BELMONT HIGH SCHOOL

Site Access Analysis

1. Existing Transportation Conditions
2. Future Recommendations and Conditions
3. Feedback Evaluations
4. Alternatives Discussion

Access Analysis – Meeting Agenda

1. **Existing Transportation Conditions**
2. Future Recommendations and Conditions
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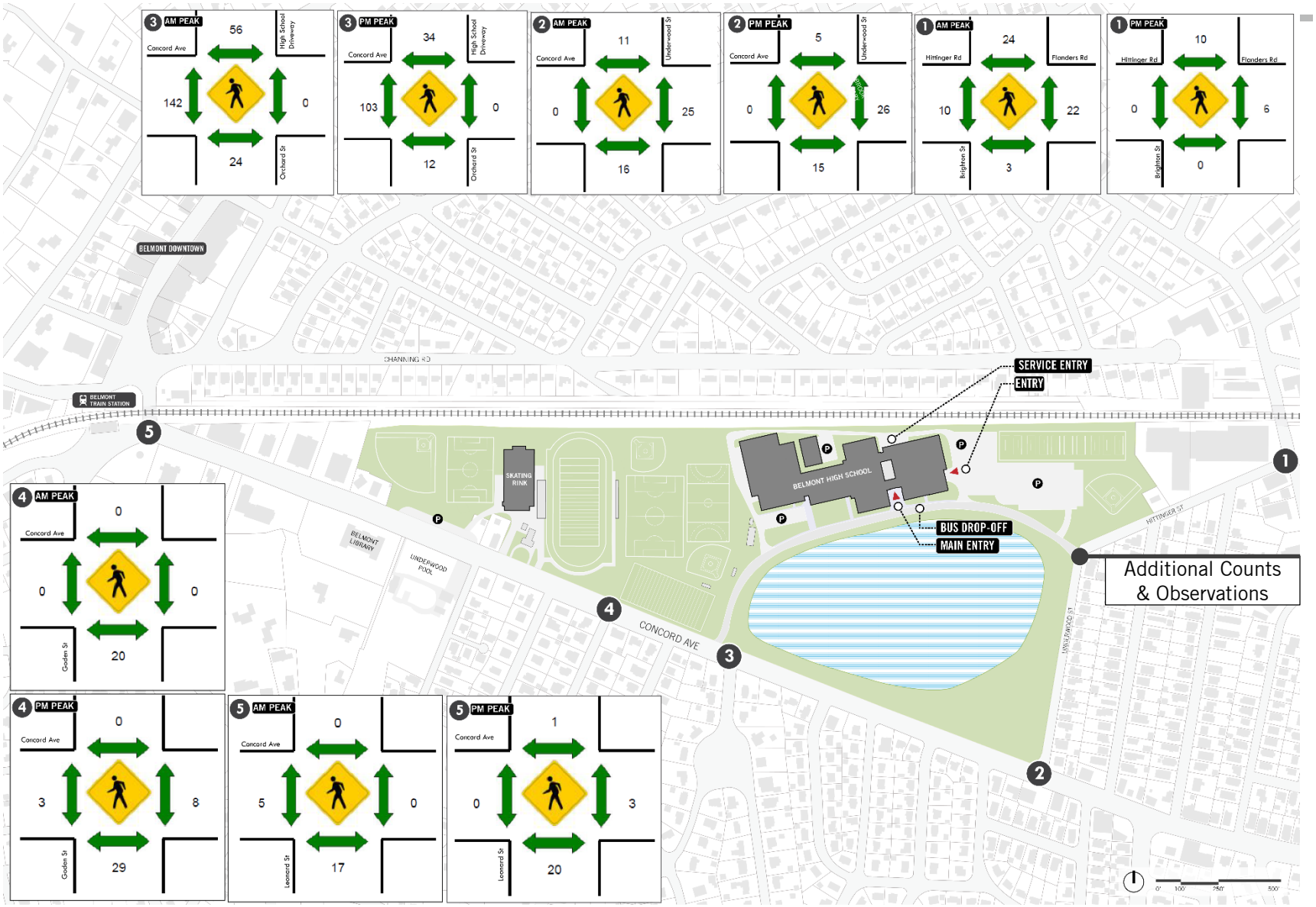
Access Analysis Process

