Final Report

Route 25 / 35 Corridor Study

PREPARED FOR:
Town of Standish
175 Northeast Road
Standish, Maine 04084

PREPARED BY:
Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237, 15 Shaker Road
Gray, Maine 04039
(207)657-6910

July 9, 2007

Final Report of Route 25 Corridor Study

Project Background

The Town of Standish retained Gorrill-Palmer Consulting Engineers, Inc. to complete a traffic study for Standish village in the vicinity of the intersections of Routes 25 and 35 and to develop an access management plan for the corridor which can be adopted by the Town and used to guide ongoing development. These routes are major two lane regional arterials which experience heavy commuter volumes that conflict with access to local businesses and pedestrian travel patterns. The goal of access management is to preserve the capacity of Route 25 and 35, avoid confusing traffic patterns, reduce the need for turning lanes and plan rather that react to where traffic signals will be installed. The transportation challenges that Standish is facing are similar to those facing many communities. Developing a plan to balance economic development while maintaining or improving mobility and safety, requires close communication between various stakeholders.

Study Area

The study area includes the intersections of Routes 25 and 35 and Route 25 and Oak Hill Road, extending from these intersections westerly to the Gorham Town Line, easterly to on Oak Hill road past the Seaveys driveway, and northerly and southerly a few thousand feet. The study area is shown in Figure 1.

Existing Traffic Volumes

Gorrill-Palmer Consulting Engineers Inc. utilized two sources of information in developing our traffic modeling; historic annual average daily traffic volumes (AADT's) collected on Routes 25 and 35 by the MaineDOT, and turning movement counts collected at the intersection of Routes 25 and 35. Each of these is discussed below:

Annual Average Daily Traffic (AADT's)

These volumes show the traffic by direction for each of the corridors. A copy of the available AADT's collected periodically from 1981 through 2005 is included in the Appendix to this report. This information shows that the traffic volumes have grown from 4482 and 5986 vehicles per day (vpd) in 1981 for Routes 35 and 25 respectively to 8680 and 14070 respectively.

Intersection Turning Movement Counts

The intersection of Routes 25 and 35 has twelve possible turning movements and each of these must be counted individually in order to assess capacity. Our office utilizes two sources of turning movement counts; counts collected by our office on October 18, 2006 at the intersection of Routes 25 and 35 as well as at the intersection of Oak Hill and Route 25. These

October volumes were increased by 10% using MaineDOT adjustment factors to approximate the 30th highest hour of the year. A copy of the peak hour volumes which occurred from 4:30 PM to 5:30 PM are included in the Appendix to this report. The attached Figure 2 shows the raw counted volumes with the seasonally adjusted volumes shown on Figure 3. The MaineDOT also supplied our office with turning movements collected at the intersection of Routes 25 and 35 in August of 1998.

Future Traffic Volumes

Based on historic traffic volumes collected by the MaineDOT, our office utilized a growth factor of 2% per year to arrive at the estimated 2016 traffic volumes utilized in the model. The attached Figure 4 shows the 2016 Forecast volumes. There are a number of large properties, particularly along Route 25 between Route 35 and the Gorham town line that are either for sale or candidates for re-development. While we have considered these in the alternatives discussed below, the 2% is a reasonable middle of the road estimate to carry forward.

Collision History

Gorrill-Palmer Consulting Engineers Inc. obtained the collision history from the MaineDOT for the latest available three year period from 2003 through 2005. A location is classified as a High Crash Location (HCL) if it meets both of the following criteria:

1. Eight or more crashes over a three-year period, and;
2. A Critical Rate Factor (CRF) of 1.00 or greater for the same three-year period. A CRF compares the actual crash rate of each intersection or road segment to the Statewide crash rate of similar locations. A CRF less than 1.00 indicates a lower than average crash rate.

Our office obtained the crash reports from the MaineDOT and compiled the collision diagrams for the High Crash locations as well as the remaining non-high crash locations in the study area. These collision diagrams are included in the Appendix to this report. The High Crash Locations are discussed in more detail below:

Intersection of Routes 25 and 35

This location experienced 30 collisions with a critical rate factor of 1.25 from 2003 to 2005. Of the 30 collisions at this location, 13 were rear end collisions with 7 of these occurring on the westbound Route 25 approach. The remaining were angled collisions. While difficult to say with certainty, it is likely that the congestions at the intersection is a contributing factor to the collisions due to people running the red (angle collisions) or following too close to the vehicle in front hoping to tag along through a yellow phase when the vehicle in front stops and is rear-ended. Improvements to address this issue will be discussed in the Alternatives portion of this report.

This location experienced eight collisions with a critical rate factor of 1.25. Other than three rear-end collisions for eastbound traffic on Route 25, there does not appear to be any discernable pattern at this location, which limits the ability to make specific recommendations.

Capacity and Level of Service

Our office performed an analysis of the capacity and level of service of the existing conditions (2006 and 2016 adjusted volumes). All analyses were done using the Synchro/SimTraffic software. The SimTraffic results were run five times with the final results averaged. Level of service rankings are similar to the academic ranking system where and 'A' experiences little control delay and an 'F' represents significant delay. A Level of Service (LOS) 'D' or higher is desirable for a signalized intersection. At an unsignalized intersection, if the level of service falls below a 'D', an evaluation should be made to determine if a traffic signal is warranted.

The following table summarizes the relationship between control delay and level of service for a signalized intersection:

Table 2.3: Level of Service (LOS) Criteria for Signalized Intersections

Level of Service (LOS)	Control Delay per Vehicle (sec)
A	Up to 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	Greater than 80.0

The results in the following tables are based on the average of five SimTraffic runs for both the 2006 and 2016 PM peak hours. The 2016 is based on extending the southbound right turn lane to 100 feet and increasing the cycle length from 100 seconds to 120 seconds.

Level of Service Results for Route 25 and Route 35

Lane Group	2006 PM Peak Hour		2016 PM Peak Hour	
	Delay (sec.)	LOS	Delay (sec.)	LOS
Route 25 EB LT	>80	F	>80	F
Route 25 EB TH/RT	72	E	24	C
Route 25 WB LT	>80	F	>80	F
Route 25 WB TH/RT	>80	F	>80	F
Route 35 NB LT/TH	58	E	73	E
Route 35 NB RT	28	C	42	D
Route 35 SB LT/TH	>80	F	>80	F
Route 35 SB RT	>80	F	>80	F
Overall	**>80**	**F**	**>80**	**F**

The tables above indicate that the intersection of Routes 25 and 35 is operation at a low level of service with extensive queuing. These results were confirmed by site observations during the course of this study. The improvements to the intersection only result in a reduction in delay to eastbound traffic; the overall increase in volumes by 2016 results in an increase in delay and queuing over the 2006 conditions.

Improvement Recommendations

Gorrill-Palmer Consulting Engineers Inc. obtained the most recent aerial photography dated 2000 and superimposed the Town's tax map information on the aerial to approximate the property line information. Alternative corridor improvements were developed based on this mapping and are discussed in the following paragraphs.

Intersection of Oak Hill Road and Route 25 (Ossipee Trail)

This intersection is frequently blocked by traffic queued back from the intersection of Routes 25 and 35 making it very difficult to turn left in or out of Oak Hill Road. This condition could be addressed by increasing the separation between these intersections. Gorrill-Palmer Consulting Engineers Inc. considered five alternatives for achieving this goal as shown in Figures 6 through 9. A description of each of these alternatives is presented below followed by our evaluation and recommendation.

Option 1 - Option 1, shown in Figure 6, relocates the intersection of Oak Hill Road approximately 120 feet west of its current location and realigns its approach to Route 25 to be more perpendicular which is desirable. This realignment is through the front of the Seavey's property which reduces their available parking and eliminates their direct access onto Route 25. This option shows potential replacement parking along Oak Hill Road, however, it would require vehicles exiting these spaces to back out onto Oak Hill Road, which is not desirable.

Option 2 - This option, shown in Figure 7, relocates the intersection of Oak Hill Road approximately 400 feet west of its current location and realigns its approach to Route 25 to be more perpendicular which is desirable. The relocation is to the rear of the Seavey property and the current alignment of Oak Hill road between the proposed connector road to Route 25 and the current intersection of Oak Hill Road and Route 25 is maintained as one-way westerly. This enables westbound traffic from Route 35 to access Oak Hill Road as it does now and also serves as a means for exiting traffic from Standish Hardware and Seavey's to access the new connector. The proposed connector road intersection with Route 25 would be a tee, three-way stop alignment to minimize right-of-way impacts at this proposed intersection under this option. A drawback to this alternative is that traffic approaching Standish Hardware or Seaveys's from the west via Route 25 will need to continue, as they do today, to access these businesses via the existing intersection of Oak Hill and Route 25.

