	6	13	25	12	1	0	0	0	0	0	0	0	0	41	44
07:00	0	0	2	3	24	40	21	3	0	0	0	0	0	0	0	0	42	45
08:00	3	0	0	13	51	94	44	12	0	0	0	0	0	0	0	0	42	45
09:00	1	0	0	11	67	129	43	11	0	0	0	0	0	0	0	0	41	45
10:00	4	2	2	12	88	128	48	11	0	0	0	0	0	0	0	0	41	45
11:00	9	0	0	15	103	167	88	12	5	0	0	0	0	0	0	0	42	45
12 PM	8	0	0	18	89	189	81	17	0	0	0	0	0	0	0	0	42	45
13:00	12	0	1	25	94	173	72	9	0	0	0	0	0	0	0	0	41	44
14:00	11	0	2	12	107	159	62	7	1	0	0	0	0	0	0	0	41	44
15:00	6	1	3	23	101	168	58	5	0	0	0	0	0	0	0	0	41	44
16:00	9	0	3	29	124	126	32	5	0	0	0	0	0	0	0	0	39	43
17:00	1	0	3	63	132	86	36	3	1	0	0	0	0	0	0	0	39	43
18:00	3	0	6	36	134	98	20	0	0	0	0	0	0	0	0	0	38	41
19:00	2	0	5	30	86	64	13	1	0	0	0	0	0	0	0	0	38	41
20:00	1	0	0	31	67	59	7	1	0	0	0	0	0	0	0	0	38	41
21:00	2	2	3	21	67	45	4	0	0	0	0	0	0	0	0	0	38	40
22:00	2	1	6	15	54	41	12	1	0	0	0	0	0	0	0	0	39	42
23:00	0	0	0	11	48	35	14	0	0	0	0	0	0	0	0	0	40	43
Total	76	6	43	392	1496	1864	681	101	8	0	0	0	0	0	0	0	4667	
Percent	1.6%	0.1%	0.9%	8.4%	32.1%	39.9%	14.6%	2.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak Vol.	9	2	2	15	103	167	88	12	5								399	
PM Peak Vol.	12	2	6	63	134	189	81	17	1								402	
Total	191	24	117	869	3138	4129	1708	297	29	4	0	0	0	0	0	0	10506	
Percent	1.8%	0.2%	1.1%	8.3%	29.9%	39.3%	16.3%	2.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		

Stats
10 MPH Pace Speed : 32-41 MPH
Number in Pace : 6688
Percent in Pace : 63.7%
Number of Vehicles > 35 MPH : 6167
Percent of Vehicles > 35 MPH : 58.7%
Mean Speed(Average) : 36 MPH

GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth

STA	CITY/TOWN	ROUTE/STREET	LOCATION	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average Annual Growth Rate
0595 L	LYNNFIELD	RTE 128 & I-95	1.6 km SOUTH OF PEABODY C.L.	124,489	119,757	122,894	121,150	121,377	132,094	97,303	110,646	127,558		-1.53%
5099 L	LYNNFIELD	RTE 128 & I-95	SOUTH OF WALNUT ST.	129,283						133,387	131,826			-0.59%
0595 L	LYNNFIELD	RTE I-95 & 128	1.6 km SOUTH OF PEABODY C.L.	124,489	119,757	122,894	121,150		132,094	97,303	110,646			-1.20%
5099 L	LYNNFIELD	RTE I-95 & 128	SOUTH OF WALNUT ST.	129,283					132,094	133,387				0.64%
Average														-0.67%
Max														0.64%
Min														-1.53%

TRIP-GENERATION CALCULATIONS

Job: Town of Lynnfield Recreation, Park, & Related
Location: Lynnfield, MA Facilities
Title: Trip Generation Calculations
Calculated by: ME

Job Number: 6305
Date: 1/24/13
Sheet 1 of 2
Checked by: _____

Total parking spaces provided by the recreational park:
= 339 spaces

Daily Trip Calculation

Assume 339 spaces turn over 2.5 times over the course of
24 hours with heavy uses during the 3-8 PM period.

