

# **Engineering and Development Feasibility Study Report**

**Melone Property  
North Road (Rt. 117)  
Sudbury, MA**

**January 31, 2011**  
(Rev. 2/24/11)

**Submitted to:**  
***Town of Sudbury  
Sudbury Town Hall  
278 Old Sudbury Road  
Sudbury, MA 01776***

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**GPR Project No:**  
***071067***



# Report on Melone Property Sudbury, MA

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## **1.0 Executive Summary**

The Melone property is a 46.6 acre property off North Road (Rt. 117), which is currently the site of the town's gravel pit, and is directly adjacent to a parcel of land owned by the Sudbury Water district. Of the site's total acreage, approximately 16.4 acres is located in the Town of Concord, much of which is wetlands and/or riverfront property. The Town is interested in developing the Sudbury property for a mixed use of multi-family residential and active recreation facilities. Six concept plans are presented. The first three were designed to achieve maximum density residential development on the site, but after rough pricing on the sewage treatment facility that would be required, it was decided to reduce residential density to allow for a septic system (albeit a large one), and increase the athletic field use. This combination use is appropriate and feasible for the site, which because of its highly disturbed nature (active gravel pit), would not be appropriate for passive recreational uses. However, the site would likely need to be re-zoned for these proposed uses, as it is currently zoned Research District, which does not allow the housing or athletic fields being planned, unless they are both designated "municipal uses".

## **2.0 Project Purpose**

The Town of Sudbury initiated this project to evaluate the potential for use of the Mahoney property, a roughly 40 acre undeveloped parcel off Old Framingham Road, and the Melone property, an approximately 46.6 acre parcel off North Road (Rt. 117), which is currently the site of the town's gravel pit, and is directly adjacent to a parcel of land owned by the Sudbury Water district, on which is located a cellular communications tower and antennae. Of the site's total acreage, approximately 16.4 acres (35%) is located in the Town of Concord.

The town RFP specifically required the parcels to be evaluated for three potential uses:

- A multi-purpose recreational facility with amenities appropriate to a high-level sports venue;
- A community multi-family housing development;
- Open space usage, including trails, passive recreation uses and links to adjacent open space.

Commercial uses were not to be considered unless a need/desire for such uses arose as part of the discussions with townspeople.

Site constraints to be evaluated included zoning, wetlands and riverfront, soils, ground water table, topography, lot geometry, access to existing trails and access from North Road.

### **3.0 Summary of Work Conducted – Melone Property**

GPR reviewed existing boundary and topographic surveys, and conducted a zoning analysis and prepared a written Zoning Summary for the site, which is included in the Appendix. GPR also attended a meeting of Town of Sudbury officials to hear the different ideas each had for the potential use of the site. A summary of ideas presented at that meeting is included in the Appendix.

An Existing Conditions Plan of the site was prepared using existing boundary and topographic information, supplemented by GPR's on-the-ground survey to better define topographic detail where needed. A copy of this plan is included in the Appendix.

Soil testing was not performed on this site, for several reasons. Due to the fact that the site is a working sand and gravel pit, the soil's suitability for subsurface sewage disposal is assumed to be high. Also due to the fact that it is a working pit, any area tested would be subject to grading and disturbance at any point in time, rendering any testing performed useless. After discussions with Town of Sudbury staff, we opted instead to conduct more extensive soil testing than we would have otherwise at the Mahoney site, where soil suitability was much more a development constraint and much more difficult to define, and forgo testing of this site.

The bulk of the wetland boundaries on the site are in the Town of Concord, and have been delineated by the town and adjudicated with the Town of Concord. The Existing Conditions Plan that was developed was used to evaluate the potential for site development, including preparation of conceptual site development plans deemed most feasible for the Melone property. These plans are also included in the Appendix.

### **4.0 Report on Existing Conditions**

#### **4.1 Topography and General Conditions**

Please refer to the Existing Conditions Plan, Aerial Plan and Conceptual Layout Plan when reviewing the following narrative.



The site is irregular in shape with its northern and eastern boundaries following the centerline of an un-named brook(s). Nearly the entire site, with the exception of the far western portion at upper elevations, has been disturbed by the gravel and sand mining operations being conducted thereon. The gravel operations extend over roughly half the property in Concord, as well over a large portion of the adjacent land of the Sudbury Water District, through which the site is accessed.

Topography on the site is typical of a working pit, with a broad flat area in the center where mining has removed gravel, and which is now used for storing, sorting and loading material. The area along the western perimeter of the site is at a higher elevation and was undisturbed when observed. The rest of the site in Sudbury is all actively involved in the mining operation, with steep slopes at the perimeter of the site where grades must meet existing grades of the abutters' properties.

#### 4.2 Wetland and Riverfront Areas

Wetlands and riverfront areas on this site are all located in the Town of Concord along two brooks, formally designated as rivers, and along a wetland area known as Dungehole Meadow. Only a small portion of the northeast corner of the site (in Concord) is within the 100 year and 500 year flood plains, however the active portion of the site is completely outside of the flood plains. None of the site is within NHESP endangered species habitat areas. Maps of flood plain and NHESP areas are included in the Appendix.

#### 4.3 Soil Test Results

Although no on-site soil testing was performed (as explained above), the sand and gravel site was observed to be extremely permeable material, well suited for subsurface sewage disposal systems. Soil map included in the Appendix confirm this observation.

#### 4.4 Distances to Abutting Town Water Supply Wells

The site is within the Zone II recharge protection areas (designated as "Aquifer Contribution Zones" in the Sudbury Zoning Bylaw) of two town water supply wells. One well in Sudbury is approximately 500' southeast of the site

of the proposed septic system area, and the other well in Concord is approximately 1200' north of the proposed septic system.

## **5.0 Development Potential & Conclusions**

Limiting factors on the site are:

- Topography of perimeter slopes, and grade change between the central and western portions of the site;
- The Sudbury/Concord town line, in that development will all occur in the Town of Sudbury, and not in the Town of Concord.
- Somewhat odd lot shape, including the property N/F of Wagner that extends into the site.
- Within a Zone II of Sudbury and Concord town wells. Need to comply with DEP regulations for siting of sewage treatment/disposal systems within a Zone II, and Sudbury zoning requirements for development within the Water Resource Protection Overland District, aquifer contribution zone (Zone II). Requirements for the wastewater treatment/disposal are discussed below.
- Zoning and other Town of Sudbury Bylaw requirements and limitations include the following:
  - Outdoor recreation is an allowed use.
  - Residential development is also permitted provided that no more than 15% of any lot may “rendered impervious” except by Special Permit;
  - Any use that will render impervious more than 15% of any lot, or 2,500 square feet, whichever is greater, requires a Special Permit pursuant to Section 4243(b) of the Sudbury Zoning Bylaw. Said Special Permit must show a net improvement to existing conditions with respect to water quality and groundwater recharge.
  - Any development which disturbs greater than 1 acre of land will be subject to the Town’s Stormwater management Bylaw
  - Single and multi-family residences may not discharge sewage effluent at a rate greater than 550 gpd per 40,000 sf of lot area, except under certain specific conditions such as for cluster subdivisions, or with valid nitrogen loading analysis meeting DEP drinking water performance goals for nitrates.
  - Site re-grading that results in a finished grade less than 5’ above the “historical high groundwater elevation” is prohibited.
- Site is currently zoned Research District, which means the multi-family housing and recreational fields being considered are not allowed unless 1)

- they are considered a municipal use, which means they must be “owned or leased by the Town for the general use and welfare of the town, its inhabitants or businesses located within the Town” (It is unlikely the housing would meet this definition), 2) the Town has use variances and one is granted, or 3) the property is re-zoned at a Town Meeting.
- Currently there is no curb cut from this site directly onto North Road (Route 117), which is a State road.

## 5.1 Residential Development Potential

This site is well suited for residential development that could be clustered or developed in multi-family form. Single family homes would not be as desirable given the highly disturbed nature/topography of the site, but are certainly possible if desired. Following are discussions of the 6 concept plans included in the Appendix. They show the progression in thinking from maximizing the site for residential use initially, to the lighter residential density, more recreational use currently being considered. Please refer to the concept plans when reviewing this discussion:

- 5.1.1 Concept 1 – The objective in this first conceptual plan was to use a mix of single family and duplex structures on the site, each structure to have its own lot. There are 18 single family homes, and 37 duplex units shown, for a total of 92 units, each 2300 sf in area, on the site. Sanitary waste would be collected in a system of underground sewers and treated by means of a treatment plant on the abutting land owned by the Sudbury Water District. The parcel is accessed by a single loop road fronting on North Road. A single regulation size soccer field is shown on the land in Concord with parking attendant to it on the land in Sudbury.
- 5.1.2 Concept 2 – The objective for this concept was to continue trying to maximize residential use of the land in Sudbury, but eliminate the single family buildings, and instead use 2, 3, and 4 unit buildings. This gave a little more open space between buildings, and still allowed a total of 93 units on the site, each 2200 sf in area. The sewage treatment area, soccer field and its parking remain the same as in Concept 1.
- 5.1.3 Concept 3 – This concept was an attempt to develop in a more neighborhood type layout pattern by eschewing the loop road in

favor of a system of cul-de-sacs and sections of roadway that will take on characteristics of small neighborhoods within the larger development. This concept has a total of 94 2200 sf units, arranged in buildings of 2, 3 and 4 units each. Sewage, soccer field and parking remain the same. Of the first 3 concepts, this was our preferred version.

- 5.1.4 Concept 4 – This plan was a first attempt at increasing the athletic fields on the site, and reducing the density of residential development. We also varied the size and number of bedrooms (BR) of the units from all 3 BR to 1, 2 and 3 BR units varying in size from 1000 sf to 2000 sf each. One design idea would be to blend the site in with existing Sudbury architecture by combining two 2 BR (two story) units with a 1 BR (1 story) unit on the end to have the appearance of a 3300 sf colonial dwelling. Combining two 3 BR units would result in a larger 4400 sf dwelling. (We can show you a project nearby where this was done with excellent results.)