Multimodal and Parking Counts Collected
Site Visits and Observations throughout the Fall
Interviews with Students and Stakeholders
Scenario Refinement & Analysis

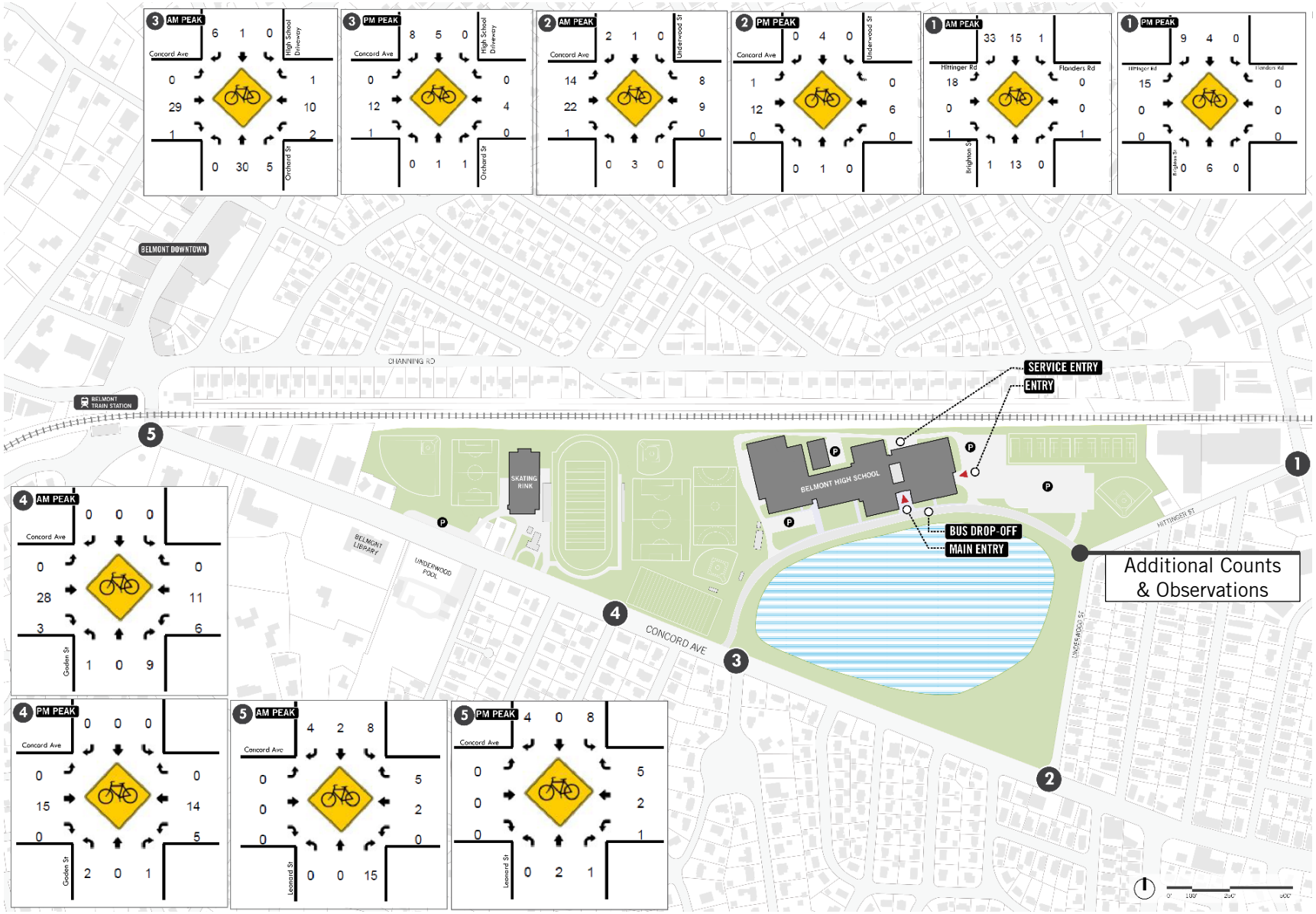
Pedestrian Counts

Roughly 250 total affiliates observed walking to school

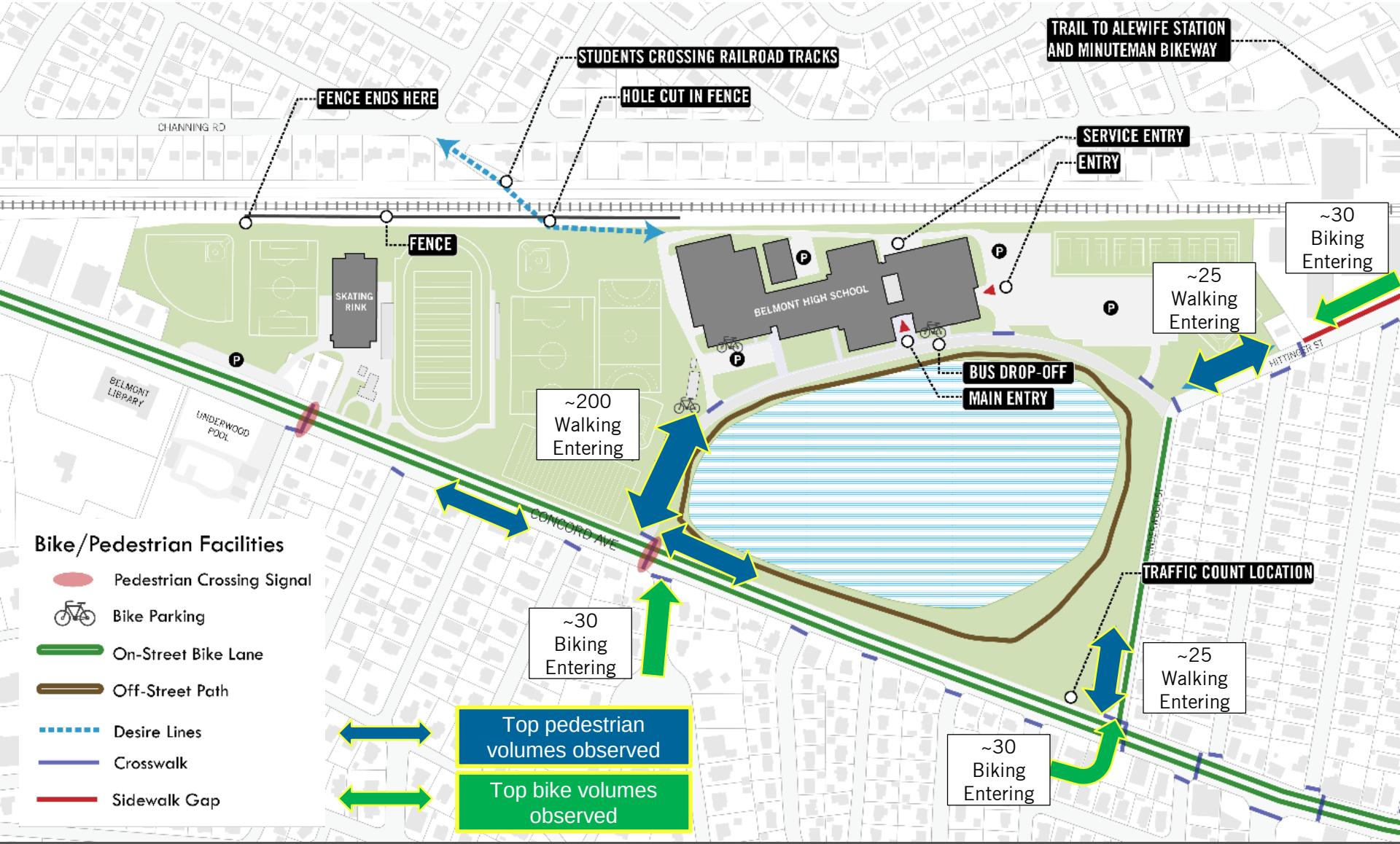


Bike Counts