Therefore, $339 \times 2.5 = 848$ trips

Say 25% drop-off/pick-up rate for the 339 spaces

$$339 \times 0.25 = 85 \text{ trips}$$

$$\text{Daily total} = 848 \text{ trips} + 85 \text{ trips} = 933 \text{ trips}$$

$$\approx 934 \text{ trips}$$



Calculations

Job: Town of Lynnfield Recreation, Park, & Related
Location: Lynnfield, MA Facilities
Title: Trip Generation Calculations
Calculated by: ME

Job Number: 6305
Date: 1/24/13
Sheet 2 of 2
Checked by: _____

Weekday Evening Trip Generation

- Assume 75% of parking spaces are used during this period
 $0.75 \times 339 \text{ spaces} = 254 \text{ trips}$

- Assume 10% drop-off/pick-up based on 339 parking spaces
 $0.10 \times 339 \text{ spaces} = 34 \text{ trips} \Rightarrow \text{SAY } 40 \text{ TRIPS TOTAL}$

Total weekday evening peak-hour trips = $254 + 40 = 294 \text{ trips}$

Use ITE 412 - County Park for entering and exiting
split:

In @ 35% = 103 trips Out @ 65% = 191 trips

Saturday Midday Trip Generation

- Same assumptions and methodology as weekday evening
peak hour

= 294 trips

Use ITE LUC 412 - County Park for entering and exiting
split for Saturday Midday

In @ 57% = 168 trips Out @ 43% = 126 trips










CAPACITY ANALYSIS WORKSHEETS

Main Street at the Project Site Driveway

Main Street at the Project Site Driveway

2018 Build Weekday Evening Peak Hour
2: Main Street & Project Driveway

1/24/2013

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	19	172	93	319	183	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	14	14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879				0.993	
Flt Protected	0.995			0.989		
Satd. Flow (prot)	1629	0	0	1904	1973	0
Flt Permitted	0.995			0.989		
Satd. Flow (perm)	1629	0	0	1904	1973	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	463			590	575	
Travel Time (s)	10.5			13.4	13.1	
Peak Hour Factor	0.92	0.92	0.97	0.97	0.90	0.90
Adj. Flow (vph)	21	187	96	329	203	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	208	0	0	425	214	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	0.92	0.92
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 53.8%
Analysis Period (min) 15
ICU Level of Service A

2018 Build Weekday Evening Peak Hour
2: Main Street & Project Driveway

1/24/2013

Intersection

Intersection Delay (sec/veh): 3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	19	172	93	319	183	10
Conflicting Peds. (#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0	0	0			0
Median Width	12			0	0	
Grade (%)	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.97	0.97	0.90	0.90
Heavy Vehicles(%)	2	2	2	2	2	2
Movement Flow Rate	21	187	96	329	203	11
Number of Lanes	1	0	0	1	1	0










Major/Minor	Major 1				Major 2	
Conflicting Flow Rate - All	730	209	214	0	0	0
Stage 1	209	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Follow-up Headway	3.518	3.318	2.218	-	-	-
Pot Capacity-1 Maneuver	389	831	1356	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	596	-	-	-	-	-
Time blocked-Platoon(%)	0	0	0	-	-	-
Mov Capacity-1 Maneuver	355	831	1356	-	-	-
Mov Capacity-2 Maneuver	355	-	-	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	544	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay (s)	11.8	1.8	0
HCM LOS	B	A	A

Lane	NBL	NBT	EBLn1	SBT	SBR
Capacity (vph)			733		
HCM Control Delay (s)	7.857	-	11.8	-	-
HCM Lane VC Ratio	0.071	-	0.283	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.228	-	1.165	-	-

2018 Build Saturday Midday Peak Hour
2: Main Street & Project Driveway

1/24/2013

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	13	113	151	205	222	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	14	14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879				0.990	
Flt Protected	0.995			0.979		
Satd. Flow (prot)	1629	0	0	1884	1967	0
Flt Permitted	0.995			0.979		
Satd. Flow (perm)	1629	0	0	1884	1967	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	463			590	575	
Travel Time (s)	10.5			13.4	13.1	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.77	0.77
Adj. Flow (vph)	14	123	162	220	288	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	137	0	0	382	310	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	0.92	0.92
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 49.6%

ICU Level of Service A

Analysis Period (min) 15

2018 Build Saturday Midday Peak Hour
2: Main Street & Project Driveway

1/24/2013

Intersection

Intersection Delay (sec/veh): 3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	13	113	151	205	222	17
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0	0	0			0
Median Width	12			0	0	
Grade (%)	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.77	0.77
Heavy Vehicles(%)	2	2	2	2	2	2
Movement Flow Rate	14	123	162	220	288	22
Number of Lanes	1	0	0	1	1	0

Major/Minor	Major 1				Major 2	
Conflicting Flow Rate - All	843	299	310	0	0	0
Stage 1	299	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Follow-up Headway	3.518	3.318	2.218	-	-	-
Pot Capacity-1 Maneuver	334	741	1250	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Time blocked-Platoon(%)	0	0	0	-	-	-
Mov Capacity-1 Maneuver	285	741	1250	-	-	-
Mov Capacity-2 Maneuver	285	-	-	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	496	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay (s)	12.2	3.5	0
HCM LOS	B	A	A