Part of the driving force for this plan was also to reduce density to 33 units, a total of 63 bedrooms, so that sewage treatment could be by a more conventional on-site sewage disposal (septic) system rather than the much more expensive treatment plant.

After Concept 3 was developed, GPR studied the cost of the treatment plant, which showed that the 90+ units planned would be large enough to require the treatment plant, but on the small side for providing treatment at a reasonable per unit cost. (Please see the discussion on sewage treatment further along in this report for more detail on this calculation.)

This density reduction allowed the additional athletic fields shown on this plan to include three smaller 6 v. 6 fields on the Sudbury property, while maintaining the parking in Sudbury and the full size field on the Concord property. This plan also allows a large increase in open space on the site, and maintains a significant buffer to abutting properties.

- 5.1.5 Concept 5 – This concept was a departure from the previous concepts of driving through the residential development to access the athletic fields. Given the more intensive recreational usage

proposed, it seemed more appropriate to locate the fields and their parking nearer the road, and then continue past them into a more secluded, quieter residential neighborhood separated from the fields by a significant planted buffer that would fill in and grow tall over time. We much prefer this arrangement for the reduced residential density over the previous concepts.

This plan is essentially a different arrangement of the same residential density and open space of the previous concept, but with a reduction by one in the number of the smaller soccer fields. Also, note that parking and the full size soccer field are all now completely on land in Sudbury, with no development planned for the property in Concord.

The residential development is a mix of 1, 2 and 3 BR units with a total of 33 units as on the concept before. This yields a septic system of roughly 7000 gallons per day, with additional capacity possible (systems must be less than 10,000 gallons per day) for provision of sanitary facilities for athletic event attendees and food preparation at any desired concession facilities. Residential development could easily be increased to 72 bedrooms (37 or 38 units) or even as much as 80 bedrooms (40 to 42 units), the latter requiring 8800 gallons per day of sewage and still leaving some capacity (1200 gpd) available for recreational use.

5.1.6 Concept 6 – This plan is similar in development philosophy to Concept 5, but substitutes both a 90' and a 60' baseball field for the soccer fields, and does increase the residential density to 36 units (72 bedrooms), which leaves 2000 gallons per day for additional facility capacity if required.

## 5.2 Sewage Disposal Alternatives

5.2.1 Waste Water Treatment Plant - Initially, when looking at maximizing residential development on the Sudbury portion of the site, we made the determination that anything over roughly 45 2 BR units would require a sewage treatment plant. At 110 gallons per day (gpd) per bedroom, 45 units would generate 9900 gallons per day. Anything over 10,000 gpd requires more involved treatment than a conventional sub-surface sewage disposal (septic) system. In our

studies, we were roughly twice the number of units this allowed, so it was clear for the type of development shown in Concepts 1 – 3, a sewage treatment plant would be required.

We met with colleagues who are knowledgeable in the design of these sewage treatment plants, and discussed pricing with them. A synopsis of this discussion is included in the Appendix. The bottom line is that the number of units (90 to 100) being considered for this site, is about the minimum needed to absorb the cost of a sewage treatment plant on this site. Units additional to the 100 can be added at relatively minimal additional cost. The larger it gets beyond the 100 units, the more cost effective per-unit costs become.

Within a Zone II groundwater recharge area, as this site is, a system of this size would require a tertiary waste water treatment plant, including 2 filters and 2 clarifiers, which would add \$250,000 to the cost of a normal system of this size. Total system cost would be in the range of \$1.5 million. Studies, designs, permitting, construction drawings, construction observation and plant startup costs would be upwards of another \$170,000. - \$200,000. On-going yearly cost for operation, maintenance and testing would be in the range of \$100,000. to \$150,000.

Due to the magnitude of a sewage treatment system cost on the site, it was decided to reduce the residential density and incorporate a larger recreational component to the development. Concepts 4, 5 and 6 reflect this change.

#### 5.2.2 Conventional Subsurface Sewage System

The residential unit design in Concept 6, the latest iteration of the plan, includes 36 units, which equates to 72 bedrooms and 7920 gallons per day of sewage flow, well below the 10,000 gpd limit for septic systems.

Because the system is over 2,000 gpd, it will require pressure dosing of the leach field. System components would include a large septic tank on the order of 16,000 gallons, an 8,000 gallon pump chamber and a 16,000 square foot (approximate) leaching field consisting of 25 trenches.

A rough-cut estimate of the cost of a system described above would be in the range of \$200,000. to \$250,000. Until a full design of the system could be completed, however, more precise costs cannot be given.

### 5.3 Athletic Fields

5.3.1 We have assumed soccer fields in many of our concepts, however baseball or lacrosse fields and/or a track could easily be accommodated as well. All our concepts have a residential component, which was our understanding of what the town desired. However, given the ability to grade this site to whatever is desired, it would clearly be able to accommodate several more fields, required parking, and concession/bathroom facilities if residential use was further curtailed or eliminated in favor of more intense recreational use.

5.3.2 Field construction on the site will require irrigation, due to the very highly drained nature of these soils, and due to the fact that healthy, resilient athletic fields require a substantial root zone, a well drained mixture of loam to sand (a 1:3 ratio is typical), which requires a great deal of water to adequately develop the field's roots. This type of a rootzone design also requires longer, deeper watering to allow the roots to grow deeper, which is what keeps the turf strong and resilient.

Typical water application rates for a well constructed, well drained field are in the range of 1" per week, but this is a very rough guideline. A turf expert would need to do the root zone design, and would specify a watering schedule based on the soil and the annual rainfall expected. This is a science in itself. Ultimately how much water gets put down depends on weather, and how much moisture is being lost, the root zone composition, the species being planted, whether sod is being placed or grass is grown, how often you are watering and for how long, which will also depend on your well's ability to supply water to the sprinklers. For example, a full size soccer field being watered a total of 1" per week, would equate to approximately 40,000 gallons a week. If this is being applied in 3 -

3 hour sessions, it would require a pump and well to supply a minimum of about 74 gallons per minute.

Root zone design, field drainage, and irrigation is also governed by how much the town is willing to spend on the fields. A first class full size soccer field can be several hundreds of thousands of dollars (like a college field), however designing a less than top-of-the-line field can allow them to be built much cheaper. A town soccer field in the area that was built 8 years ago with drainage and irrigation, but with a compromise on the rootzone design ran about \$140,000 to build. This field was grown, but a sod field could also have been placed, but was considered too expensive for this particular application.

- 5.3.3 The fields are located within the Zone II of the existing Sudbury public water supply wells, therefore there will be restrictions on the use of fertilizers, particularly nitrogen, on the field. There are no restrictions (that we were able to find) related to water supply for the amount of watering that can be applied to a field in a Zone II.
- 5.3.4 Of course, use of an artificial turf for the fields would eliminate the requirement for fertilizers and daily watering, should the Town be inclined to consider its use. Maintenance costs for artificial turf vs. natural grass are similar, but artificial turf, while not requiring daily watering, still requires water for cleaning and cooling on hot days when artificial turf can be up to 40 degrees hotter than grass. There are also concerns that artificial turf can lead to increased abrasion injuries, and recently that it may shed lead dust and carcinogens, although that research is still inconclusive.

#### 5.4 Passive Recreation Uses

Due to the highly disturbed nature of the site currently, the property in Sudbury would have little or no value for passive recreation. The property in Concord near the wetlands would have value in this regard, but the arrangement regarding this area with the Town of Concord may hinder or preclude this possibility.



## **Zoning Summary**

## Zoning Summary

rev. 2/3/2011

Town of Sudbury Map: C 12  
North Road Parcel: ---  
Sudbury, MA Lot: 003, 004, 100

Proposed Use: Housing and/or athletic fields

Parameter	Section [1]	Requirement	Remarks
Zoning District	Map C-12	RD	Research District NO.1
Overlay District	4100	Floodplain District [see note 2]	
	4240	Water Resource Protection Overlay	Within mapped Zone II and III
Zoning Uses	Appendix A	Allowed Uses	Senior Residential Community, Incentive Senior Development, agricultural uses, municipal uses, certain agricultural related commercial uses, light mfg, R&D, mfg
		Prohibited Uses	Residential and recreational uses being considered for this site not allowed unless designated municipal uses;
Lot Area	Appendix B	8 AC	
Frontage	Appendix B	200 FT	[see note 4]
Lot Width	2641A	50 FT	
Yard	Appendix B-1		
	Front	100 FT	
	Side	50 FT	Unless Abutting Town Line
	Rear	50 FT	Unless Abutting Town Line
	From Residence Zone	150 FT	
Building Height	Appendix B	45 FT	
Building Coverage	Appendix B	18%	
Floor Area Ratio		None	
Lighting	3427.F		
Landscaping	3500		
Parking [5]	3100	Two (2) spaces per dwelling unit; otherwise varies by use;	
Wetlands Setback	state bylaw	100 feet from resource area	
MDEP Riverfront Area		within 200 feet of riverbank	Along northern boundary of property w/ Concord;
FEMA Floodplain	250217 0002C	Within Mapped zone AE and X	[see note 2] NE corner of property only;
		Within Zone C	vast majority of site
ACEC	N/A		
Zone 1 Protective Radius	N/A		none on site
Mapped Zone 2	Map Pg C-36	Yes; Sudbury well to the SE	Water Resource Protection Districts
IWPA	N/A	Concord well to the N	none on site

### NOTES:

[1] Reference to section of Zoning Bylaw, where applicable.

[2] From maps entitled "Flood Insurance Rate Maps and Flood Boundary and Floodway Maps" dated June 4, 2010.

[3] Section 145-16 - Land below mean high water shall not be included as part of land calculations to meet area requirements.

[4] Minimum Frontage required through front yard setback, and lots abutting streets on more than one side shall have the front yard setback applied to each abutting street.

[5] Section 145-27 (D) - special provisions may be granted by the Planning Board during Site Plan Review process allowing relief from strict compliance to parking requirements and parking setback requirements if existing on- and off-site parking can be utilized.