Roughly 100 total affiliates observed biking to school

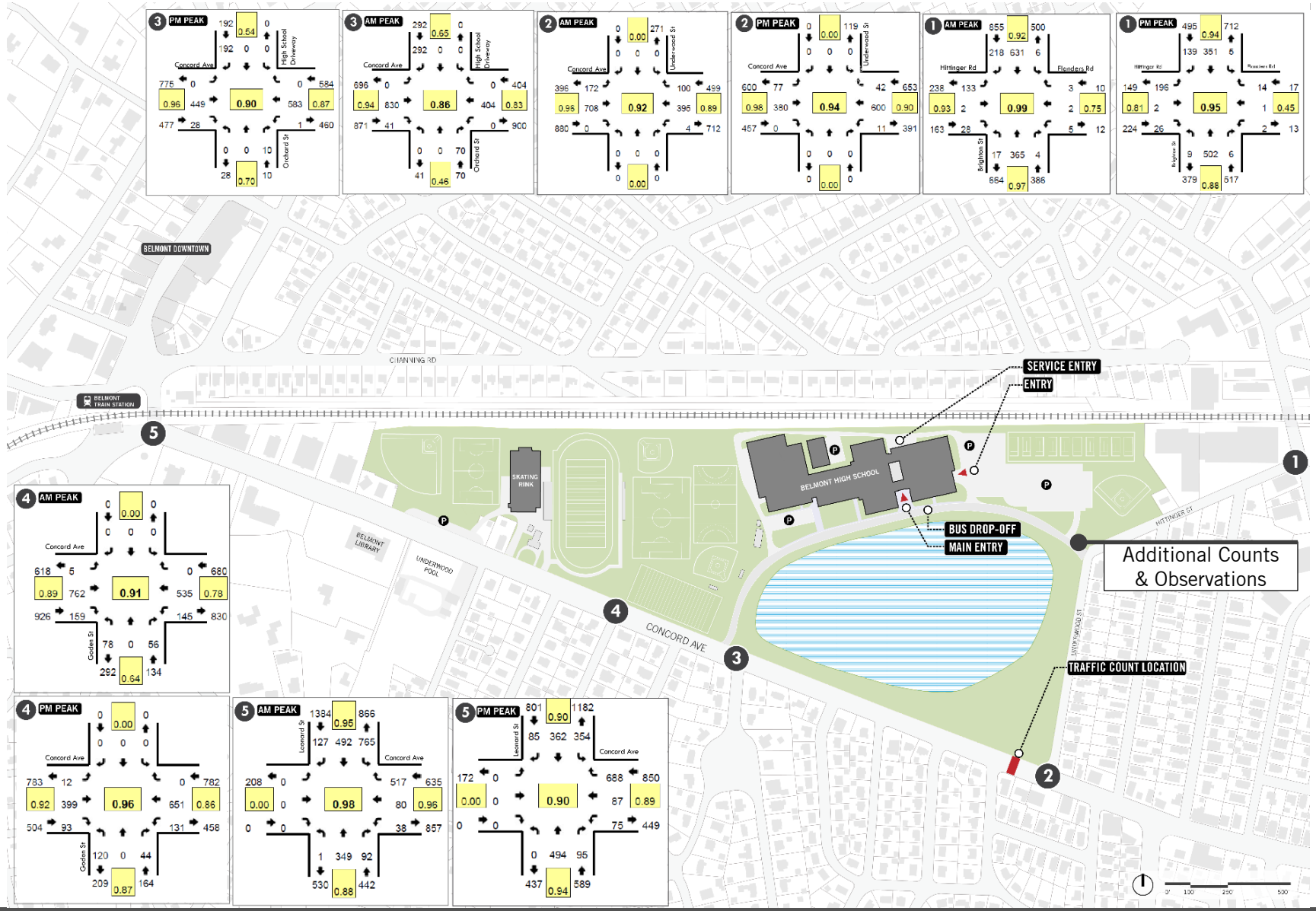


Counted Biking and Walking Access Patterns



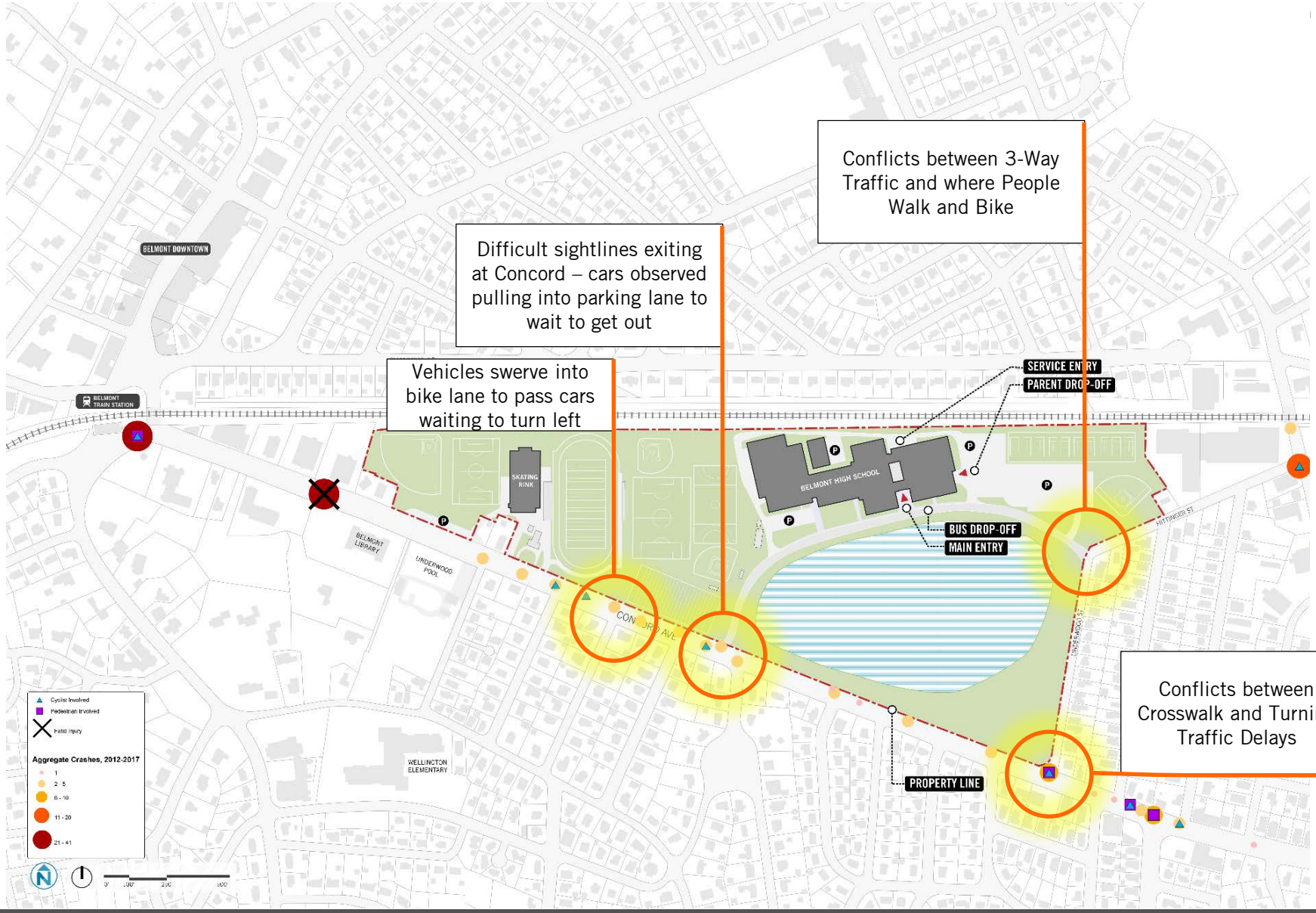
Driving Counts

About 750-800 cars enter the campus each morning.
Almost 300 exit onto Concord from the school drive.
Over 1,600 vehicles flowing on Concord during AM peak.