Lane	NBL	NBT	EBLn1	SBT	SBR
Capacity (vph)			636		
HCM Control Delay (s)	8.309	-	12.2	-	-
HCM Lane VC Ratio	0.13	-	0.215	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.446	-	0.813	-	-

Enclosure 9
Development Cost Estimates

SCHEMATIC COST ESTIMATE - MAIN STREET RECREATION PARCEL - OPTION 1
LYNNFIELD, MA MASTER PLAN

This cost estimate reflects the improvements proposed at the Main Street Recreation Complex, including one (1) multipurpose synthetic turf game field, two (2) multipurpose natural turf fields, parking lots, access roadway, passive recreation opportunities, pedestrian circulation routes, and related amenities.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	COST	TOTAL COST	REMARKS
ACTIVE RECREATION AREA (NORTH)							
1	General Conditions					\$ 87,432.93	
a	Bonds and Insurance (2%)	LS	1	\$ 67,432.93	\$ 67,432.93		
b	Mobilization/Demobilization	LS	1	\$ 20,000.00	\$ 20,000.00		
2	Erosion Control					\$ 74,700.00	
a	Haybales and Silt Fence	LF	8300	\$ 9.00	\$ 74,700.00		*assume length of buffer zone
3	Demolition					\$ 30,000.00	
a	Misc. Demolition	LS	1	\$30,000.00	\$ 30,000.00		
4	Synthetic Turf Field Construction - Field 1 (w / Lights)					\$ 1,087,435.00	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1800	\$ 12.00	\$ 21,600.00		
b	Prepare sub-base, shape and compact	SY	9,700	\$ 2.25	\$ 21,825.00		
c	Drainage						
d	Geotextile Separation Layer	SY	9,700	\$ 2.00	\$ 19,400.00		
e	10" Perf. HDPE	LF	990	\$ 25.00	\$ 24,750.00		*estimated quantity at schematic level
f	Flat panel drains	LF	2800	\$ 4.00	\$ 11,200.00		*estimated quantity at schematic level
g	Cleanouts (Nyloplast CB's)	EA	6	\$ 1,600.00	\$ 9,600.00		*estimated quantity at schematic level
h	Field Base						
j	Crushed Stone Base under Field (8")	CY	2200	\$ 36.00	\$ 79,200.00		
k	Crushed Stone Base under Field (2")	CY	540	\$ 37.00	\$ 19,980.00		
l	Concrete						
m	Cast in place Concrete Curb without Trench Drain	LF	1220	\$ 32.00	\$ 39,040.00		
n	Field Fencing						
o	4' High Perimeter Fence	LF	1220	\$ 40.00	\$ 48,800.00		
p	12' Wide Gate	EA	2	\$ 1,725.00	\$ 3,450.00		
q	4' Pedestrian Gate	EA	4	\$ 560.00	\$ 2,240.00		
r	Water Supply						
s	Water Cannon	EA	1	\$ 7,000.00	\$ 7,000.00		
t	Water Cannon Connection	EA	4	\$ 1,500.00	\$ 6,000.00		
u	Water Line	LF	1150	\$ 22.00	\$ 25,300.00		*estimated quantity at schematic level
v	Field Surfacing						
w	Filled-Turf installed	SF	87,400	\$ 4.25	\$ 371,450.00		
x	Turf striping	Sport	4	\$ 7,000.00	\$ 28,000.00		
y	Equipment						
z	Scoreboard	LS	1	\$ 25,000.00	\$ 25,000.00		
aa	Goals	PR	4	\$ 3,400.00	\$ 13,600.00		
bb	Site Electrical (connection of system)	LS	1	\$30,000.00	\$30,000.00		*does not include electric service to parcel
cc	MUSCO Athletic Field Lighting System	Pole	4	\$70,000.00	\$280,000.00		
6	Natural Turf Field - Field 2					\$ 341,142.50	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1500	\$ 12.00	\$ 18,000.00		
b	Prepare sub-base, shape and compact	SY	8,950	\$ 2.25	\$ 20,137.50		
c	Drainage						
d	Geotextile Separation Layer	SY	8,950	\$ 2.00	\$ 17,900.00		
e	12" Perf. HDPE	LF	930	\$ 28.00	\$ 26,040.00		*estimated quantity at schematic level
f	Flat panel drains	LF	2000	\$ 4.00	\$ 8,000.00		*estimated quantity at schematic level
g	Cleanouts (Nyloplast CB's)	EA	6	\$ 1,600.00	\$ 9,600.00		
h	Field Base						
i	Crushed Stone Base under Field (4")	CY	1000	\$ 36.00	\$ 36,000.00		
j	Place and amend root zone materials (8")	CY	2000	\$ 27.00	\$ 54,000.00		
k	Irrigation						
l	Water line	LF	600	\$ 22.00	\$ 13,200.00		*estimated quantity at schematic level
m	Irrigation System and controller	LS	1	\$ 30,000.00	\$ 30,000.00		*Irrigation well / pump separate
n	Field Surfacing						
o	Seed athletic field mix and fine grade	SF	80,500	\$ 0.35	\$ 28,175.00		
p	Turf Establishment Requirements	LS	1	\$ 8,000.00	\$ 8,000.00		
q	Field Fencing						
r	4' High Perimeter Fence	LF	1160	\$ 40.00	\$ 46,400.00		
s	12' Wide Gate	EA	2	\$ 1,725.00	\$ 3,450.00		
t	4' Pedestrian Gate	EA	4	\$ 560.00	\$ 2,240.00		
u	Equipment						
v	Scoreboard	LS	1	\$ 20,000.00	\$ 20,000.00		
6	Natural Turf Field - Field 3					\$ 341,142.50	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1500	\$ 12.00	\$ 18,000.00		
b	Prepare sub-base, shape and compact	SY	8,950	\$ 2.25	\$ 20,137.50		
c	Drainage						
d	Geotextile Separation Layer	SY	8,950	\$ 2.00	\$ 17,900.00		
e	12" Perf. HDPE	LF	930	\$ 28.00	\$ 26,040.00		*estimated quantity at schematic level
f	Flat panel drains	LF	2000	\$ 4.00	\$ 8,000.00		*estimated quantity at schematic level
g	Cleanouts (Nyloplast CB's)	EA	6	\$ 1,600.00	\$ 9,600.00		
h	Field Base						
i	Crushed Stone Base under Field (4")	CY	1000	\$ 36.00	\$ 36,000.00		
j	Place and amend root zone materials (8")	CY	2000	\$ 27.00	\$ 54,000.00		
k	Irrigation						
l	Water line	LF	600	\$ 22.00	\$ 13,200.00		*estimated quantity at schematic level