Option 3 - This option, shown in Figure 8, is similar to option 2 except that a horizontal curve is introduces to the connector road to enable it to be the through roadway and Oak Hill Road is realigned to a tee. An additional difference with option 2 is that the remnant portion of Oak Hill Road is a dead end serving Standish Hardware and Seavey's rather than being designated as one way.

Option 4 - This option, shown in Figure 9, is similar to Option 3, but the remnant portion of Oak Hill Road becomes two-way from its intersection with the proposed connector road and Standish Hardware, and one way between Standish Hardware and the existing intersection.

Option 5 - This option, also shown in Figure 9, proposes a new connector roadway between Oak Hill Road and Route 25 approximately 6400 feet westerly of the existing intersection of Oak Hill Road and Route 25. The existing alignment of Oak Hill Road between the connector road and Route 25 would remain as two-way from Standish Hardware westerly and become one-way westerly between the hardware store and Route 25. The connector roadway under this option would be approximately a mile in length.

Evaluation of Options 1 through 5

Each of the Options relieves traffic congestion associated with the intersection of Routes 25 and Oak Hill Road and by proximity, Route 35 to some degree. Option 1 provides the least separation and has a significant impact on parking for Seavey's and therefore its overall benefit is marginal and not recommended by our office. Options 2, 3, and 4 all provide a connector roadway behind Seavey's in various configurations which increases the separation to the adjacent intersection to a more appropriate distance of 400 feet. It is our opinion that teeing Oak Hill Road into the curved connector road, as shown in Options 3 and 4 provides less delay and operational benefits with Option 4 providing better overall access to adjacent businesses. It is our recommendation that the Town consider implementing Option 4. Option 5 is separated from the intersection of Routes 25 and 35 by over a mile, would have more potential environmental impacts and cost significantly more in comparison to the other alternatives. It does provide the potential to serve additional land, and eliminates potential interference with adjacent driveways if it were developed in the future, so the Town may want to consider reserving the right-of-way for this Option in the future.

Potential Additional Connector Roadway Alignments

In addition to the potential re-alignments of the intersection of Oak Hill Road and Route 25, the Town should consider other long-term alternatives to relieve the intersection of Routes 25 and 35. As local and regional land uses develop, traffic approaching this intersection will increase and, short of taking land in each of the adjacent quadrants of the intersection which would destroy the village character and be dangerous for pedestrians, there are no improvements at this intersection which will increase capacity. Therefore, it will be important to develop strategies which will provide alternatives to traffic traveling through this intersection. Historically traffic engineers and community planners have addressed this issue in other communities through a series of interconnected roadways such that all the traffic did not have to traverse through a single intersection.

In developing alternative connector roads, there are several important considerations, First, property owners should provide to the extent practical for interconnection between properties allowing for trips to multiple uses without having to re-enter the roadway system. Second, the connector roadways should be laid out to minimize environmental impacts, maximize the

remaining developable area on impacted parcels, and minimize cut and fill. Thirdly, potential intersections of these connector roadways with existing intersections should be adequately spaced and serve sufficient traffic such that they could be signalized. Such connector roadways when combined with appropriate access management on the existing roadways, can significantly increase safety reduce delay in the village area.

Based on the existing and potential land uses, existing driveways, and existing traffic signals locations we recommend that a future traffic signal be planned at the existing driveway to the Standish veterinary hospital as illustrated in Figure 5 and coordinated with the existing traffic signals at the intersections of 25/35 and the Colonial Market Place driveway. This traffic signal would serve a connector roadway shown on either side of Route 25, consolidating turning movement to this one driveway rather than development multiple driveways and additional land uses occur, none of which would warrant a traffic signal individually. Each of these connector roadways would extend back northeast and southwest to intersect connector roadways parallel to Route 25 as illustrated in Figure 5. These connector roadways will enable some traffic to avoid the intersection of Routes 25 and 35. For example, traffic traveling northeasterly on Route 25 toward the intersection which is destined to Hannaford or other destinations on the easterly side (Gorham side) of the intersection, could turn right onto the connector road to avoid the intersection and utilize the same route on the return trip thereby avoiding the intersection. These alternative routes will provide alternative low speed routes which can also be utilized by pedestrians and bicyclists. If the connector roadways shown in Figure where all completed in the future, they would form a perimeter system of roadways diverting a significant amount of existing and future traffic away from the intersection of 25/35.

It is important to note that the alignments shown on the concept plans in Figure 5 are schematic only and that the actual alignment will need to be revised based on topographic and environmental constraints.

Access Management

As development occurs along the Route 25 and 35 corridors, the location of driveways will need to be well planned to avoid the cumulative effect of numerous driveways which leads to side friction and delay which has occurred for example, along the Route 302 corridor in Windham. The access management plan should establish future driveway locations, correct driveways that are poorly located due to sight line restrictions, close proximity to adjacent intersections; and promote connectivity wherever possible. When combined with the connector roadways discussed in the previous section, it will result in a comprehensive approach to preserve the capacity of both corridors.

Gorrill-Palmer Consulting Engineers Inc. reviewed the existing driveway locations and has developed a recommended access management plans shown in Figures 10-13.

Potential Options to Fund Parallel Service Roads and Access Management Plan

There are a variety of alternatives for consideration in funding the improvements contained recommended in this report. However, as a first step, it is important that the town formally adopt the plan and reference it in their land use ordinance which will provide a tool to assist

both the Town and developers. When a developer is considering development of a parcel, the town planner, planning board and developer will have a framework around which to plan the development proposal.

There are several funding mechanisms to consider in implementing the recommendations contained in this study as discussed below. It would be our expectation that the improvements actually be funded through a combination of these alternatives.

Impact Fee Ordinance - Impact fees are fees collected from the developer toward a portion of the improvements to mitigate the impact of their project. The fees are determined based on a preliminary engineering study of the connector roads have been completed so that a construction cost can be estimated and an impact fee ordinance adopted. The impact fee is usually assessed on a cost per trip basis.

Developer Contributions - The developer may be required as a condition of approval toward mitigation of their impacts, to contribute the right of way for the portion of the connector road crossing their land and to construct a portion of the roadway.

Economic Development District – This is a mechanism that some municipalities use to fund roadway improvements by using a portion of the additional tax revenue generated by the development to fund the roadway improvements. Thus the Town foregoes some of the tax revenue for a period of time.

MaineDOT Funding - the MaineDOT funds projects on a biennial basis. Due to funding limitations, it is a very competitive process. In addition, accepting State and or Federal funding may add cost to the project to meet their requirements which are tied to the funding. There may be less restrictive funds available for the construction of sidewalks along the connector roadway.

Standish Capital Improvement Program - The Town may dedicate funding to fill in gaps in the plan not funded by other mechanisms.