### ABBREVIATIONS:

SF=square feet; CF=cubic feet; FT=feet; GFA=gross floor area; AC=acres; PB=Planning Board; ZBA=Zoning Board of Appeals; IWPA=interim wellhead protection area; ACEC=Area of Critical Environmental Concern; FIRM=Flood Insurance Rate Map; MDEP=Massachusetts Dept of Environmental Protection

## **Summary of Town Comments**

## MEETING NOTES



**BY:** Eric Rudenauer,  
GPR  
**MEETING DATE:** 10/29/07  
**TIME:** 1:00 PM  
**PROJECT NO.:** 071067  
**NAME:** Town of Sudbury Feasibility

### ATTENDEES:

Bill Place  
James Kelly  
Dennis Mannone  
Jody Kablack  
Beth Rust  
Parker Coddington  
Robert Leoupold  
Victoria Parsons  
Calvin Goldsmith

### REPRESENTING

Engineering  
Building  
Recreation  
Planning and Development  
Housing  
Conservation  
Sudbury Board of Health  
Conservation and BOH  
GPR

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**SUBJECT:** Melone and Mahoney Parcel Development

### NOTES:

#### Melone:

- Wagner parcel to be considered in development, not to be shown (not owned by town presently)
- Site entrance near Wagner property to allow greater site distance on Rte 117
- Planning on continuing excavation for 1-2 years don't want to over excavate
- Water Department Property not to be used for housing, possibly for stormwater BMP
- Aware that a Groundwater Discharge Permit will be necessary for 100+ housing units
- TEC contamination in groundwater from office buildings to the west of the site
- Relocating cell tower to NW corner of property is out of the question because of cost to relocate structure and utilities and limited access
- Recreation does not want a field if they can not irrigate it
- Concerned about use of fertilizers in Zone II, town well directly on opposite side of Rte 117

**Mahoney:**

- Some housing a possibility to offset field, utilities installation and access construction cost
- Looking for 2 or more full size baseball fields (90' Bases, 350+ to foul pole) stone dust infield
- Site lighting for adult use (games run until after dark)
- Lots of parking for sporting events, playground, open space use, as well as possible future railroad bed recreation use
- Both parcels most easterly abutting stream are conservation parcels
- Possible playground area
- Concessions and Bathroom facilities
- Recreation Dept would like more Baseball/Softball fields
- Soccer requires more turf maintenance
- Will take rectangular fields if that's all that will fit
- Recreation Dept does not need/want fields that are unusable during wet season (have too many already) fields would need to have drains or be raised
- Concerned about use of fertilizers in Zone II, proximity to wetlands/stream

## MEETING NOTES



**BY:** Doug Miller, GPR  
**MEETING DATE:** 11/13/2007  
**TIME:** 8:15PM  
**PROJECT NO.:** 071067  
**NAME:** Sudbury Board of Selectmen

**ATTENDEES:** Jody Kablack  
Board of Selectmen  
Town Manager  
Doug Miller  
Eric Rudenauer  
Abutters and Parties  
of Interest  
**REPRESENTING** Sudbury Planning Board  
  
GPR  
GPR

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**SUBJECT:** GPR Presentation of Constraints on Mahoney and Melone Properties

**NOTES:** The Chairman of the Board of Selectmen, John C. Drobinski, opened the meeting with a brief overview of what the Board hoped to accomplish by the meeting and then turned the presentation over to Jody Kablack, Planning Director. Jody introduced GPR representatives and gave a brief history of the how and when the Town acquired the parcels, including a description and location of each parcel and it's surrounding neighborhood. Jody also explained what has already transpired with regard to input from Town Departments. It was decided to review parcels one at a time.

Doug Miller began with the Melone property off North Road and explained what information and testing GPR has performed on this site and then Eric Rudenauer reviewed the plans and indicated the various constraining issues of the property. Board members asked clarifying questions and the floor was open to the audience. The following is a list of various comments and questions from the audience:

- Does Concord Zoning allow housing/senior housing?
- Does this fit with the Town's Master Plan?
- How will both the Sudbury and Concord wells be protected?
- Will the tree buffer to Northwoods be saved?
- What screening will be installed?
- Residents experience rusty water at times.
- Does Concord have concerns about this property's development? – Note: Jody explained the Concord Planning Director was invited to the meeting but did not respond to the invitation.
- Is the site appropriate for school use?
- Is the site appropriate for use as playing fields?
- Concerns with traffic on Route 117 were raised.
- A resident commented that the site should remain "natural".
- What are the abutting uses? Note: Jody explained the current use of all abutting parcels.
- A representative of the Sudbury Housing Authority explained that the Town is looking for affordable rentable units and he added that the site may be best as multi-use land.

Chairman Drobinski moved the meeting along to the Mahoney parcel. Doug Miller explained that GPR has identified wetland resources on the property and located them, but did not perform any topographic survey. Eric Rudenauer reviewed the constraining issues for this parcel and the meeting was opened to the audience. The following is a list of various comments and questions from the audience:

- When was the testing done? Jody explained that it was recent. The speaker followed with the statement that since we are in a drought, the testing may not be valid. Doug Miller explained the high groundwater determination procedure based on Title 5 and that the fact that we are in a drought does not affect the groundwater elevation determination.
- The Town should consider agricultural use for the land.
- The area is subject to MESA.
- Several speakers commented on the vista and beauty of the land.
- Where is the site access? Jody explained that access is from Old Framingham Road and that the Town made sure there was adequate access to save the existing stone wall along Old Framingham Road.
- The land is good for cross country skiing, hiking, snowmobiling and similar activities.
- The railroad bed may become part of a regional rail trail.
- Ball fields are a bad idea.
- Playing fields with lights are opposed by some abutters.
- Where will parking for playing fields be?
- Equestrian use is a suitable use.
- The test pits have disrupted the haying process.
- Keep the land as it is currently used – hayfield.
- Consider “victory” gardens.
- Consider mixed agricultural and recreational use.
- Turtles and other wildlife have disappeared since Grouse Hill and Mahoney Farms development.
- Traffic on Old Framingham is a problem.
- Old Framingham Road is a “Scenic Road”.
- The farm next door has “water issues”.
- One of the abutters offered to lease the property for haying and use by her equestrian school.

## Record of Meeting

Attendees: Jim Borrebach, PE, LSP of OHI Engineering, Inc.  
Tom Jordan, PE, LSP of Thomas A. Jordan, PE, LSP, Inc.  
Eric Rudenauer of GPR  
Cal Goldsmith of GPR

Re: Town of Sudbury: Melone Property development sewage disposal system limitations due to nearby public wells

Date: April 16, 2008

The Melone property in Sudbury, MA is a gravel pit located well within the Zone II for a downstream well in Sudbury (500' from the site) and a well in Concord (1200' from the site). The following notes are the result of a meeting with 2 engineers familiar with groundwater hydrology and waste water treatment plant design, and are preliminary conclusions for what waste water treatment would be required should the Melone site be developed with a multi-family residential use.

### Notes:

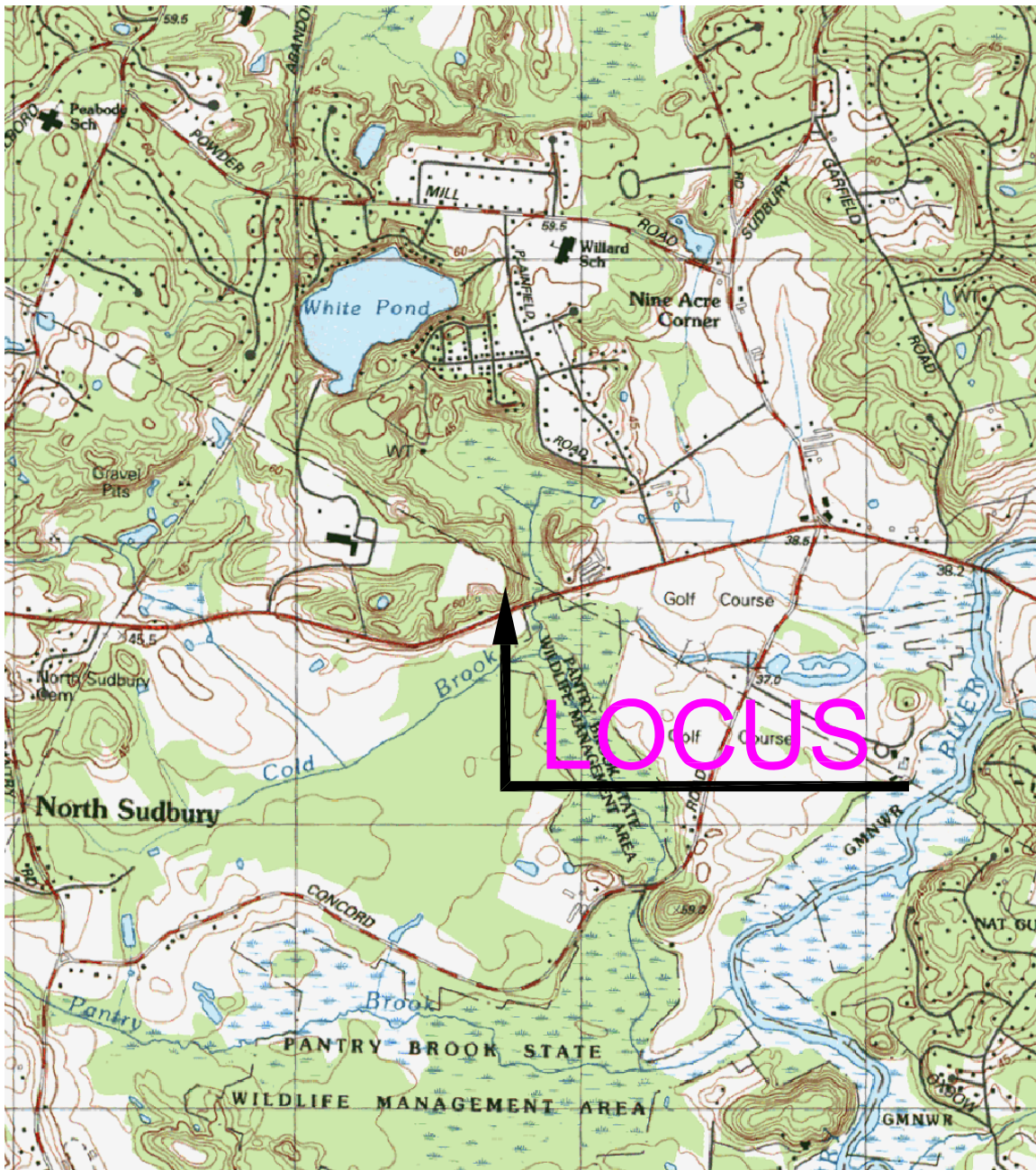
1. Can stay under 10,000 gallons per day (gpd) and do an innovative alternative septic system. But that's only about 45 two-bedroom units, or 30 three-bedroom units, or a combination of the two.
2. Once we're over 10,000 gpd, we're into a tertiary treatment waste water treatment (WWT) plant that will run about \$1.5MM +/- within the Zone II. This would include 2 filters and 2 clarifiers because of the Zone II.
3. Size of system: Waste Water Treatment Plant (WWTP) flow (assume for 100 - 2 BR units)
  - a. = 100 units x 2 BR/unit x 110gpd
  - b. = 22,000 gallons per day (gpd)
2. Disposal Field size: 5 gpd/sf in open sand beds = 4400sf x 2 = 8800sf soil absorption system (SAS) primary disposal area and reserve area.
3. Permitting would require mounding analysis, travel time analysis. Either keep flows under 10,000 gpd, or go with full treatment plant. No in between.