m	Irrigation System and controller	LS	1	\$	30,000.00	\$	30,000.00		*irrigation well / pump separate
n	Field Surfacing								
o	Seed athletic field mix and fine grade	SF	80,500	\$	0.35	\$	28,175.00		
p	Turf Establishment Requirements	LS	1	\$	8,000.00	\$	8,000.00		
q	Field Fencing								
r	4' High Perimeter Fence	LF	1160	\$	40.00	\$	46,400.00		
s	12' Wide Gate	EA	2	\$	1,725.00	\$	3,450.00		
t	4' Pedestrian Gate	EA	4	\$	560.00	\$	2,240.00		
u	Equipment								
v	Scoreboard	LS	1	\$	20,000.00	\$	20,000.00		
7	Amenities Building							\$	396,500.00
a	1,800 SF building (bare concession, storage, restrooms)	SF	1800	\$	175.00	\$	315,000.00		
b	Underground Electrical Service	LF	1500	\$	21.00	\$	31,500.00		*estimated quantity at schematic level
c	Water Service	LF	1000	\$	50.00	\$	50,000.00		*estimated quantity at schematic level
8	Irrigation Well / Pump							\$	14,000.00
a	Irrigation Well	LF	100	\$	75.00	\$	7,500.00		
b	Pump at Irrigation well	EA	1	\$	6,500.00	\$	6,500.00		
9	Septic System							\$	10,000.00
a	Septic Tank w/ D-Box and Leaching Field	EA	LS	\$	10,000.00	\$	10,000.00		
10	Spectator Seating							\$	22,500.00
a	100-seat mobile bleachers	EA	3	\$	7,500.00	\$	22,500.00		
11	Walkways / Access Drives							\$	144,378.75
a	Prepare sub-base, shape and compact	SY	2535	\$	2.25	\$	5,703.75		
b	Gravel Base (8" base)	SY	2535	\$	8.00	\$	20,280.00		
c	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	2535	\$	22.00	\$	55,770.00		
d	Site Lighting Bollards	EA	15	\$	4,175.00	\$	62,625.00		*estimated quantity at schematic level
12	Main Parking Lot							\$	334,900.00
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1050	\$	12.00	\$	12,600.00		
c	Gravel Base (8" base)	SY	6300	\$	8.00	\$	50,400.00		
d	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	6300	\$	25.00	\$	157,500.00		
e	Signage	LS	1	\$	1,500.00	\$	1,500.00		
f	Drainage								
g	Catch Basins / Manholes	EA	5	\$	2,800.00	\$	14,000.00		
h	Subsurface Detention System	LS	1	\$	52,000.00	\$	52,000.00		
i	12" RCP	LF	270	\$	50.00	\$	13,500.00		
j	Parking lot Lighting	pole	8	\$	4,175.00	\$	33,400.00		
13	Northern Parking Lot & Access Drive							\$	80,650.00
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	250	\$	12.00	\$	3,000.00		
c	Gravel Base (8" base)	SY	1500	\$	8.00	\$	12,000.00		
d	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	1500	\$	25.00	\$	37,500.00		
e	Signage	LS	1	\$	1,500.00	\$	1,500.00		
f	Drainage								
g	Catch Basins / Manholes	EA	1	\$	2,800.00	\$	2,800.00		
h	Subsurface Detention System	LS	0	\$	52,000.00	\$	-		
i	12" RCP	LF	70	\$	50.00	\$	3,500.00		
j	Bioretention Ponds	LS	1	\$	12,000.00	\$	12,000.00		
k	Parking lot Lighting	pole	2	\$	4,175.00	\$	8,350.00		
15	Southern Parking Lot							\$	151,730.00
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	470	\$	12.00	\$	5,640.00		
b	Gravel Base (8" base)	SY	2780	\$	8.00	\$	22,240.00		
c	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	2780	\$	25.00	\$	69,500.00		
d	Signage	LS	1	\$	1,500.00	\$	1,500.00		
e	Drainage								
f	Catch Basins / Manholes	EA	3	\$	2,800.00	\$	8,400.00		
g	Subsurface Detention System	LS	0	\$	52,000.00	\$	-		
h	12" RCP	LF	45	\$	50.00	\$	2,250.00		
i	10" HDPE Perf. Pipe	LF	220	\$	25.00	\$	5,500.00		
j	Bioretention Ponds	LS	1	\$	20,000.00	\$	20,000.00		
k	Parking lot Lighting	pole	4	\$	4,175.00	\$	16,700.00		
14	Trails at Recreation Park							\$	96,750.00
a	Prepare sub-base, shape and compact	SY	3000	\$	2.25	\$	6,750.00		
b	Gravel Base (8" base)	SY	3000	\$	8.00	\$	24,000.00		
c	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	3000	\$	22.00	\$	66,000.00		
15	Landscaping							\$	36,000.00
a	Landscaping Planting Areas (entrances)	EA	2	\$	8,000.00	\$	16,000.00		
b	Loom and Seed Areas (including at demolished bleacher)	LS	1	\$	20,000.00	\$	20,000.00		*quantity estimated at schematic level
16	Site Drainage							\$	47,200.00
a	12" HDPE Pipe	LF	600	\$	28.00	\$	16,800.00		*quantity estimated at schematic level
b	Catch Basins / Manholes	EA	8	\$	2,800.00	\$	22,400.00		*quantity estimated at schematic level
c	Nyloplast Drain Structures	EA	5	\$	1,600.00	\$	8,000.00		*quantity estimated at schematic level
17	Basketball Court							\$	41,617.50
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	100	\$	12.00	\$	1,200.00		
b	Prepare sub-base, shape and compact	SY	470	\$	2.25	\$	1,057.50		
c	Gravel Base (8" base)	SY	470	\$	8.00	\$	3,760.00		
d	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	470	\$	25.00	\$	11,750.00		
e	Court Surfacing	SY	470	\$	10.00	\$	4,700.00		
f	Basketball Hoops	EA	2	\$	800.00	\$	1,600.00		
g	10' chain link fence	LF	270	\$	65.00	\$	17,550.00		