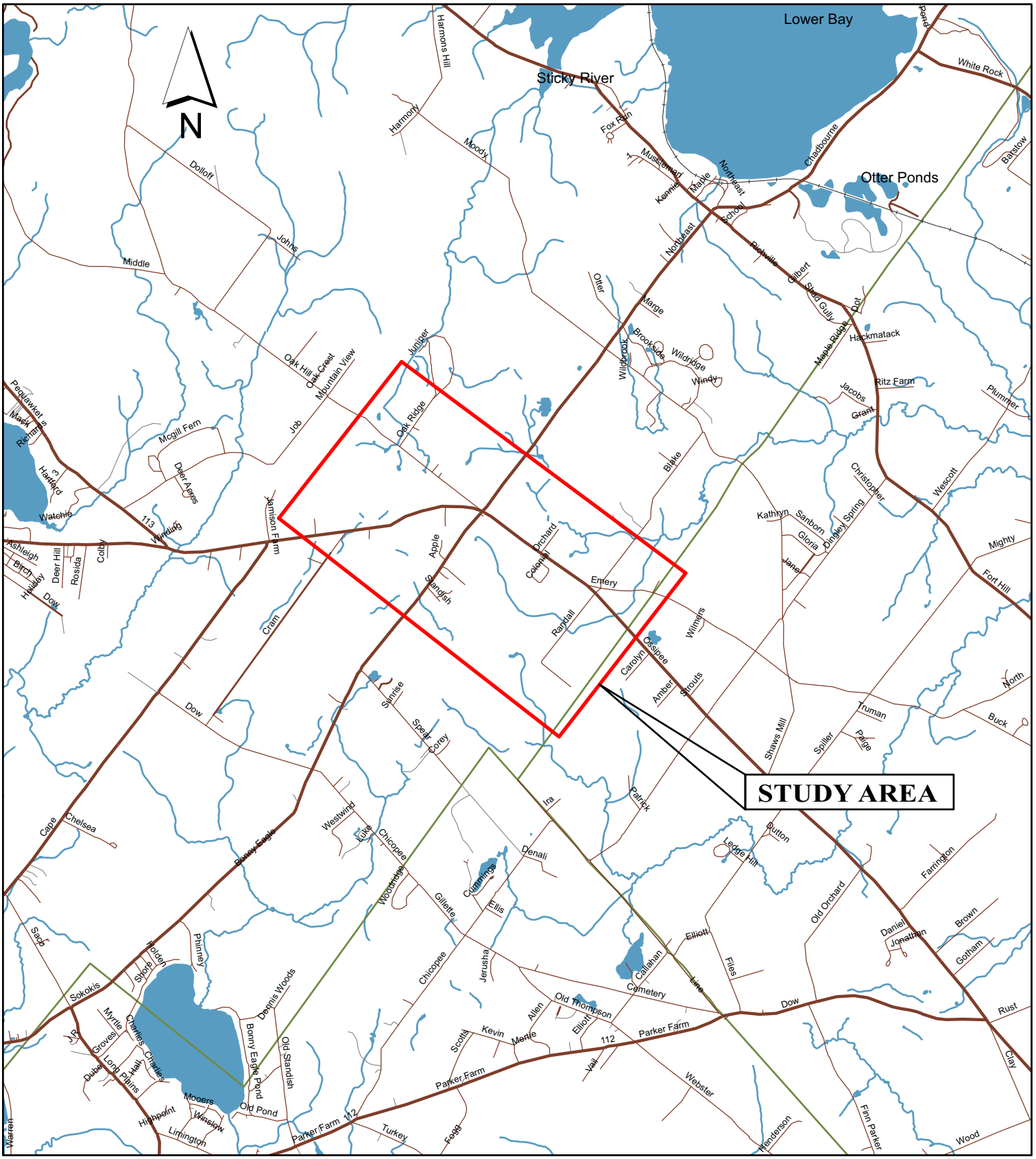
Bonding - The Town may obtain funds to construct one or more of the connector roadways through a bonding initiative. This can be effective after some initial funds are collected. The Town can then bond the construction and use future revenue from impact fees or other revenue to pay back the bond. This allows the benefit of the roadway and also avoids construction inflation if the roadway were completed at a future date.

Appendix A

Study Area Map
Turning Movement Diagrams
Improvement Options

Study Area Map

Figure No. 1



ROUTE 25 ACCESS MANAGEMENT STUDY, STANDISH, MAINE

GP Gorrill-Palmer Consulting Engineers, Inc.

Traffic and Civil Engineering Services

PO Box 1237
15 Shaker Road
Gray, ME 04039

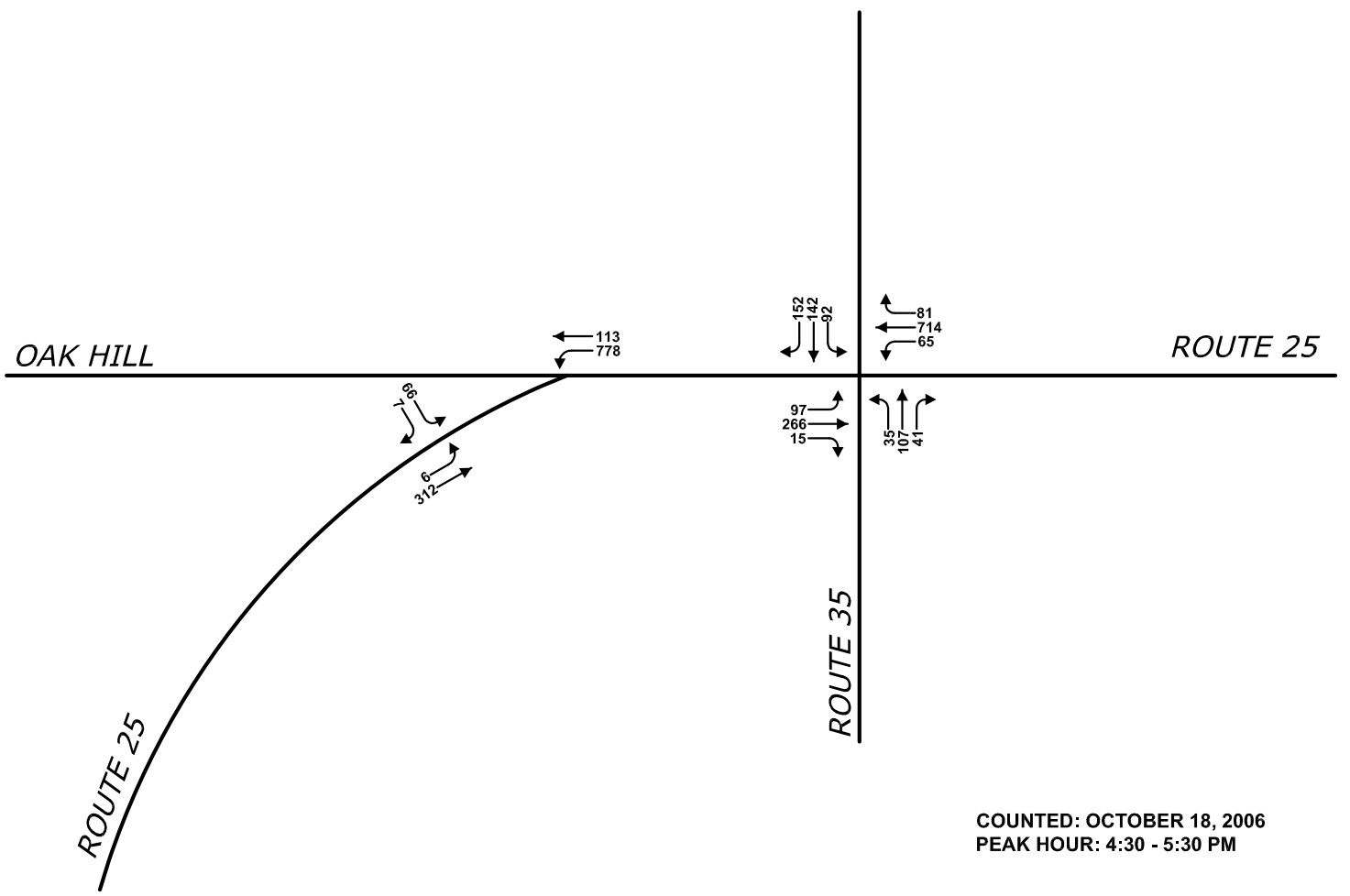
207-657-6910
Fax: 207-657-6912
mailbox@gorrillpalmer.com
www.gorrillpalmer.com