4. To absorb this kind of cost, you would need density on the order of 100 2-BR units. This works out to \$15k per unit for sewage treatment, which is not out of line with conventional individual on-site disposal system costs.
5. WWTP to be a conventional activated sludge system with suspended media to provide tertiary treatment with nitrogen removal. Needs about 1 acre of area total.
6. Plant would cost about \$250k more than normal to construct due to being in a Zone II. Because DEP requires more redundancy.
7. DEP is ultra-conservative in Zone II: Lots of spare parts on hand; 2 power supplies double looped; test for ecoli, pathogens, many others as well; 4 – 5 permanent monitoring wells tested monthly.
8. Also requires about \$30k to \$40k /year in analytical testing, vs. \$10k for plant outside Zone II area.
9. Can request a waiver to additional testing if groundwater travel time from plant to downstream well is > 2 years. Consultant doubts this will be the case, though. Would need to perform a hydro-geological study to determine this. (\$20k – \$25k).
10. Once we get into the WWT plant, adding units is a relatively small incremental cost; going from 100 to 120 units for example probably only costs \$3k to 4k more per unit added.
11. Studies, design and permitting costs for WWTP \$70k – \$90k.
12. Construction drawings \$50k +/-.
13. Construction observation services and plant start-up \$50k +/-.
14. Total operation and maintenance costs, including the analytical testing will run \$100k - \$150k per year.

**Bottom Line:** Building up to 45 units (90 bedrooms), we can do an I/A system, (which is not nearly as involved as a WWTP). More than 45 units means we're building a WWTP. Then density needs to be up around 100 units or more to have it make sense financially.

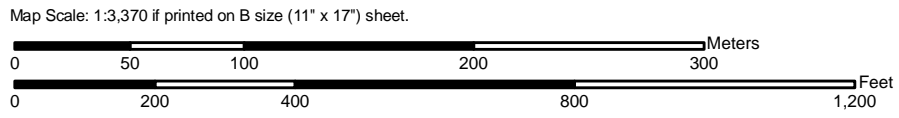
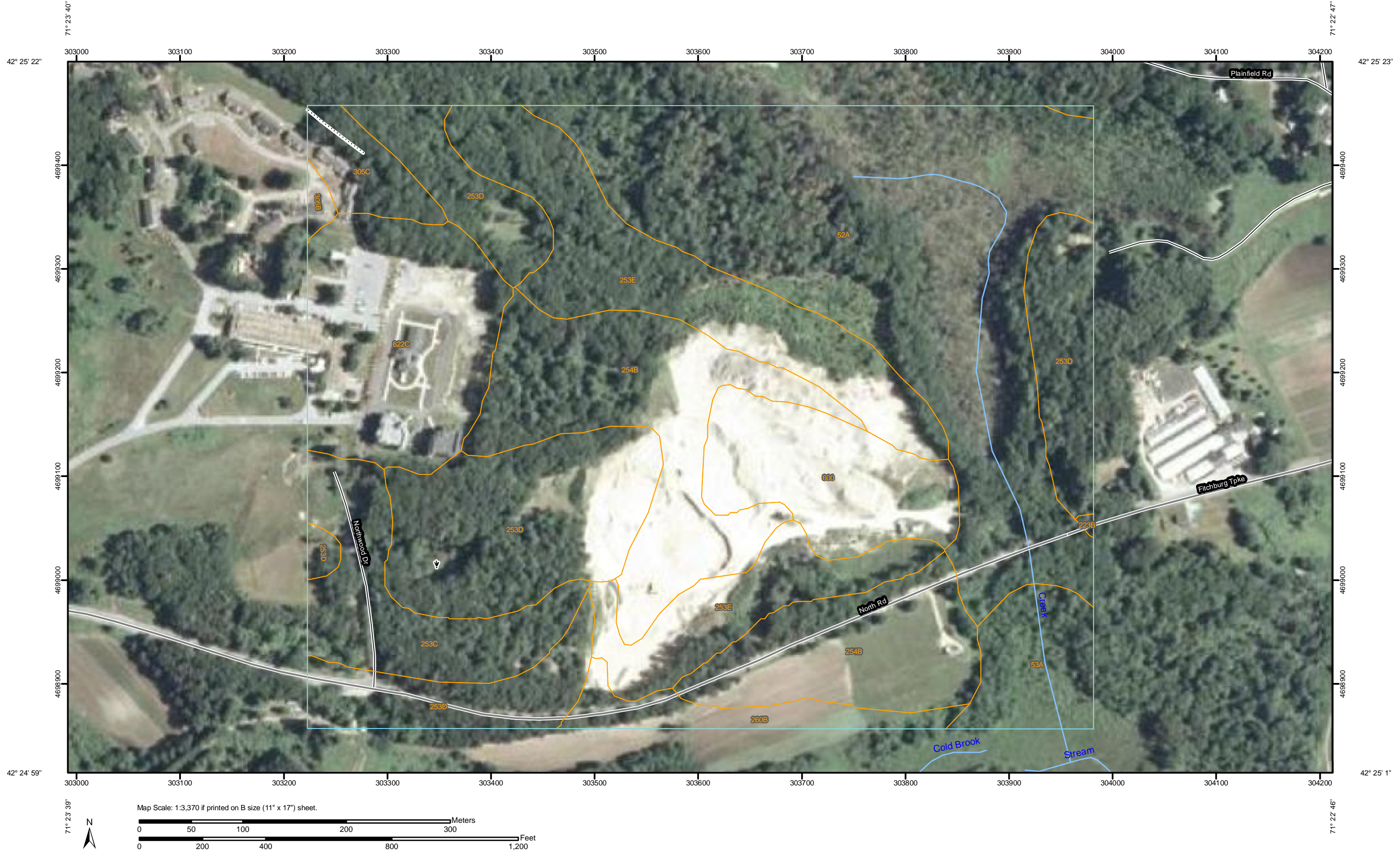
**Soils Map, WRPD Plan,**  
**Flood Plain Map, and NHESP Map**


$$1'' = 2000'$$

1 OF 1



Soil Map—Middlesex County, Massachusetts  
(Melone Property - Sudbury, MA)



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  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



Very Stony Spot



Wet Spot



Other

### Special Line Features



Gully



Short Steep Slope



Other

### Political Features



Cities

### Water Features



Oceans



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

## MAP INFORMATION

Map Scale: 1:3,370 if printed on B size (11" × 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:25,000.

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.

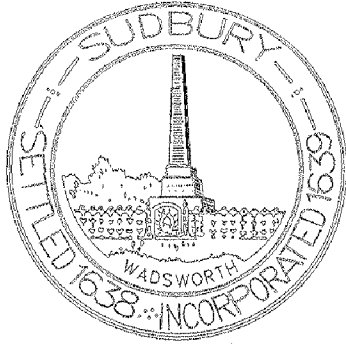
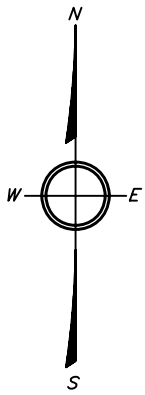
Soil Survey Area: Middlesex County, Massachusetts  
Survey Area Data: Version 12, Feb 26, 2010

Date(s) aerial images were photographed: 7/10/2003

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.