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SCHEMATIC COST ESTIMATE - MAIN STREET RECREATION PARCEL - OPTION 2							
LYNNFIELD, MA MASTER PLAN							
This cost estimate reflects the improvements proposed at the Main Street Recreation Complex under Option 2, including two (2) multipurpose synthetic turf game fields, one (1) multipurpose natural turf field, parking lots, access roadway, passive recreation opportunities, pedestrian circulation routes, and related amenities.							
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	COST	TOTAL COST	REMARKS
ACTIVE RECREATION AREA (NORTH)							
1	General Conditions					\$ 97,031.48	
a	Bonds and Insurance (2%)	LS	1	\$ 77,031.48	\$ 77,031.48		
b	Mobilization/Demobilization	LS	1	\$ 20,000.00	\$ 20,000.00		
2	Erosion Control					\$ 74,700.00	
a	Haybales and Silt Fence	LF	8300	\$ 9.00	\$ 74,700.00		*assume length of buffer zone
3	Demolition					\$ 100,000.00	
a	Misc. Demolition	LS	1	\$30,000.00	\$ 30,000.00		
b	Clearcutting	AC	10	\$7,000.00	\$ 70,000.00		
4	Synthetic Turf Field Construction - Field 1 (w / Lights)					\$ 1,087,435.00	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1800	\$ 12.00	\$ 21,600.00		
b	Prepare sub-base, shape and compact	SY	9,700	\$ 2.25	\$ 21,825.00		
c	Drainage						
d	Geotextile Separation Layer	SY	9,700	\$ 2.00	\$ 19,400.00		
e	10" Perf. HDPE	LF	990	\$ 25.00	\$ 24,750.00		*estimated quantity at schematic level
f	Flat panel drains	LF	2800	\$ 4.00	\$ 11,200.00		*estimated quantity at schematic level
g	Cleanouts (Nyloplast CB's)	EA	6	\$ 1,600.00	\$ 9,600.00		
h	Field Base						
j	Crushed Stone Base under Field (8")	CY	2200	\$ 36.00	\$ 79,200.00		
k	Crushed Stone Base under Field (2")	CY	540	\$ 37.00	\$ 19,980.00		
l	Concrete						
m	Cast in place Concrete Curb without Trench Drain	LF	1220	\$ 32.00	\$ 39,040.00		
n	Field Fencing						
o	4' High Perimeter Fence	LF	1220	\$ 40.00	\$ 48,800.00		
p	12' Wide Gate	EA	2	\$ 1,725.00	\$ 3,450.00		
q	4' Pedestrian Gate	EA	4	\$ 560.00	\$ 2,240.00		
r	Water Supply						
s	Water Cannon	EA	1	\$ 7,000.00	\$ 7,000.00		
t	Water Cannon Connection	EA	4	\$ 1,500.00	\$ 6,000.00		
u	Water Line	LF	1150	\$ 22.00	\$ 25,300.00		*estimated quantity at schematic level
v	Field Surfacing						
w	Filled-Turf installed	SF	87,400	\$ 4.25	\$ 371,450.00		
x	Turf striping	Sport	4	\$ 7,000.00	\$ 28,000.00		
y	Equipment						
z	Scoreboard	LS	1	\$ 25,000.00	\$ 25,000.00		
aa	Goals	PR	4	\$ 3,400.00	\$ 13,600.00		