Miles
0.5 0 0.5 1

JN: 1578
DATE: JUN 2007
FILE:1578-STUDY AREA MAP.MXD
SOURCE: MAINE GIS WEBSITE

Raw Volumes

Figure No. 2



COUNTED: OCTOBER 18, 2006
PEAK HOUR: 4:30 - 5:30 PM

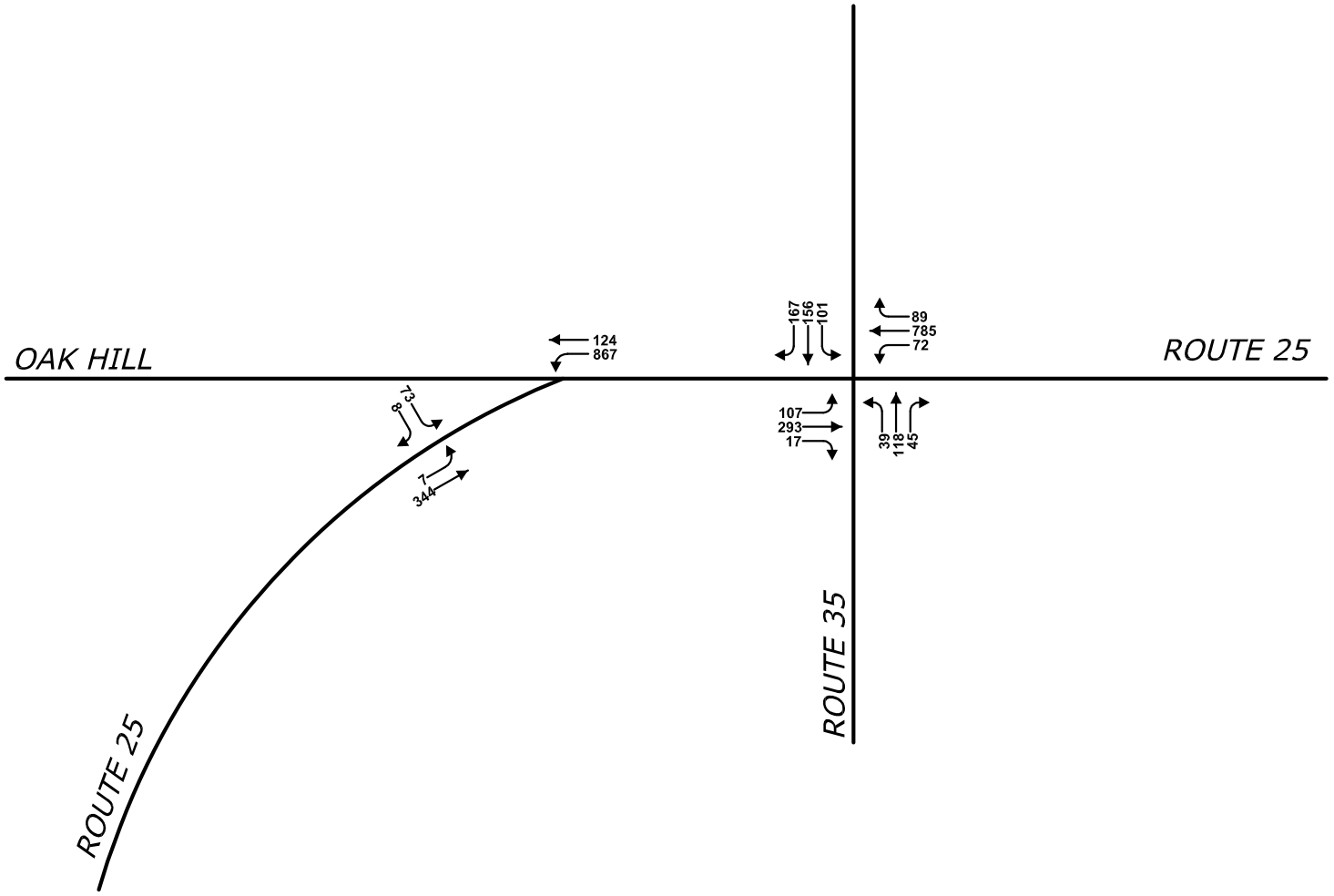
VILLAGE DESIGN MASTER PLAN, STANDISH, MAINE

Design:	RED	Scale:	NONE
Draft:	LMC	Date:	MARCH 2007
Checked:	JJB	File Name:	1578-TRAF.dwg

Gorrill–Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237
15 Shaker Road
Gray, ME 04039
207-657-6910
Fax: 207-657-6912
mailbox@gorrillpalmer.com
www.gorrillpalmer.com

2006 Adjusted Volumes

Figure No. 3



SEASONAL ADJUSTMENT: $\frac{0.96}{0.87}$ = 1.10

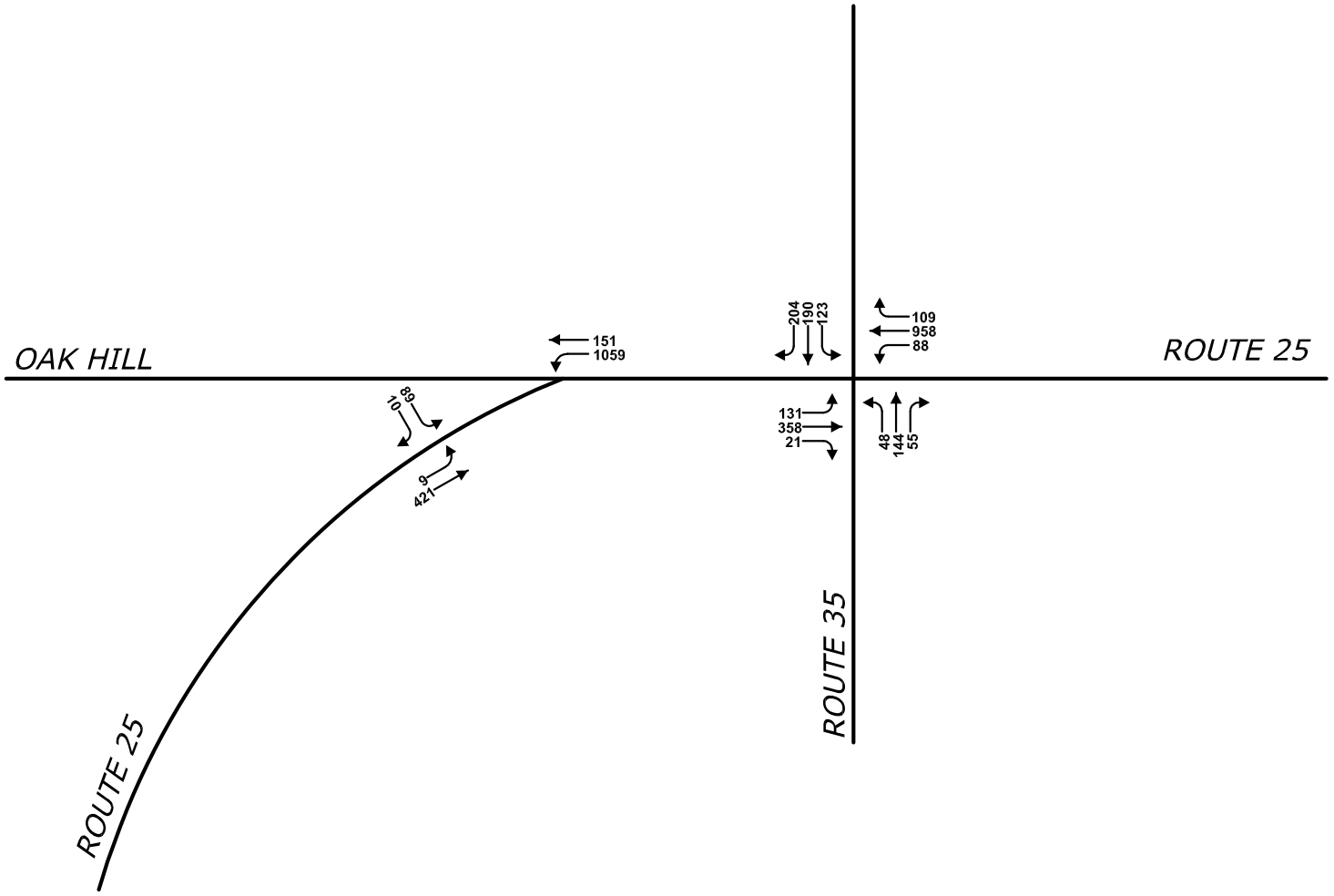
VILLAGE DESIGN MASTER PLAN, STANDISH, MAINE

Design:	RED	Scale:	NONE
Draft:	LMC	Date:	MARCH 2007
Checked:	JJB	File Name:	1578-TRAF.dwg

Gorrill–Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237
15 Shaker Road
Gray, ME 04039
207-657-6910
Fax: 207-657-6912
mailbox@gorrillpalmer.com
www.gorrillpalmer.com