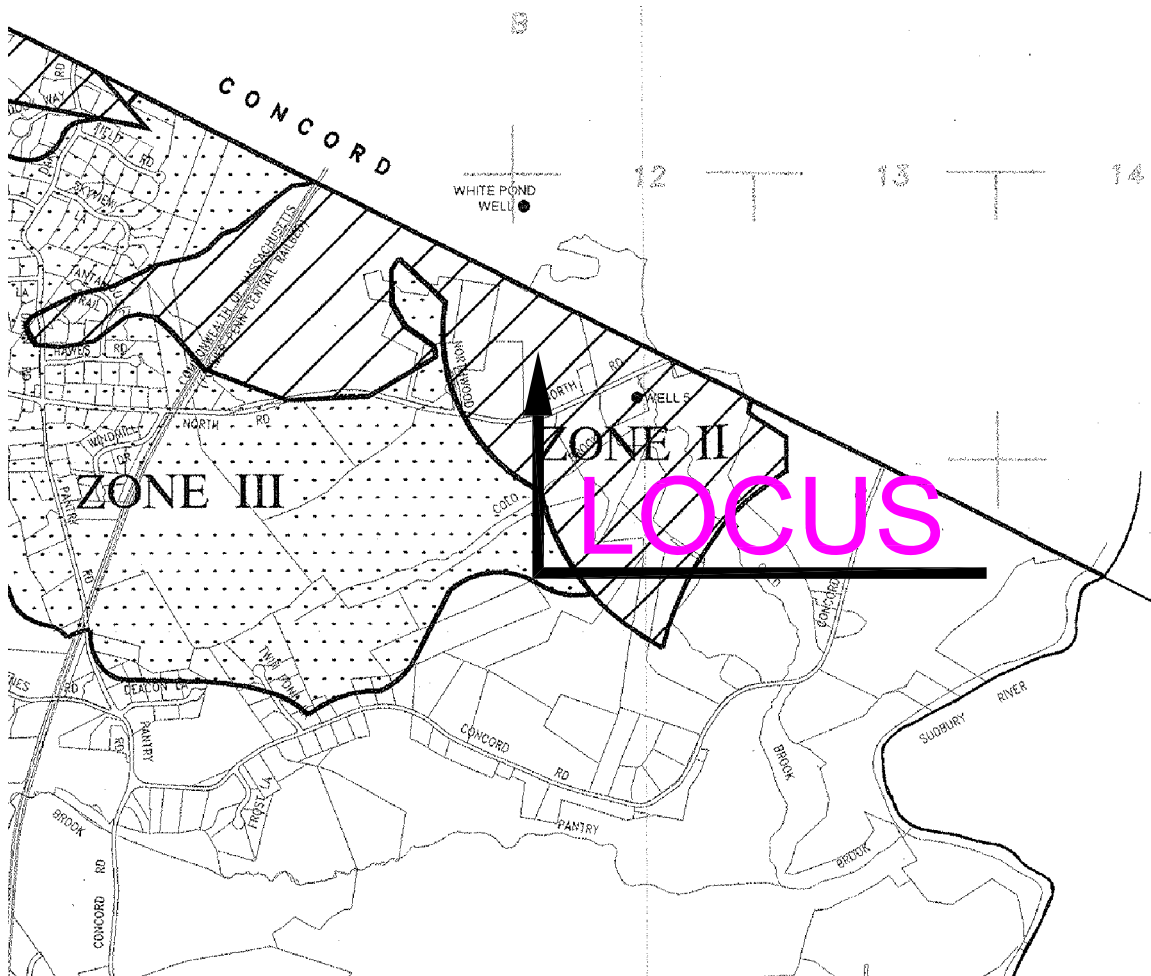
## Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
52A	Freetown muck, 0 to 1 percent slopes	28.4	25.2%
53A	Freetown muck, ponded, 0 to 1 percent slopes	3.7	3.2%
223B	Scio very fine sandy loam, 3 to 8 percent slopes	0.1	0.1%
253C	Hinckley loamy sand, 8 to 15 percent slopes	6.3	5.6%
253D	Hinckley loamy sand, 15 to 25 percent slopes	20.4	18.1%
253E	Hinckley loamy sand, 25 to 35 percent slopes	14.7	13.1%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	17.8	15.8%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	2.5	2.2%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	0.3	0.3%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	2.1	1.9%
600	Pits, gravel	6.5	5.7%
622C	Paxton-Urban land complex, 3 to 15 percent slopes	10.0	8.9%
<b>Totals for Area of Interest</b>		<b>112.6</b>	<b>100.0%</b>



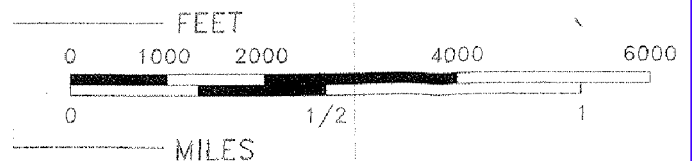
## PLAN REFERENCES

1. "MAP OF WATER RESOURCE PROTECTION DISTRICTS PLAN, TOWN OF SUDBURY, MASSACHUSETTS FEBRUARY 15, 2001" AS AMENDED BY SUDBURY TOWN MEETING.



## LOCUS MAP

SCALE: AS SHOWN



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MELONE PROPERTY  
NORTH ROAD  
SUDBURY, MASSACHUSETTS

## WATER RESOURCE PROTECTION DISTRICTS PLAN

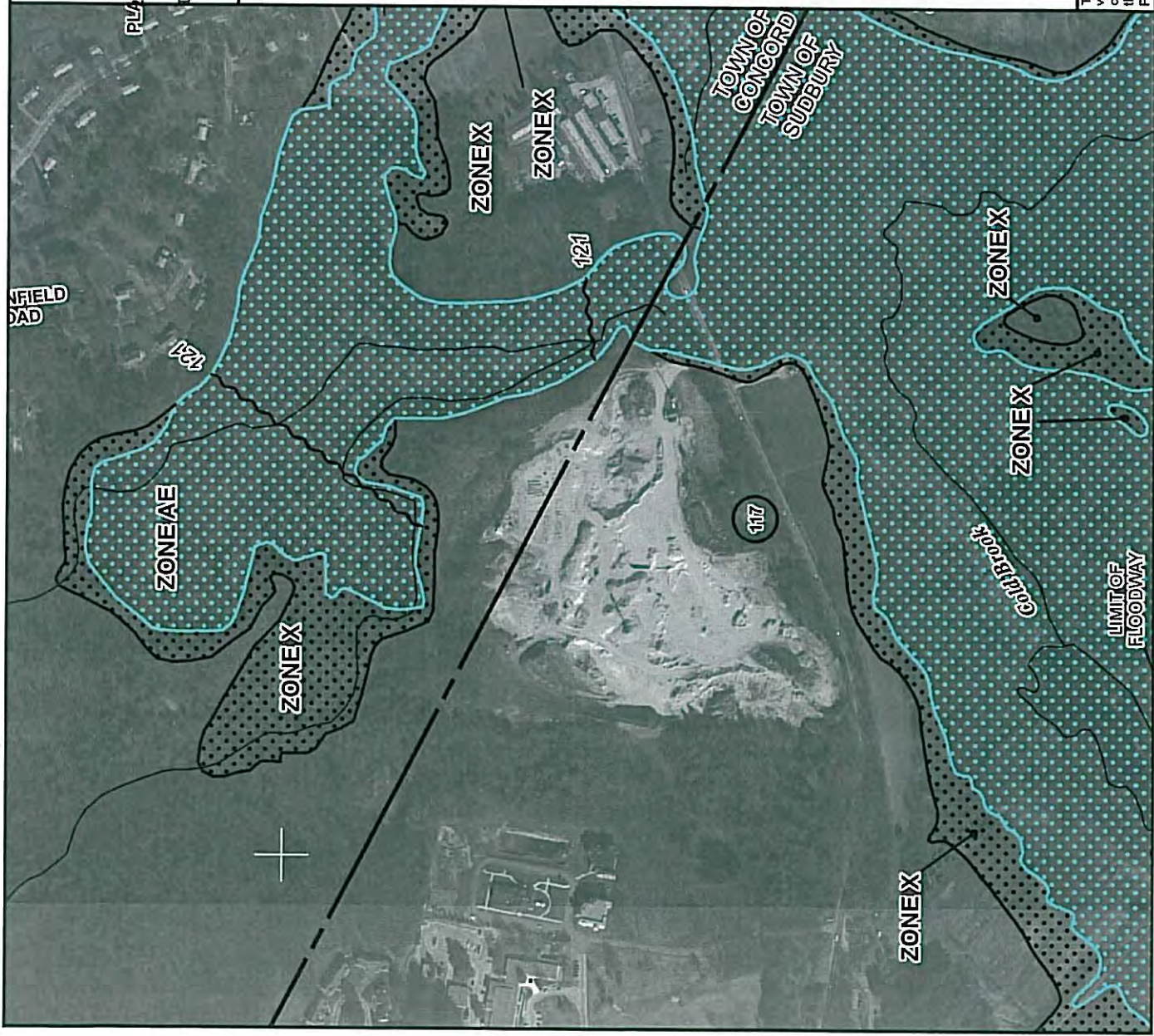
JOB: 071067

BY: AMP CHK: CRG

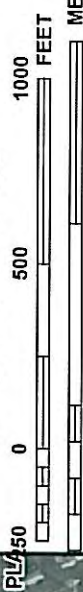
DATE: 11/02/10

1 OF 1





MAP SCALE 1" = 500'



**NFIP**  
**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0367E

**FIRM**  
FLOOD INSURANCE RATE MAP  
MIDDLESEX COUNTY,  
MASSACHUSETTS  
(ALL JURISDICTIONS)

PANEL 367 OF 656  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)


CONTAINS:  
COMMUNITY  
CONCORD, TOWN OF  
SUBBURY, TOWN OF

NUMBER  
250163  
250217

PANEL  
0367  
0367

SUFFIX  
E  
E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community

  
**MAP NUMBER**  
25017C0367E  
**EFFECTIVE DATE**  
JUNE 4, 2010  
**Federal Emergency Management Agency**

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



# Melone Property

## North Road, Sudbury, MA

☒ NavTeq MA Other Streets Names

☒ NHESP Certified Vernal Pools



☒ NHESP Estimated Habitats of Rare Wildlife



☒ NHESP Priority Habitats of Rare Species



☒ USGS Color Ortho Imagery 2008 30cm



☒ Massachusetts Town Boundaries



100 m (1:5706)

Source: MassGIS (www.mass.gov/mgis). Maps and photos are for planning purposes only.