bb	Site Electrical (connection of system)	LS	1	\$30,000.00	\$30,000.00		*does not include electric service to parcel
cc	MUSCO Athletic Field Lighting System	Pole	4	\$70,000.00	\$280,000.00		
5	Synthetic Turf Field Construction - Field 2					\$ 751,070.00	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1600	\$ 12.00	\$ 19,200.00		
b	Prepare sub-base, shape and compact	SY	9,330	\$ 2.25	\$ 20,992.50		
c	Drainage						
d	Geotextile Separation Layer	SY	9,330	\$ 2.00	\$ 18,660.00		
e	10" Perf. HDPE	LF	960	\$ 25.00	\$ 24,000.00		*estimated quantity at schematic level
f	Flat panel drains	LF	2600	\$ 4.00	\$ 10,400.00		*estimated quantity at schematic level
g	Cleanouts (Nyloplast CB's)	EA	6	\$ 1,600.00	\$ 9,600.00		*estimated quantity at schematic level
h	Field Base						
j	Crushed Stone Base under Field (8")	CY	2100	\$ 36.00	\$ 75,600.00		
k	Crushed Stone Base under Field (2")	CY	520	\$ 37.00	\$ 19,240.00		
l	Concrete						
m	Cast in place Concrete Curb without Trench Drain	LF	1200	\$ 32.00	\$ 38,400.00		
n	Field Fencing						
o	4' High Perimeter Fence	LF	1190	\$ 40.00	\$ 47,600.00		
p	12' Wide Gate	EA	2	\$ 1,725.00	\$ 3,450.00		
q	4' Pedestrian Gate	EA	4	\$ 560.00	\$ 2,240.00		
r	Water Supply						
s	Water Cannon	EA	1	\$ 7,000.00	\$ 7,000.00		
t	Water Cannon Connection	EA	4	\$ 1,500.00	\$ 6,000.00		
u	Water Line	LF	1150	\$ 22.00	\$ 25,300.00		*estimated quantity at schematic level
v	Field Surfacing						
w	Filled-Turf installed	SF	83,950	\$ 4.25	\$ 356,787.50		
x	Turf striping	Sport	4	\$ 7,000.00	\$ 28,000.00		
y	Equipment						
z	Scoreboard	LS	1	\$ 25,000.00	\$ 25,000.00		
aa	Goals	PR	4	\$ 3,400.00	\$ 13,600.00		
6	Natural Turf Field - Field 3					\$ 341,142.50	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1500	\$ 12.00	\$ 18,000.00		
b	Prepare sub-base, shape and compact	SY	8,950	\$ 2.25	\$ 20,137.50		
c	Drainage						
d	Geotextile Separation Layer	SY	8,950	\$ 2.00	\$ 17,900.00		
e	12" Perf. HDPE	LF	930	\$ 28.00	\$ 26,040.00		*estimated quantity at schematic level
f	Flat panel drains	LF	2000	\$ 4.00	\$ 8,000.00		*estimated quantity at schematic level
g	Cleanouts (Nyloplast CB's)	EA	6	\$ 1,600.00	\$ 9,600.00		
h	Field Base						
i	Crushed Stone Base under Field (4")	CY	1000	\$ 36.00	\$ 36,000.00		
j	Place and amend root zone materials (8")	CY	2000	\$ 27.00	\$ 54,000.00		
k	Irrigation						
l	Water line	LF	600	\$ 22.00	\$ 13,200.00		*estimated quantity at schematic level
m	Irrigation System and controller	LS	1	\$ 30,000.00	\$ 30,000.00		*irrigation well / pump separate