2016 Forecast Volumes

Figure No. 4

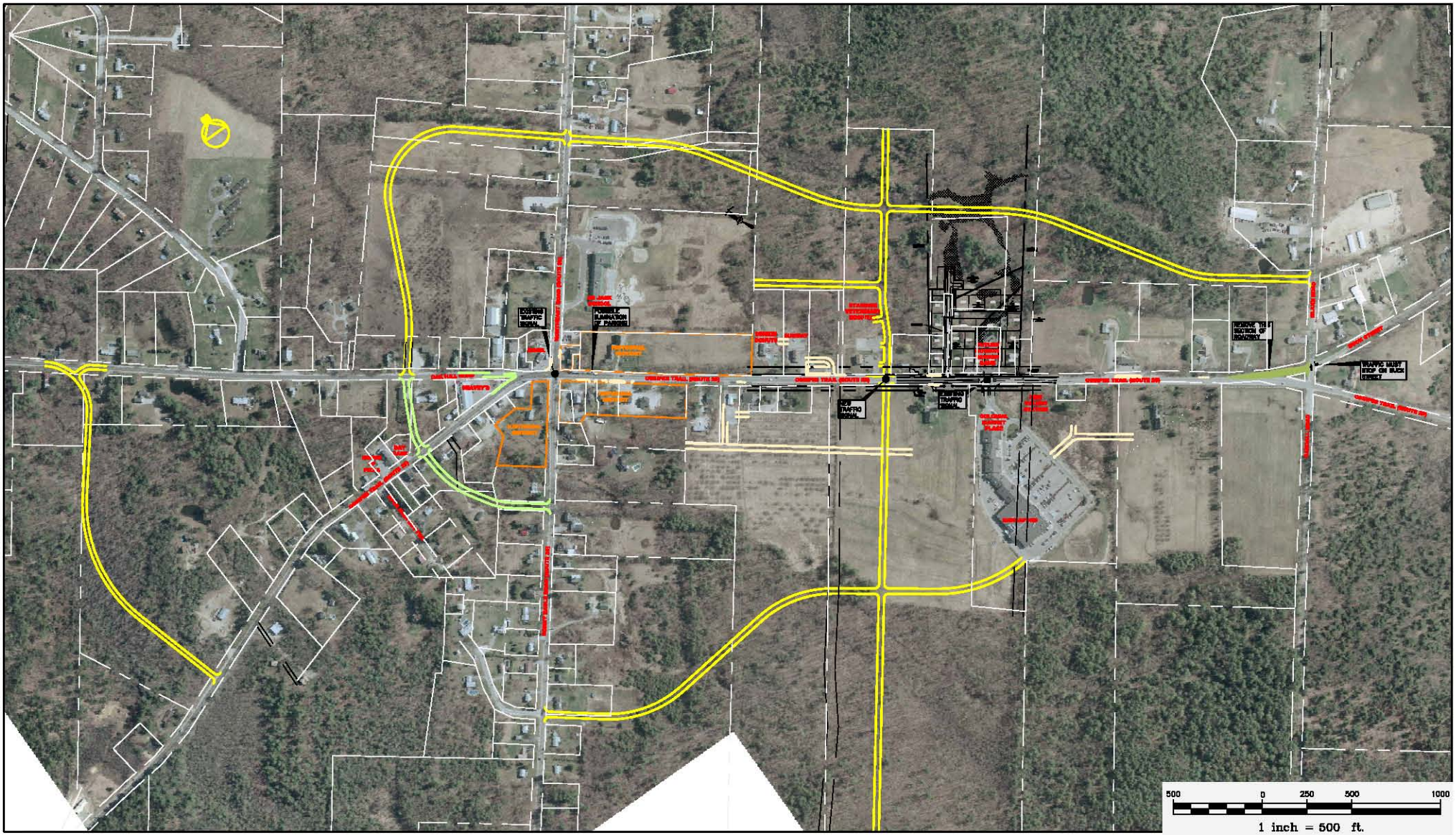


YEARLY GROWTH: $(1.02)^{10} = 1.22$

VILLAGE DESIGN MASTER PLAN, STANDISH, MAINE

Design:	RED	Scale:	NONE
Draft:	LMC	Date:	MARCH 2007
Checked:	JJB	File Name:	1578-TRAF.dwg

Gorrill–Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237
15 Shaker Road
Gray, ME 04039
207-657-6910
Fax: 207-657-6912
mailbox@gorrillpalmer.com
www.gorrillpalmer.com



Rev.	Date	Revision
–	–	–

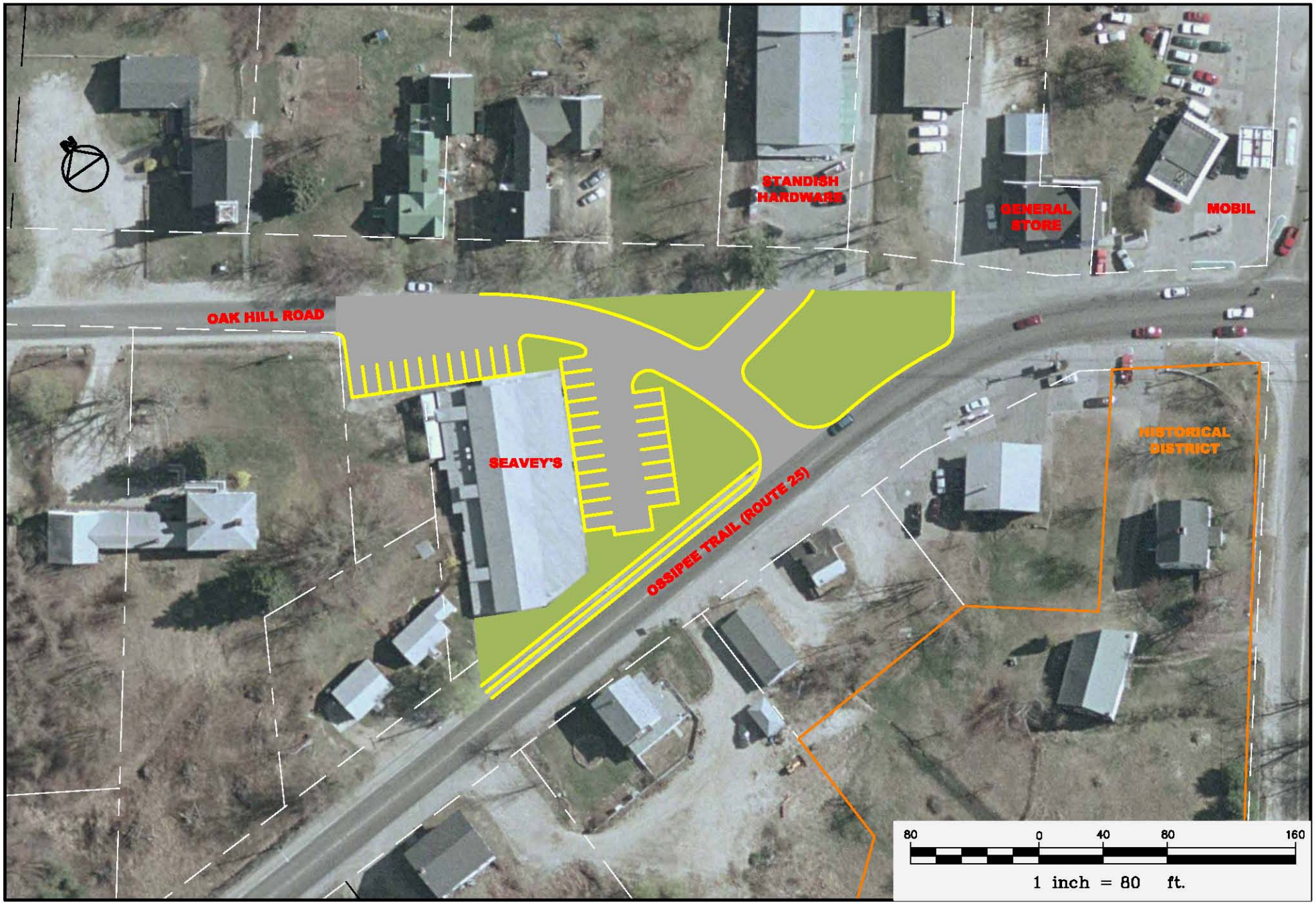
Design: DB	Date: JUN 2007
Draft: DB	Job No.: 1578
Checked: TLG	Scale: 1"=500'
File Name: 1578-MASTERPLAN.dwg	

GP Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237
15 Shaker Road
Gray, ME 04039
207-657-6910
FAX: 207-657-6912
E-Mail: mailbox@gorrillpalmer.com