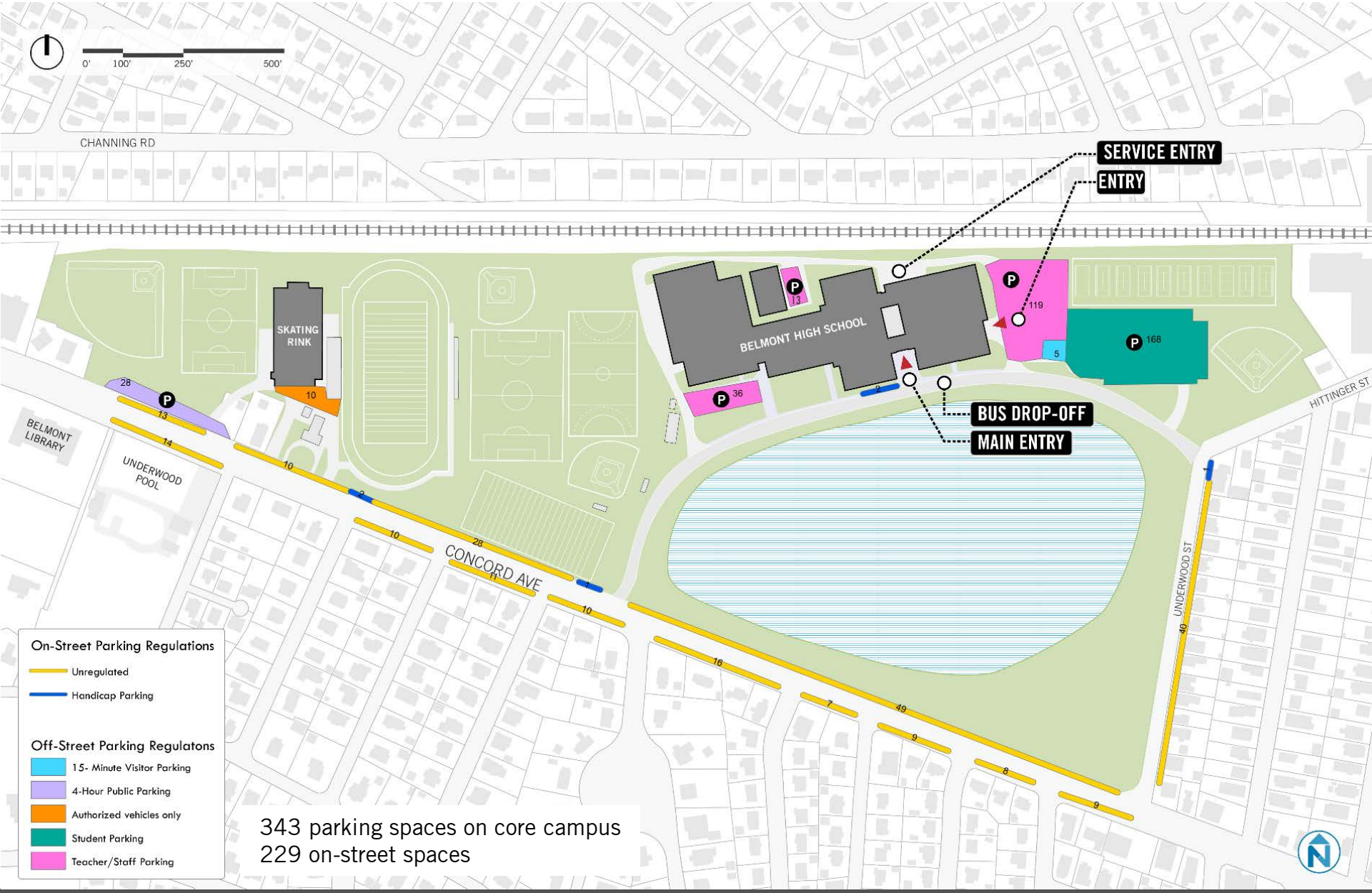


Mapping Crash Locations

Pointed Safety Issues Observed on Site

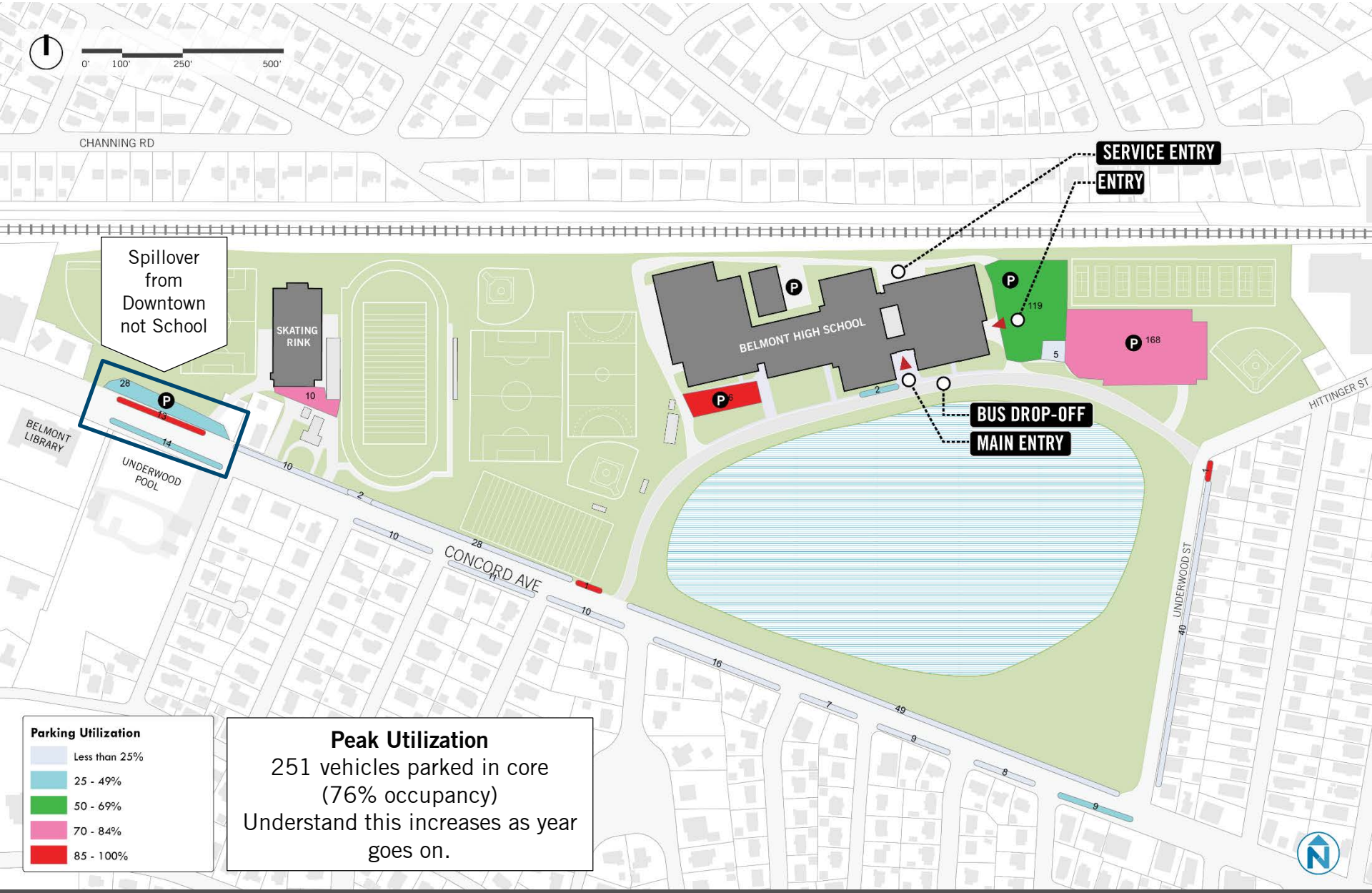