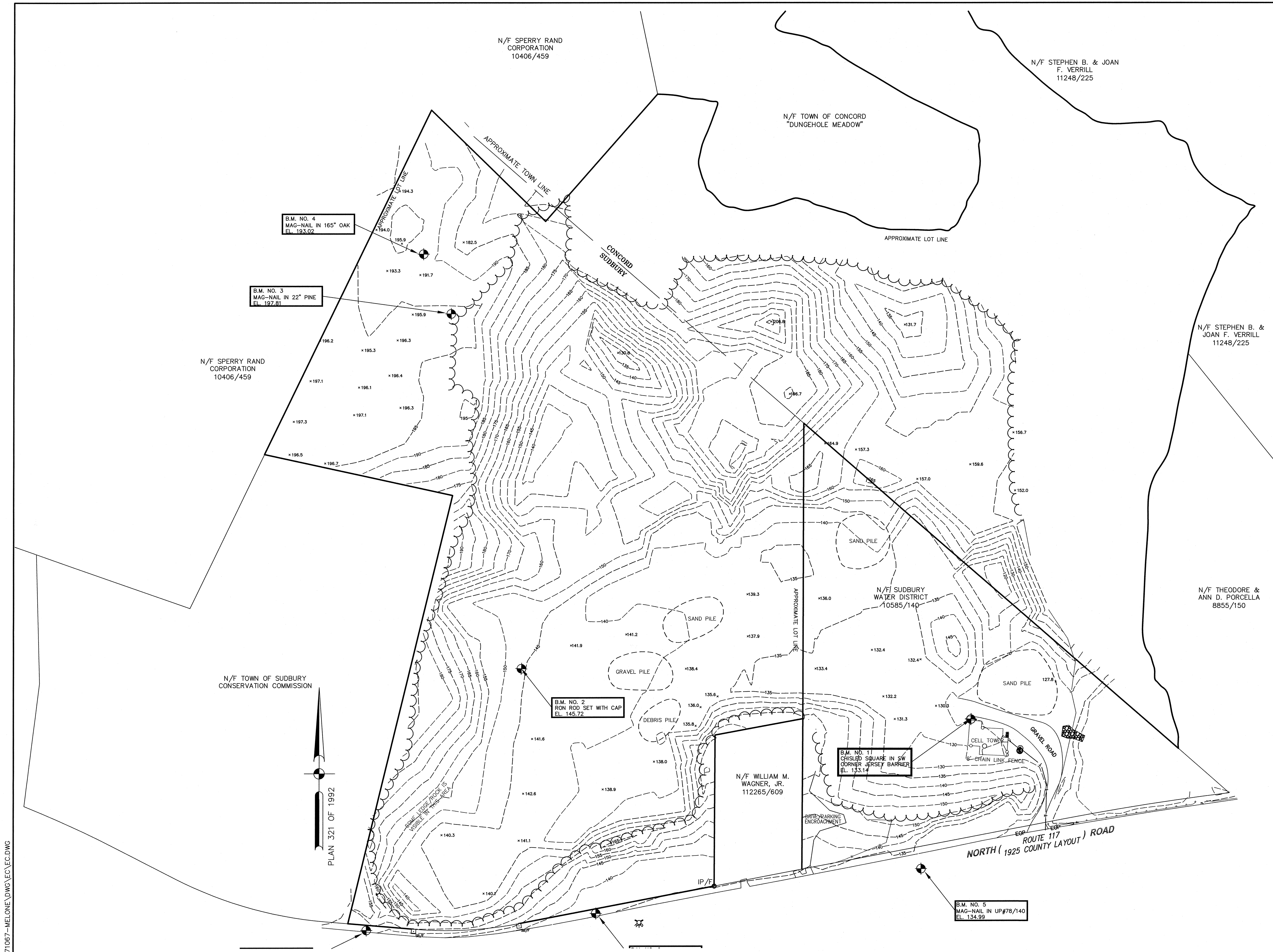
WARNING: This map does not meet national map accuracy standards, and cannot be used for engineering purposes. Please consult <http://www.state.ma.us/mgis/>

## **Exhibit Plan (Aerial)**

**Note: Aerial Plan too large to be transmitted electronically. Please refer to hard copy report and cd for aerial view of site.**

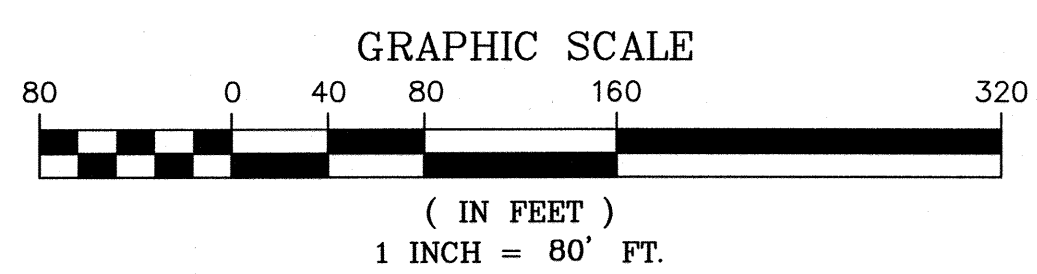
## **Topographic Plan of Land**





LEGEND			
N/F	NOW OR FORMERLY	CTR	CENTER
1111/111	DEED BOOK/PAGE	DH	DRILL HOLE
(F)	FOUND	○	PIPE/ROD
(S)	SET	□	STONE BOUND
IP	IRON/STEEL PIPE	⊙	DRILL HOLE
SB	STONE BOUND	∞	STONE WALL

- NOTES:
1. THE LOT LINES SHOWN ON THIS PLAN ARE APPROXIMATE ONLY. A BOUNDARY SURVEY WOULD BE REQUIRED TO DETERMINE THE LOT LINES.
  2. THE CONTOURS SHOWN REFLECT A GENERAL VIEW OF WHAT THE AREA LOOKS LIKE. THE SITE IS A WORKING SAND PIT.



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TOPOGRAPHIC PLAN  
MELONE PROPERTY  
IN  
SUDBURY, MASS.

THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, COVENANTS, OR OTHER LIMITATIONS WHICH MAY BE DISCLOSED BY A TITLE EXAMINATION.

**Existing Available Boundary Survey**

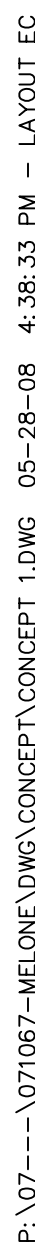
LOT 1 IS DESCRIBED IN A DEED TO  
JOSEPH & MARIA MELONE TRUST  
RECORDED IN THE MIDDLESEX SOUTH  
DISTRICT REGISTRY OF DEEDS BK.12660-  
431.





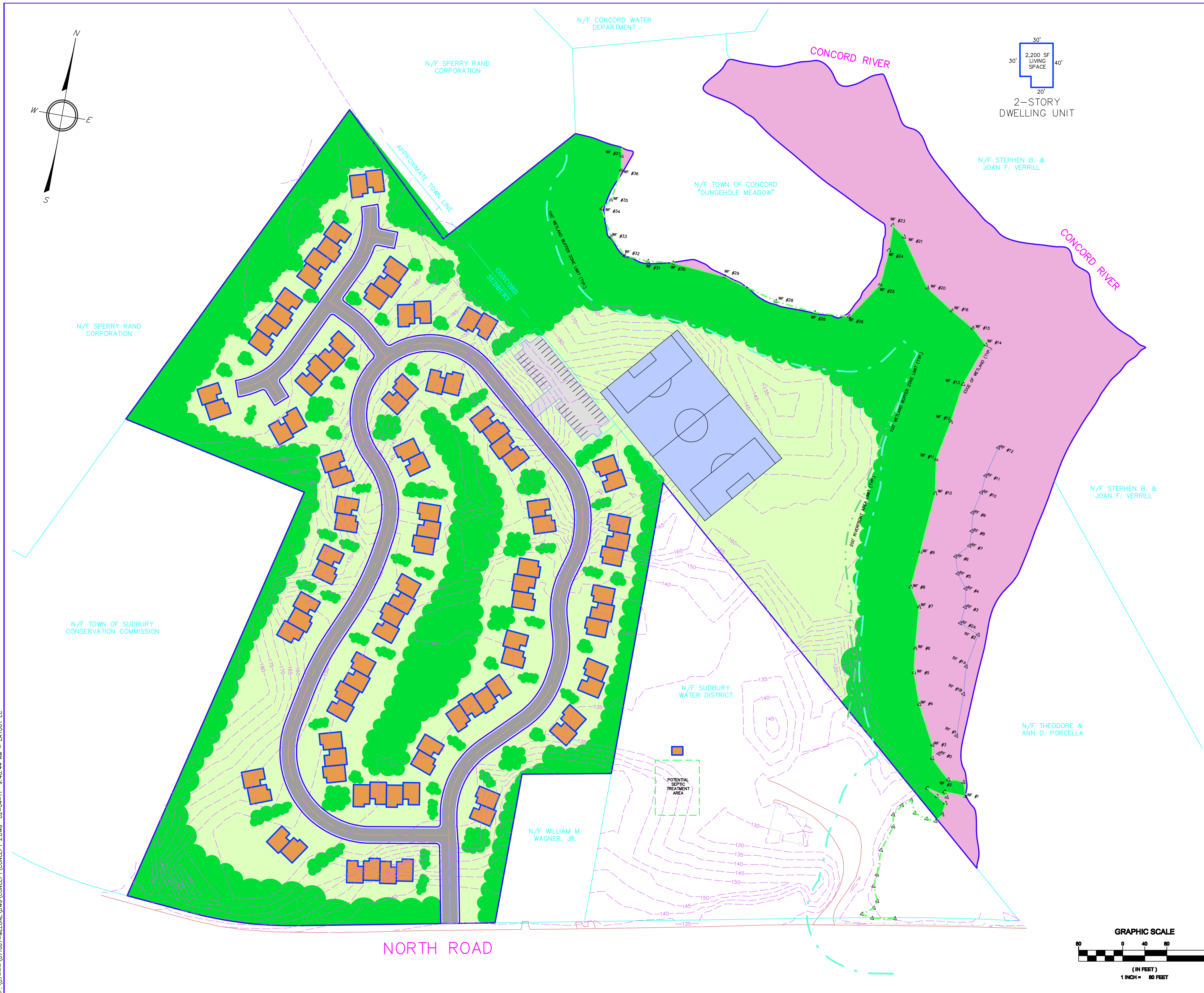
## **Conceptual Development Plans**







P:\07-1071067-MELONE\DWG\CONCEPT\CONCEPT 2.DWG 02-04-11 9:40:44 AM -- LAYOUT EC



- BUILDING
- LAWN AREA / USABLE AREA
- DRIVEWAYS / PARKING AREAS
- POTENTIAL SEWAGE TREATMENT AREA
- WOODS / LANDSCAPING
- BORDERING VEGETATED WETLAND
- SPORTS FIELD

CONDOMINIUM SCHEDULE:

2-DWELLING UNITS:	18 BUILDINGS
3-DWELLING UNITS:	7 BUILDINGS
4-DWELLING UNITS:	9 BUILDINGS
TOTAL NUMBER OF UNITS:	93 UNITS

EXISTING CONDITIONS NOTES:

- TOPOGRAPHIC AND PROPERTY LINE INFORMATION SHOWN HEREON IS APPROXIMATE ONLY.
- LOCATION OF RIVERBANK FLAGGED BY DEP PERSONNEL, AS TAKEN FROM PLAN REFERENCE NO. 1.