Drawing Name: Overall Master Plan

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 5



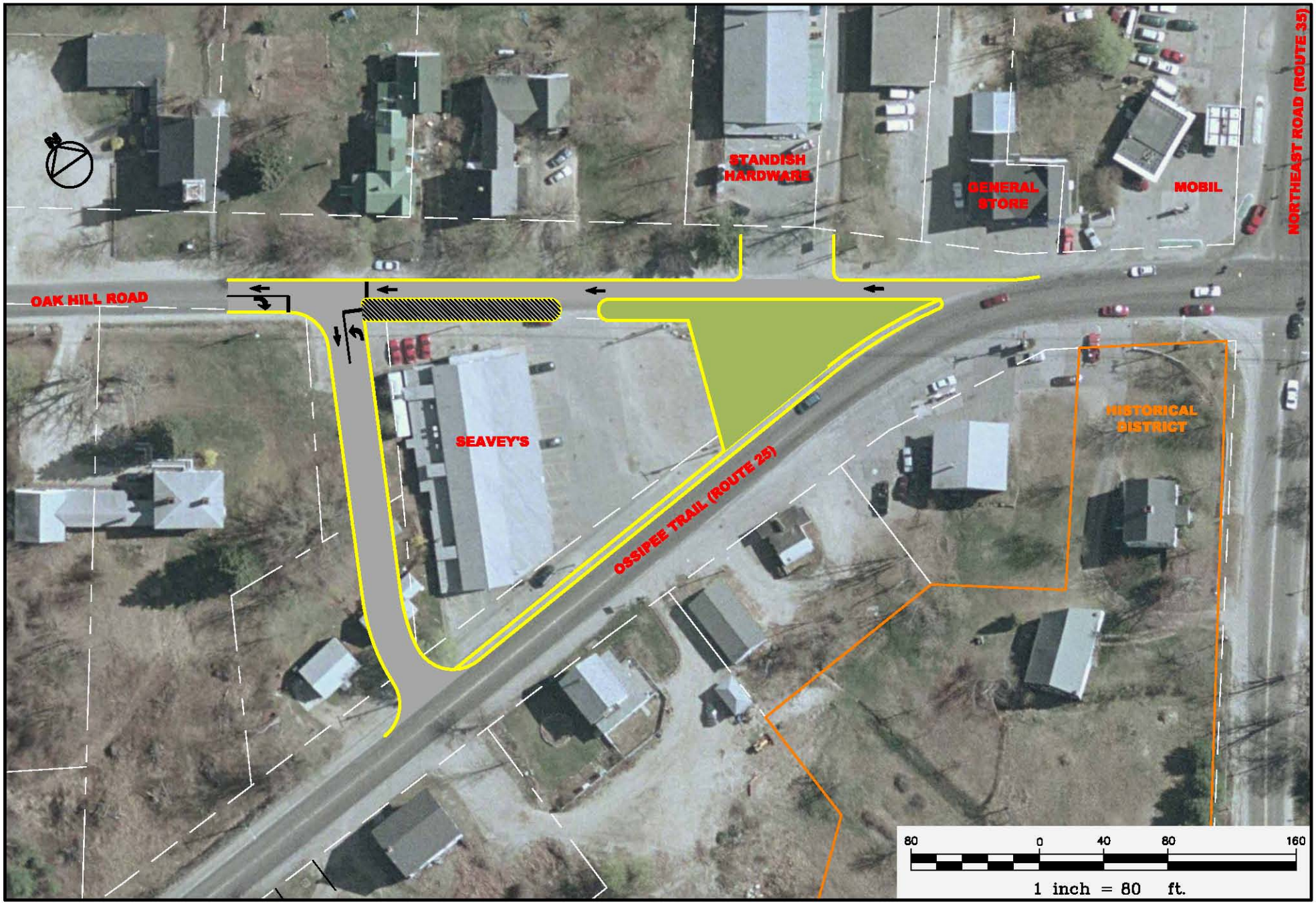
Design:	DB	Date:	JUN 2007
Draft:	DB	Job No.:	1578
Checked:	TLG	Scale:	1"=80'
File Name: 1578-CONCEPT1.dwg			

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Oak Hill Relocation – Option 1

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 6



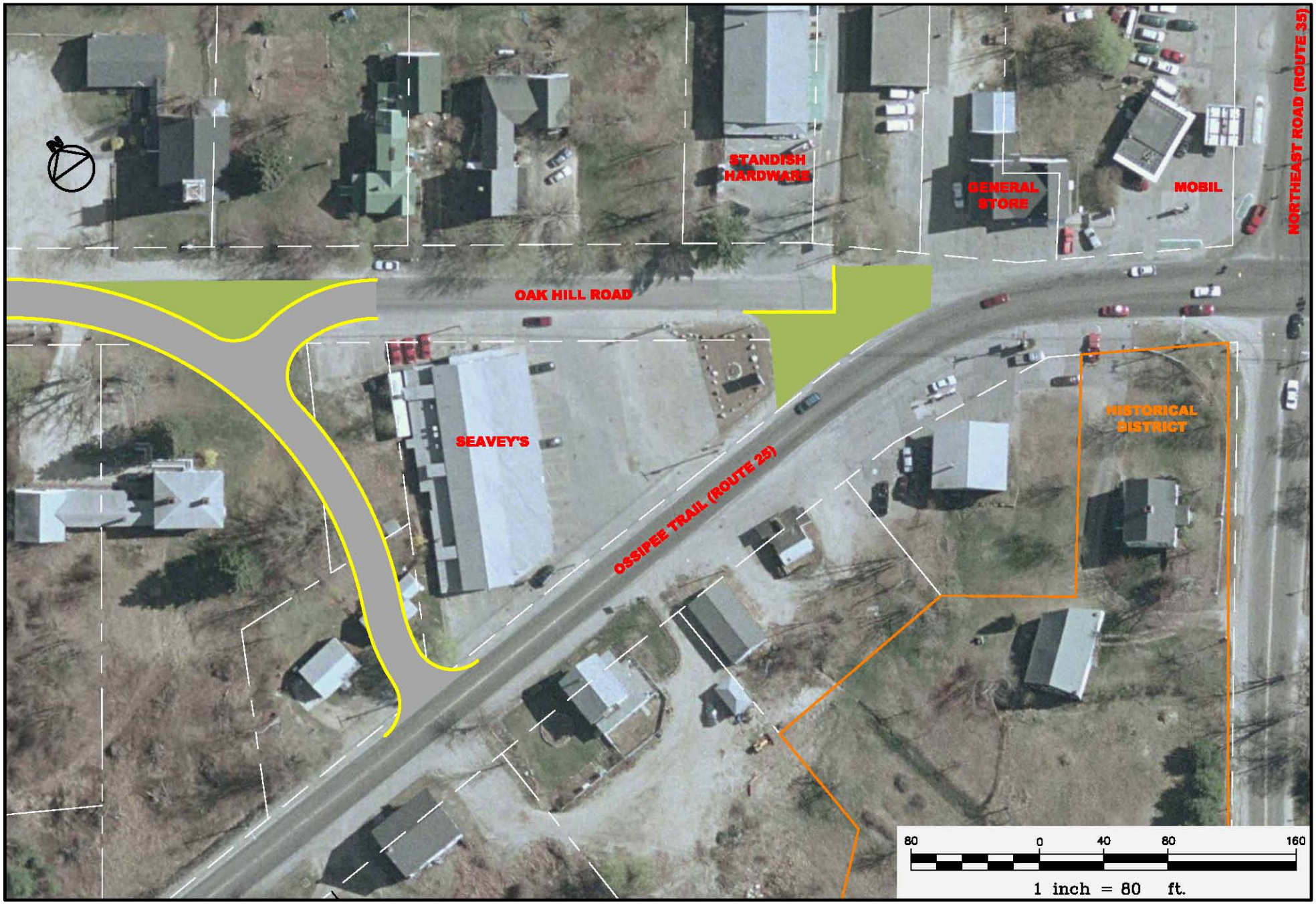
Design: DB	Date: JUN 2007
Draft: DB	Job No.: 1578
Checked: TLG	Scale: 1"=80'
File Name: 1578-CONCEPT2.dwg	

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Oak Hill Relocation – Option 2