n	Field Surfacing						
o	Seed athletic field mix and fine grade	SF	80,500	\$ 0.35	\$ 28,175.00		
p	Turf Establishment Requirements	LS	1	\$ 8,000.00	\$ 8,000.00		
q	Field Fencing						
r	4' High Perimeter Fence	LF	1160	\$ 40.00	\$ 46,400.00		
s	12' Wide Gate	EA	2	\$ 1,725.00	\$ 3,450.00		
t	4' Pedestrian Gate	EA	4	\$ 560.00	\$ 2,240.00		
u	Equipment						
v	Scoreboard	LS	1	\$ 20,000.00	\$ 20,000.00		
7	Amenities Building					\$ 396,500.00	
a	1,800 SF building (bare concession, storage, restrooms)	SF	1800	\$ 175.00	\$ 315,000.00		
b	Underground Electrical Service	LF	1500	\$ 21.00	\$ 31,500.00		*estimated quantity at schematic level
c	Water Service	LF	1000	\$ 50.00	\$ 50,000.00		*estimated quantity at schematic level
8	Irrigation Well / Pump					\$ 14,000.00	
a	Irrigation Well	LF	100	\$ 75.00	\$ 7,500.00		
b	Pump at Irrigation well	EA	1	\$ 6,500.00	\$ 6,500.00		
9	Septic System					\$ 10,000.00	
a	Septic Tank w/ D-Box and Leaching Field	EA	LS	\$ 10,000.00	\$ 10,000.00		
10	Spectator Seating					\$ 22,500.00	
a	100-seat mobile bleachers	EA	3	\$ 7,500.00	\$ 22,500.00		
11	Walkways / Access Drives					\$ 144,378.75	
a	Prepare sub-base, shape and compact	SY	2535	\$ 2.25	\$ 5,703.75		
b	Gravel Base (8" base)	SY	2535	\$ 8.00	\$ 20,280.00		
c	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	2535	\$ 22.00	\$ 55,770.00		
d	Site Lighting Bollards	EA	15	\$ 4,175.00	\$ 62,625.00		*estimated quantity at schematic level
12	Main Parking Lot					\$ 334,900.00	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	1050	\$ 12.00	\$ 12,600.00		
c	Gravel Base (8" base)	SY	6300	\$ 8.00	\$ 50,400.00		
d	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	6300	\$ 25.00	\$ 157,500.00		
e	Signage	LS	1	\$ 1,500.00	\$ 1,500.00		
f	Drainage						
g	Catch Basins / Manholes	EA	5	\$ 2,800.00	\$ 14,000.00		
h	Subsurface Detention System	LS	1	\$ 52,000.00	\$ 52,000.00		
i	12" RCP	LF	270	\$ 50.00	\$ 13,500.00		
j	Parking lot Lighting	pole	8	\$ 4,175.00	\$ 33,400.00		
13	Northern Parking Lot & Access Drive					\$ 80,650.00	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	250	\$ 12.00	\$ 3,000.00		
c	Gravel Base (8" base)	SY	1500	\$ 8.00	\$ 12,000.00		
d	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	1500	\$ 25.00	\$ 37,500.00		
e	Signage	LS	1	\$ 1,500.00	\$ 1,500.00		
f	Drainage						
g	Catch Basins / Manholes	EA	1	\$ 2,800.00	\$ 2,800.00		
h	Subsurface Detention System	LS	0	\$ 52,000.00	\$ -		
i	12" RCP	LF	70	\$ 50.00	\$ 3,500.00		
j	Bioretention Ponds	LS	1	\$ 12,000.00	\$ 12,000.00		
k	Parking lot Lighting	pole	2	\$ 4,175.00	\$ 8,350.00		
15	Southern Parking Lot					\$ 151,730.00	
a	Strip and haul topsoil / organics (assume 6" per test pits)	CY	470	\$ 12.00	\$ 5,640.00		
b	Gravel Base (8" base)	SY	2780	\$ 8.00	\$ 22,240.00		
c	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	2780	\$ 25.00	\$ 69,500.00		
d	Signage	LS	1	\$ 1,500.00	\$ 1,500.00		
e	Drainage						
f	Catch Basins / Manholes	EA	3	\$ 2,800.00	\$ 8,400.00		
g	Subsurface Detention System	LS	0	\$ 52,000.00	\$ -		
h	12" RCP	LF	45	\$ 50.00	\$ 2,250.00		
j	10" HDPE Perf. Pipe	LF	220	\$ 25.00	\$ 5,500.00		
i	Bioretention Ponds	LS	1	\$ 20,000.00	\$ 20,000.00		
k	Parking lot Lighting	pole	4	\$ 4,175.00	\$ 16,700.00		
14	Trails at Recreation Park					\$ 96,750.00	
a	Prepare sub-base, shape and compact	SY	3000	\$ 2.25	\$ 6,750.00		
b	Gravel Base (8" base)	SY	3000	\$ 8.00	\$ 24,000.00		
c	Pavement (1.5" Binder course and 1.5" Wearing Course)	SY	3000	\$ 22.00	\$ 66,000.00		