PLAN REFERENCES:

- "TOPOGRAPHIC PLAN OF LAND IN SUDBURY AND CONCORD, MA" PREPARED BY TOWN OF SUDBURY ENGINEERING DEPARTMENT. DATED FEBRUARY 16, 1999; REVISED THROUGH MARCH 17, 2000.

DRAWING ISSUED FOR:

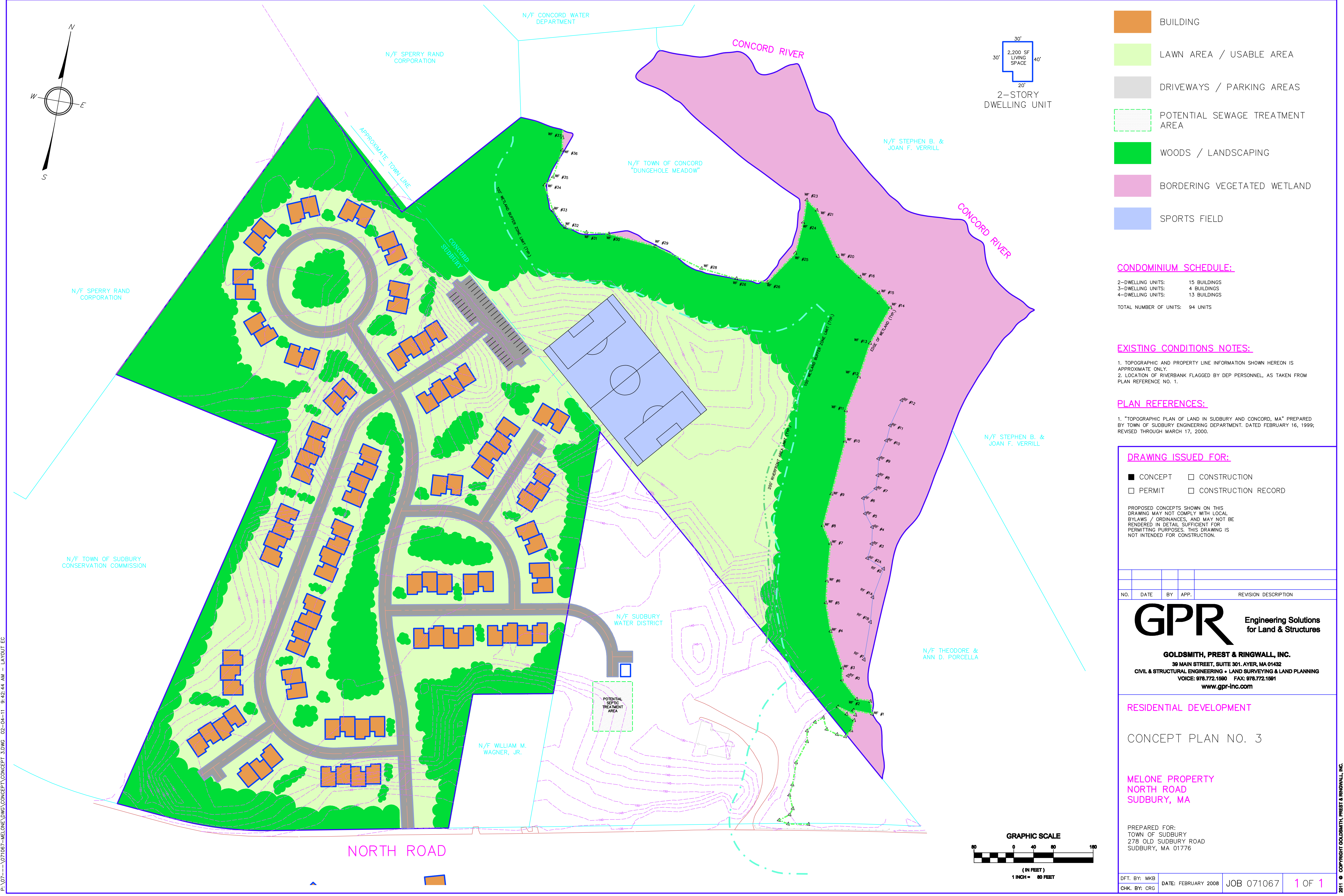
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- CONSTRUCTION
- PERMIT
- CONSTRUCTION RECORD

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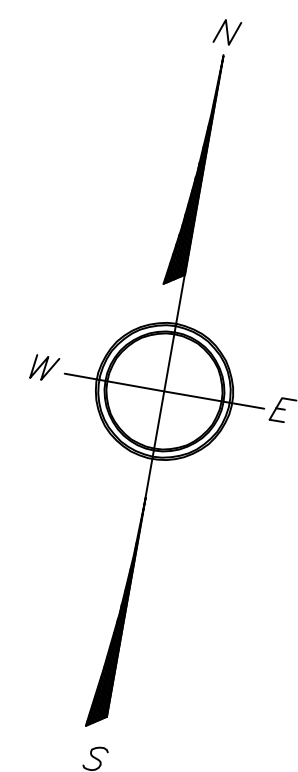
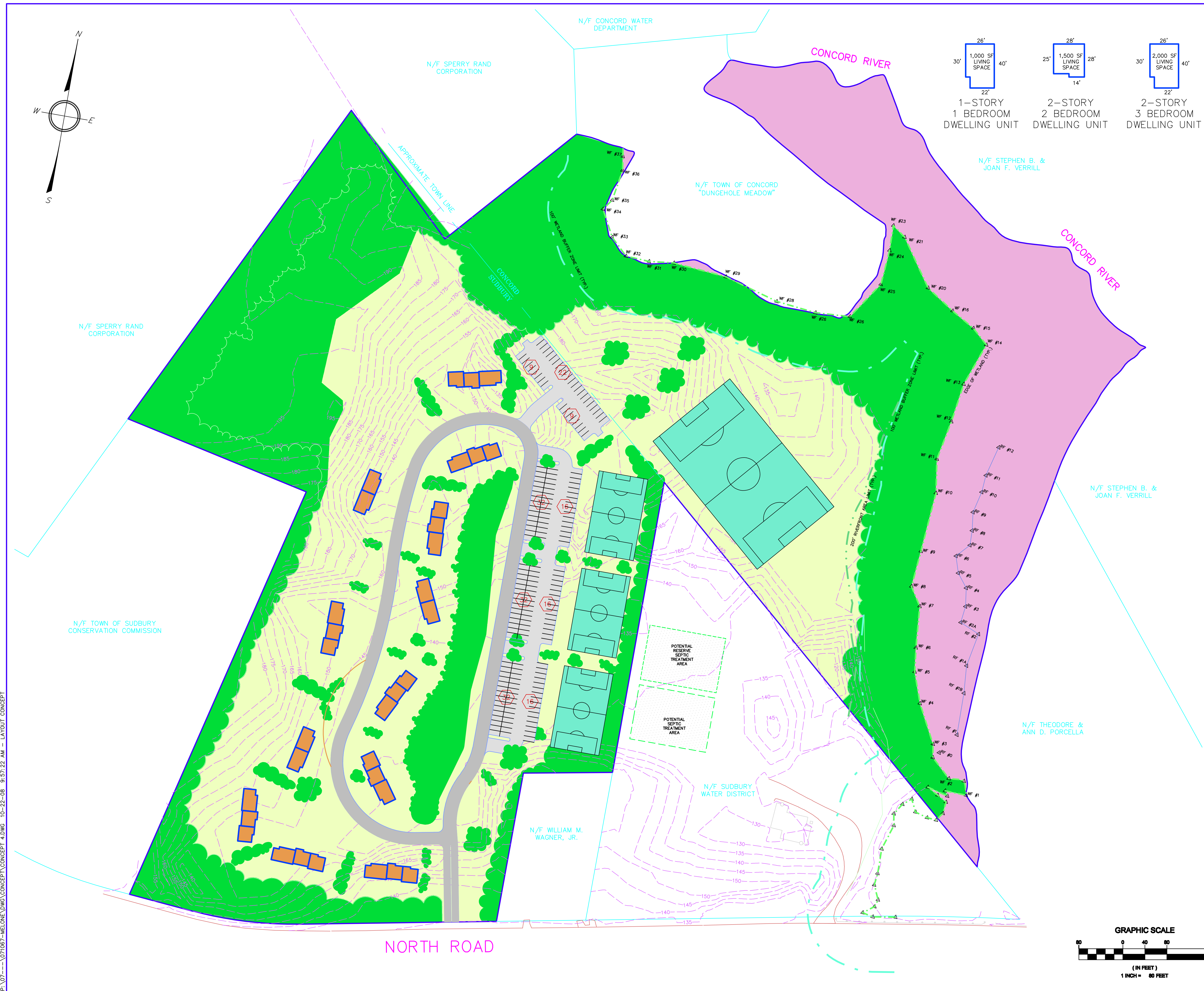
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<b>RESIDENTIAL DEVELOPMENT</b>				
CONCEPT PLAN NO. 2				
<b>MELONE PROPERTY</b>				
<b>NORTH ROAD</b>				
<b>SUDBURY, MA</b>				
PREPARED FOR:				
TOWN OF SUDBURY				
278 OLD SUDBURY ROAD				
SUDBURY, MA 01776				
DFT. BY: MKB	DATE: FEBRUARY 2008	JOB 071067	1 OF 1	
CHK. BY: CRG				

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5

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CORPORATION

N/F TOWN OF SUDBURY  
CONSERVATION COMMISSION

N/F SPERRY RAND

N/F CONCORD WATER  
DEPARTMENT

N/F TOWN OF CONCORD  
"DUNGEHOLE MEADOW"