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 7



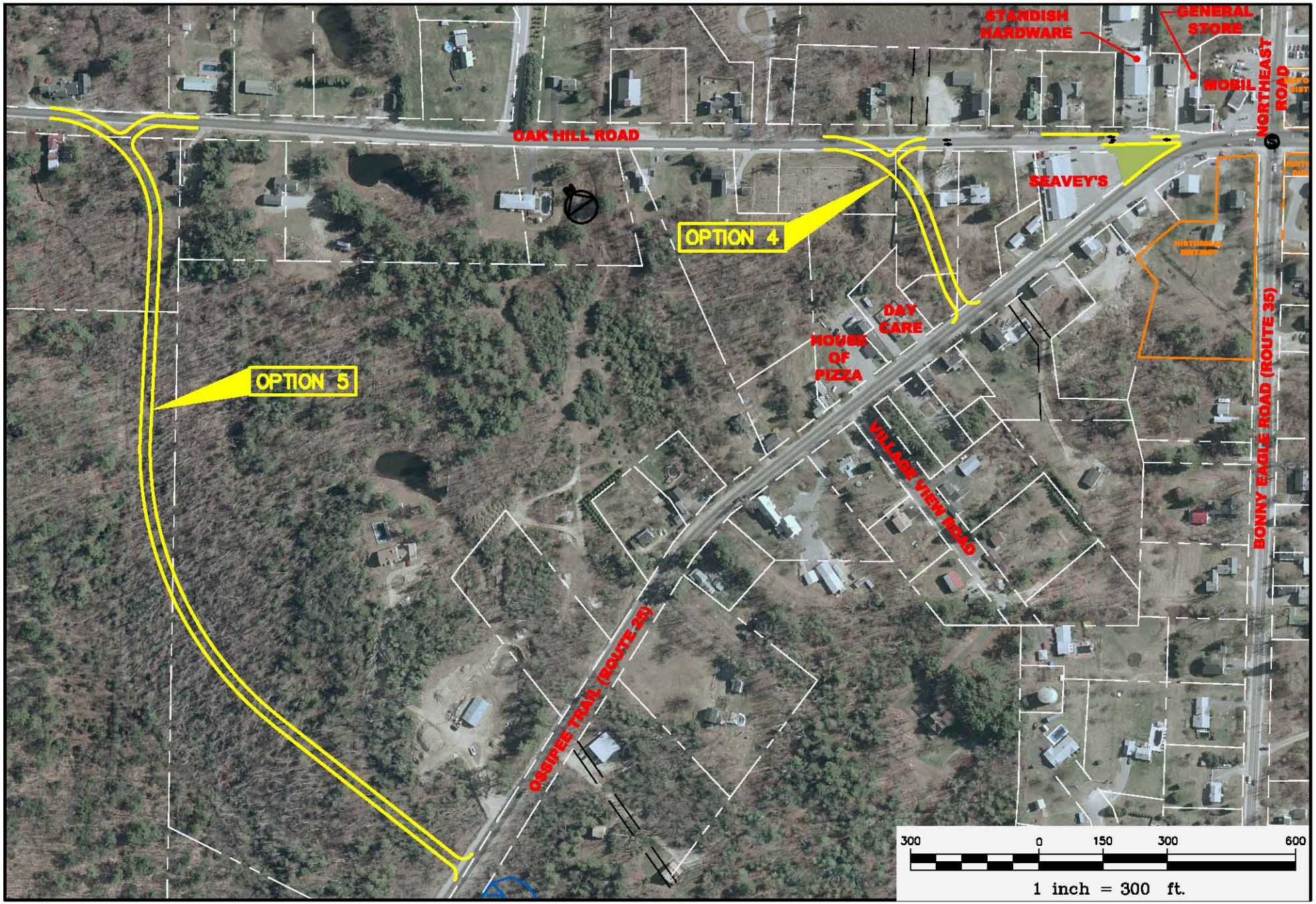
Design: DB	Date: JUN 2007
Draft: DB	Job No.: 1578
Checked: TLG	Scale: 1"=80'
File Name: 1578–CONCEPT3.dwg	

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207–657–6910

Drawing Name: Oak Hill Relocation – Option 3

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 8



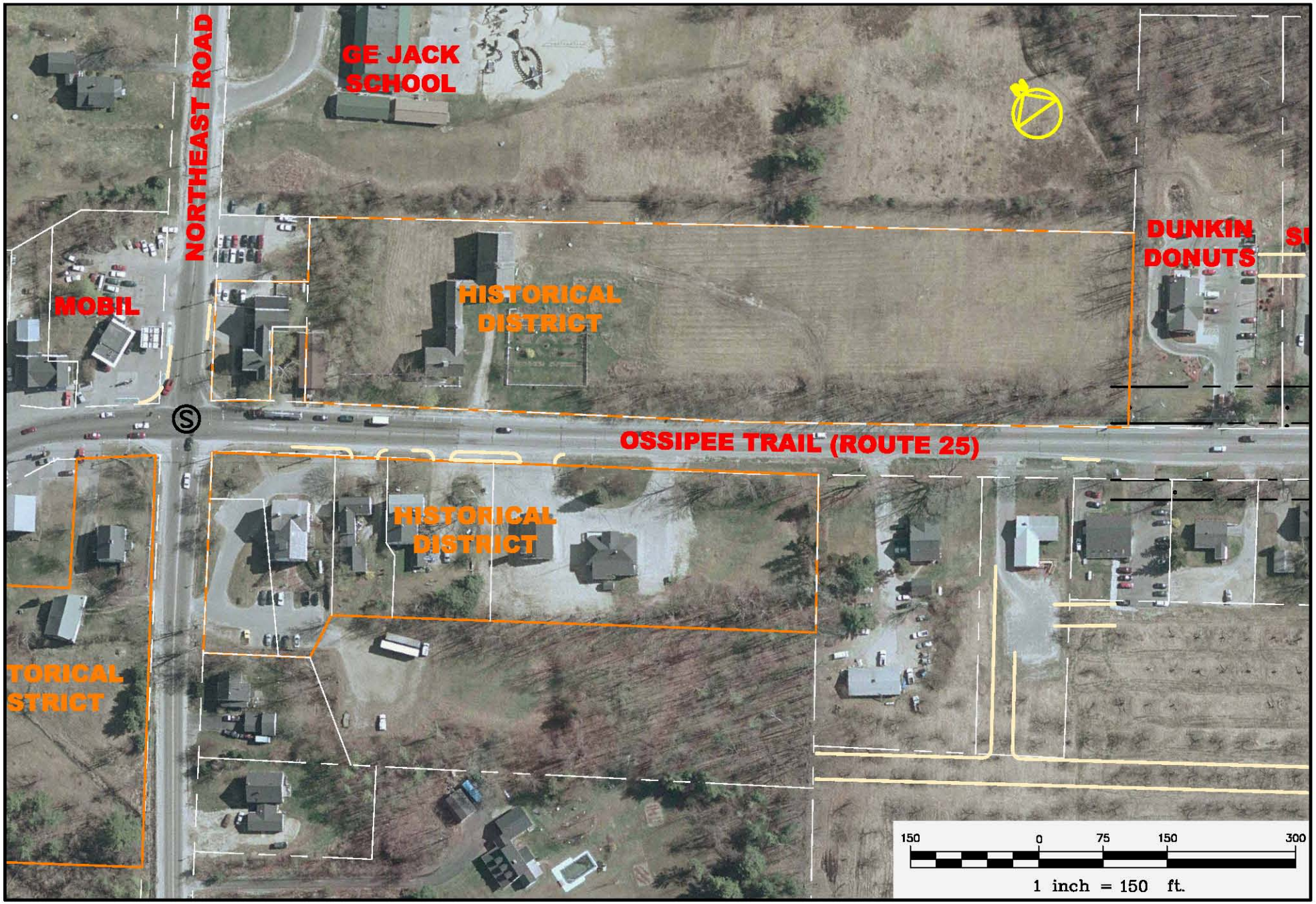
Design:	DB	Date:	JUN 2007
Draft:	DB	Job No.:	1578
Checked:	TLG	Scale:	1"=300'
File Name: 1578-CONCEPT4-5.dwg			

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Oak Hill Relocation – Options 4 & 5