[illegible]

Enclosure 10
Electrical Consultant Recommendations

Verne G. Norman Associates, Inc.

Electrical Consultants, Engineers and Designers

210 Winter St. Suite 301 Weymouth, MA 02188-3323

Tel: 781-335-4200 E-mail: vgna@vgna.com

Fax: 781-335-5737

January 14, 2013

Mr. John Perry
Gale Associates, Inc.
163 Libbey Parkway
P.O. Box 890189
Weymouth, MA 02189-0004

Project: Lynnfield Recreation Park

Dear John:

It has been determined that Reading Electric Light Company will be the Utility company which would provide power to the site.

We have discussed the power issue with Peter Price of Reading Municipal Light Department and single phase power is available at the entry to the site and if three phase power is desired than we would need to have Reading Municipal Light Department reconstruct facilities approximate 2/3 miles away from this site to a point near the Sagamore Golf Course on Main street in Lynnfield.

The cost of the primary electric service whether single phase or three phase would be borne by the Town of Lynnfield.

We have had discussions with Musco Lighting and there is no concern serving their lighting system single phase. This is a very common condition in rural areas.

Ultimately there would be higher wiring cost with a single phase system versus a three phase system but the cost of Reading Municipal Light Department to reconstruct two thirds of a mile of a primary three phase service would be very costly.

The anticipated electric load for the project was based on the following:

Roadway Lighting – 16 poles with 250 watt metal halide lighting fixtures. (Approximately 5.0KW).

Parking Area Lighting – 8 single head poles and 4 double head. 250 watt metal halide lighting fixtures. (Approximately 5.0KW).

Soccer fields – 14 poles consisting of a total of 128 150 watt lighting fixtures. (Approximately 150KW).

Future concession building - Approximately 25.0KW.

Total potential electric load is approximately 185.0 KW.

The site secondary electric service would be 120/240volt single phase, three wire rated at 1000 Amperes.

We would recommend "LED" lighting of the roadway and parking area in lieu of the 250 watt metal halide lighting fixtures. This would result in reduced operating and maintenance cost.

Please feel free to contact our office if you have any questions regarding the aforementioned material.

Very truly yours,

Frederick P. Goff

Frederick P. Goff, P. E.

FG/nh