N/F STEPHEN B. &  
JOAN F. VERRILL

N/F STEPHEN B. &  
JOAN F. VERRILL

N/F THEODORE &  
ANN D. PORCELLA

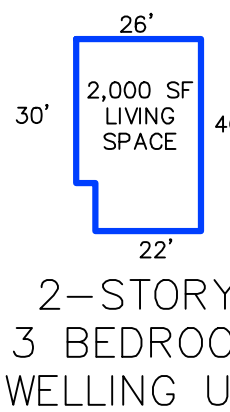
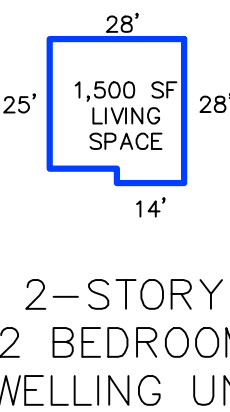
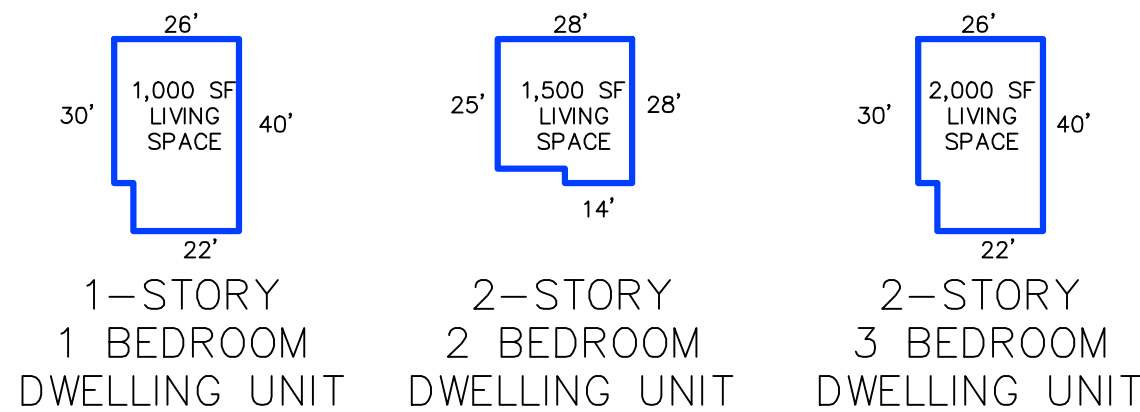
N/F WILLIAM M.  
WAGNER, JR.

N/F SUDBURY  
WATER DISTRICT

CONCORD RIVER

CONCORD RIVER

NORTH ROAD



- |   |                                 |
|---|---------------------------------|
|   | BUILDING                        |
|  | LAWN AREA / USABLE AREA         |
|  | DRIVEWAYS / PARKING AREAS       |
|  | POTENTIAL SEWAGE TREATMENT AREA |
|  | WOODS / LANDSCAPING             |
|  | BORDERING VEGETATED WETLAND     |
|  | SPORTS FIELD                    |

LAWN AREA / USABLE AREA

## DRIVEWAYS / PARKING AREAS

POTENTIAL SEWAGE TREATMENT  
AREA

WOODS / LANDSCAPING

BORDERING VEGETATED WETLAND

SPORTS FIELD

### SCHEDULE OF UNITS:

1-BEDROOM UNITS:	9 UNITS	9 BEDROOMS
2-BEDROOM UNITS:	18 UNITS	36 BEDROOMS
3-BEDROOM UNITS:	6 UNITS	18 BEDROOMS
TOTAL NUMBER OF BEDROOMS:		63

EXISTING CONDITIONS NOTES:

1. TOPOGRAPHIC AND PROPERTY LINE INFORMATION SHOWN HEREON IS APPROXIMATE ONLY.
2. LOCATION OF RIVERBANK FLAGGED BY DEP PERSONNEL, AS TAKEN FROM PLAN REFERENCE NO. 1.

### PLAN REFERENCES:

1. "TOPOGRAPHIC PLAN OF LAND IN SUDBURY AND CONCORD, MA" PREPARED BY TOWN OF SUDBURY ENGINEERING DEPARTMENT. DATED FEBRUARY 16, 1999; REVISED THROUGH MARCH 17, 2000.

## DRAWING ISSUED FOR:

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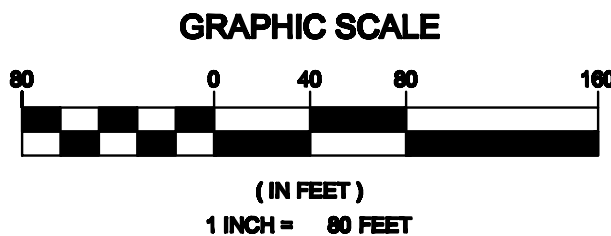
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## RESIDENTIAL DEVELOPMENT

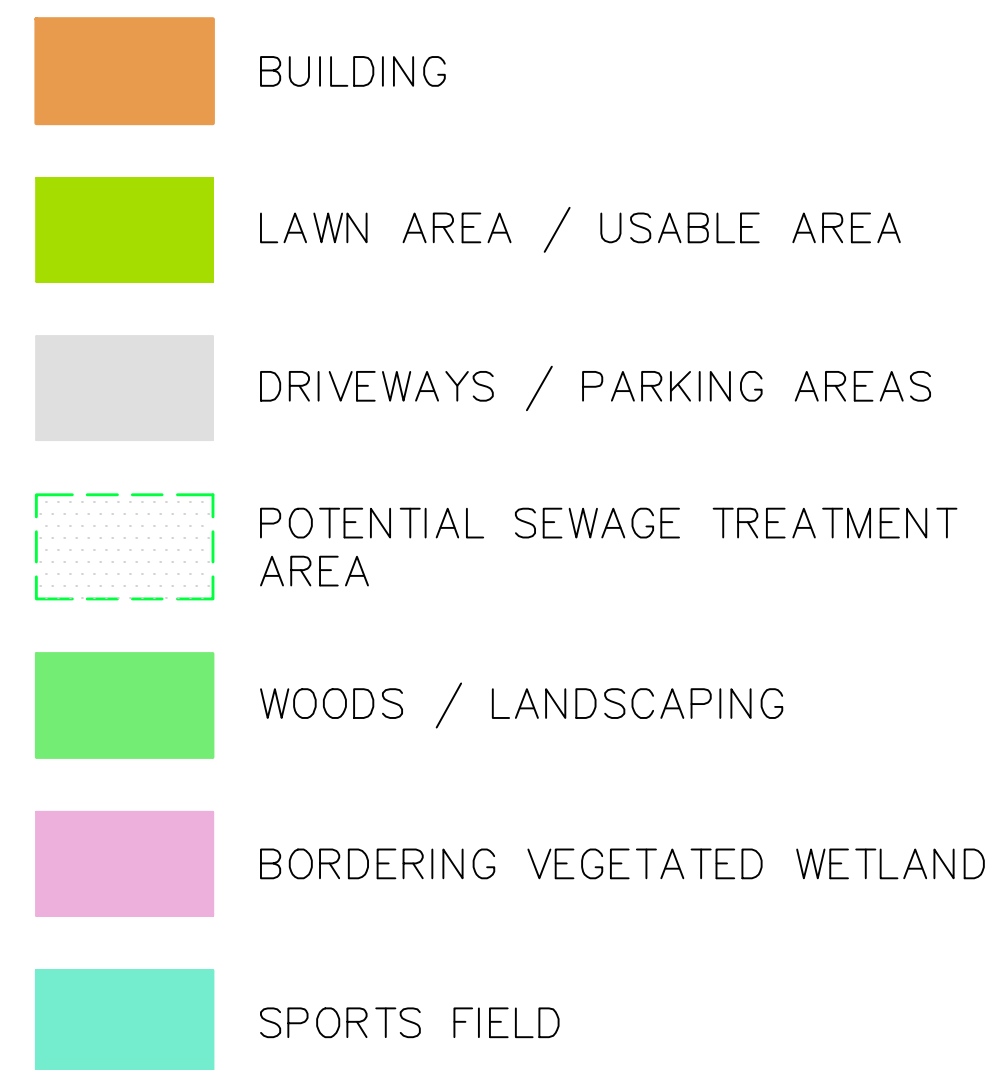
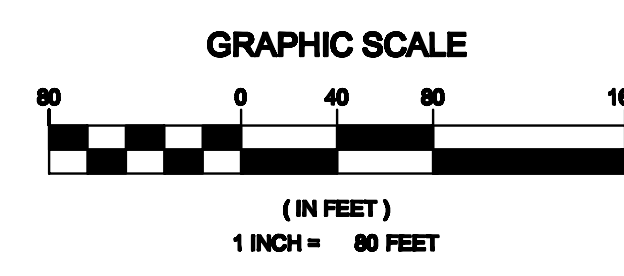
CONCEPT PLAN NO. 4

MELONE PROPERTY  
NORTH ROAD  
SUDBURY, MA

PREPARED FOR:  
TOWN OF SUDBURY  
278 OLD SUDBURY ROAD  
SUDBURY, MA 01776







1-BEDROOM UNITS:	9 UNITS	9 BEDROOMS
2-BEDROOM UNITS:	18 UNITS	36 BEDROOMS
3-BEDROOM UNITS:	6 UNITS	18 BEDROOMS
TOTAL NUMBER OF BEDROOMS:		63

1. TOPOGRAPHIC AND PROPERTY LINE INFORMATION SHOWN HEREON IS APPROXIMATE ONLY.

2. LOCATION OF RIVERBANK FLAGGED BY DEP PERSONNEL, AS TAKEN FROM PLAN REFERENCE NO. 1.

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☐ PERMIT       ☐ CONSTRUCTION RECORD

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## CONCEPT PLAN NO. 5

MELONE PROPERTY  
NORTH ROAD  
SUDBURY, MA

PREPARED FOR:  
TOWN OF SUDBURY  
278 OLD SUDBURY ROAD  
SUDBURY, MA 01776

DFT. BY: EMR	DATE: OCTOBER 2008	JOB 071067	1 OF 1
CHK. BY: CRG			



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