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 9



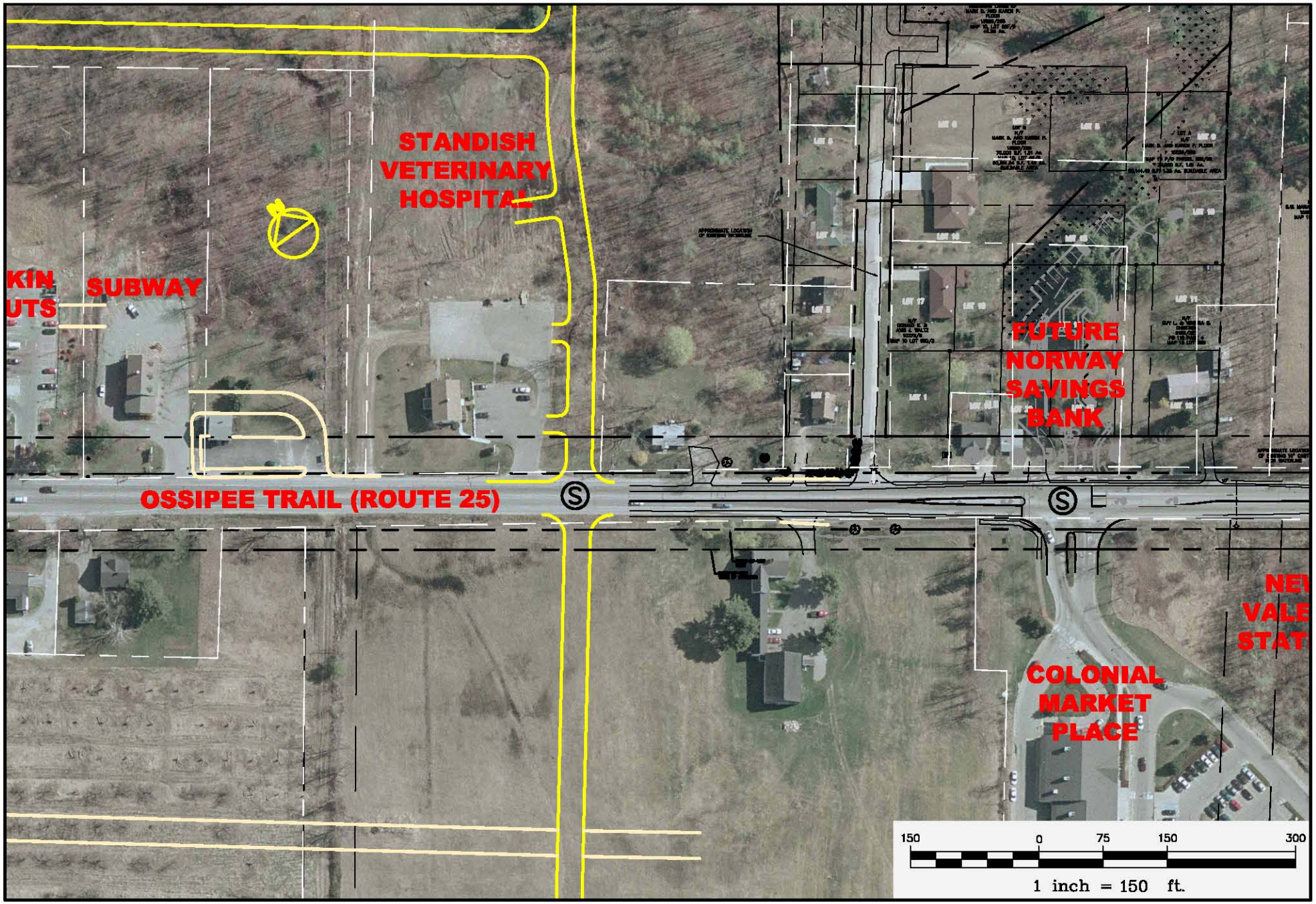
Design: DB	Date: JUN 2007
Draft: DB	Job No.: 1578
Checked: TLG	Scale: 1"=150'
File Name: 1578-MASTERPLAN.dwg	

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Access Management Plan – 1

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 10



Design: DB	Date: JUN 2007		
Draft: DB	Job No.: 1578		
Checked: TLG	Scale: 1"=150'		
File Name: 1578-MASTERPLAN.dwg			

GP Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Access Management Plan – 2

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 11

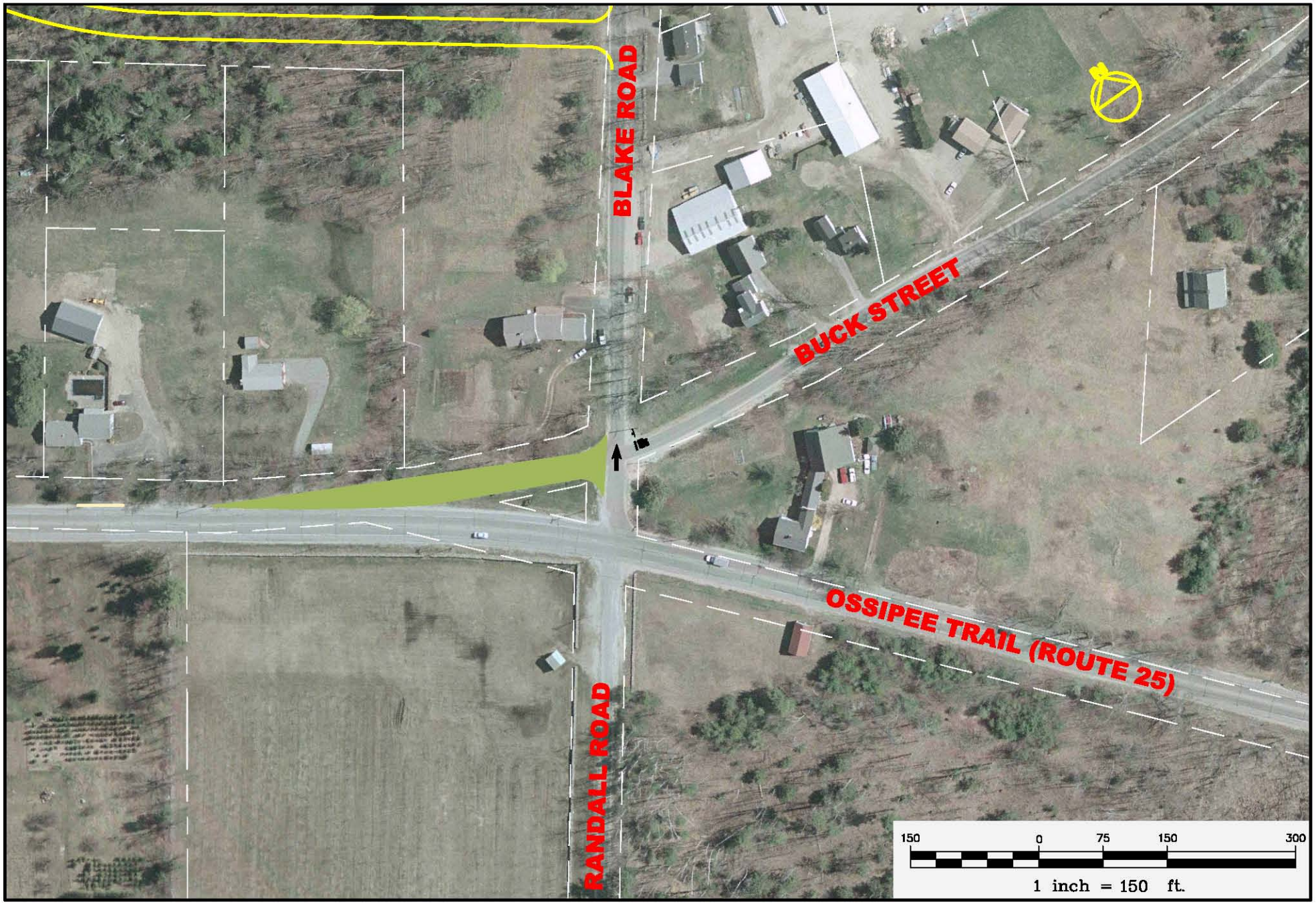
Design:	DB	Date:	JUN 2007
Draft:	DB	Job No.:	1578
Checked:	TLG	Scale:	1"=150'
File Name: 1578-MASTERPLAN.dwg			

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Access Management Plan – 3

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 12



Design: DB	Date: JUN 2007
Draft: DB	Job No.: 1578
Checked: TLG	Scale: 1"=150'
File Name: 1578-MASTERPLAN.dwg	

Gorrill-Palmer Consulting Engineers, Inc.
Traffic and Civil Engineering Services
PO Box 1237, 15 Shaker Road
Gray, ME 04039
207-657-6910

Drawing Name: Access Management Plan – 4

Project: RTE 25 ACCESS MANAGEMENT STUDY, STANDISH, ME

Figure No. 13