Documented Parking: 343 Spaces in Core Campus



343 parking spaces on core campus
229 on-street spaces

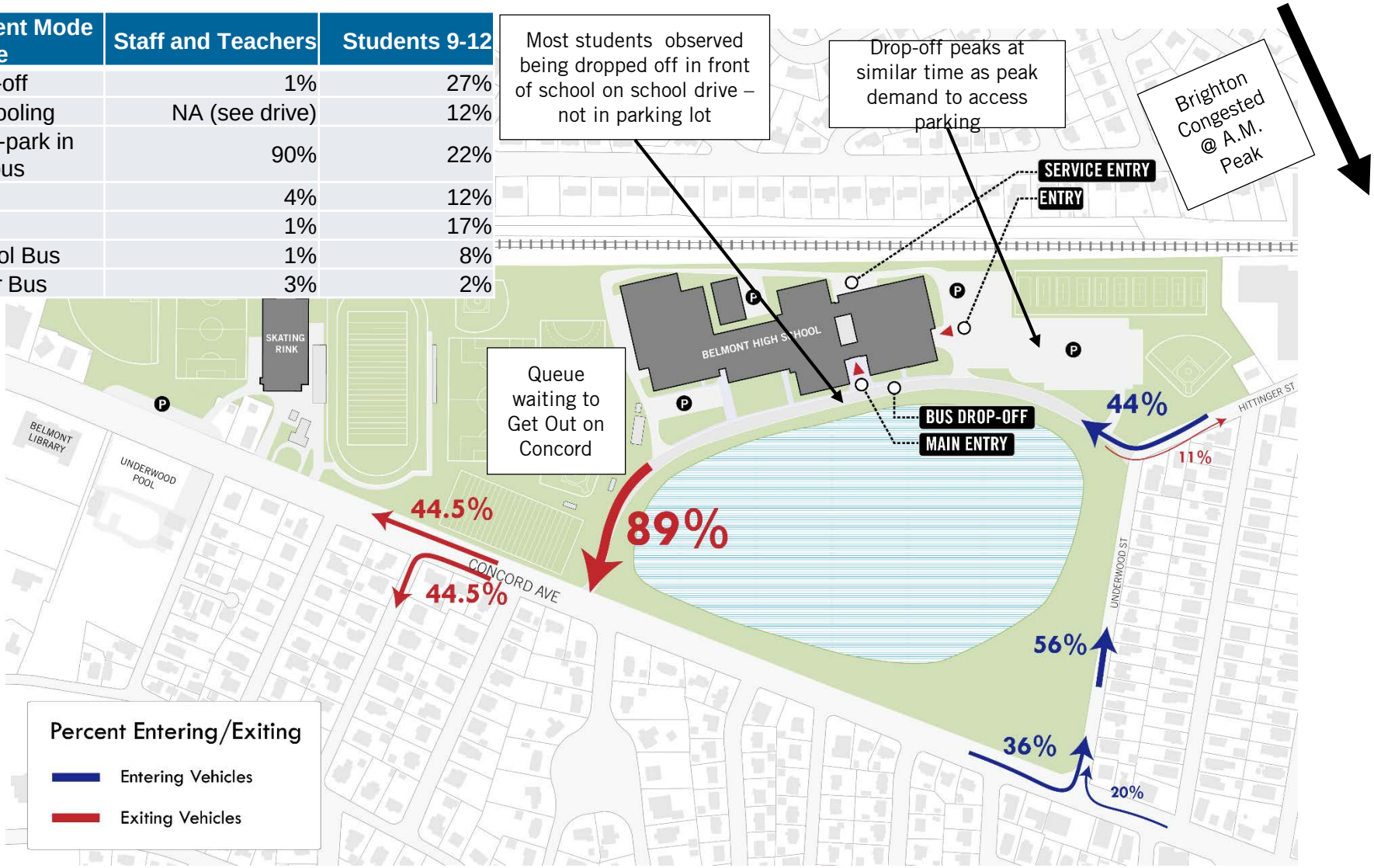
Counted Midday Parking Demand: September



Existing High School Access and Mode Shares (percentages)

Almost all staff drive and park, students use a variety of modes with most being dropped off or driving and parking

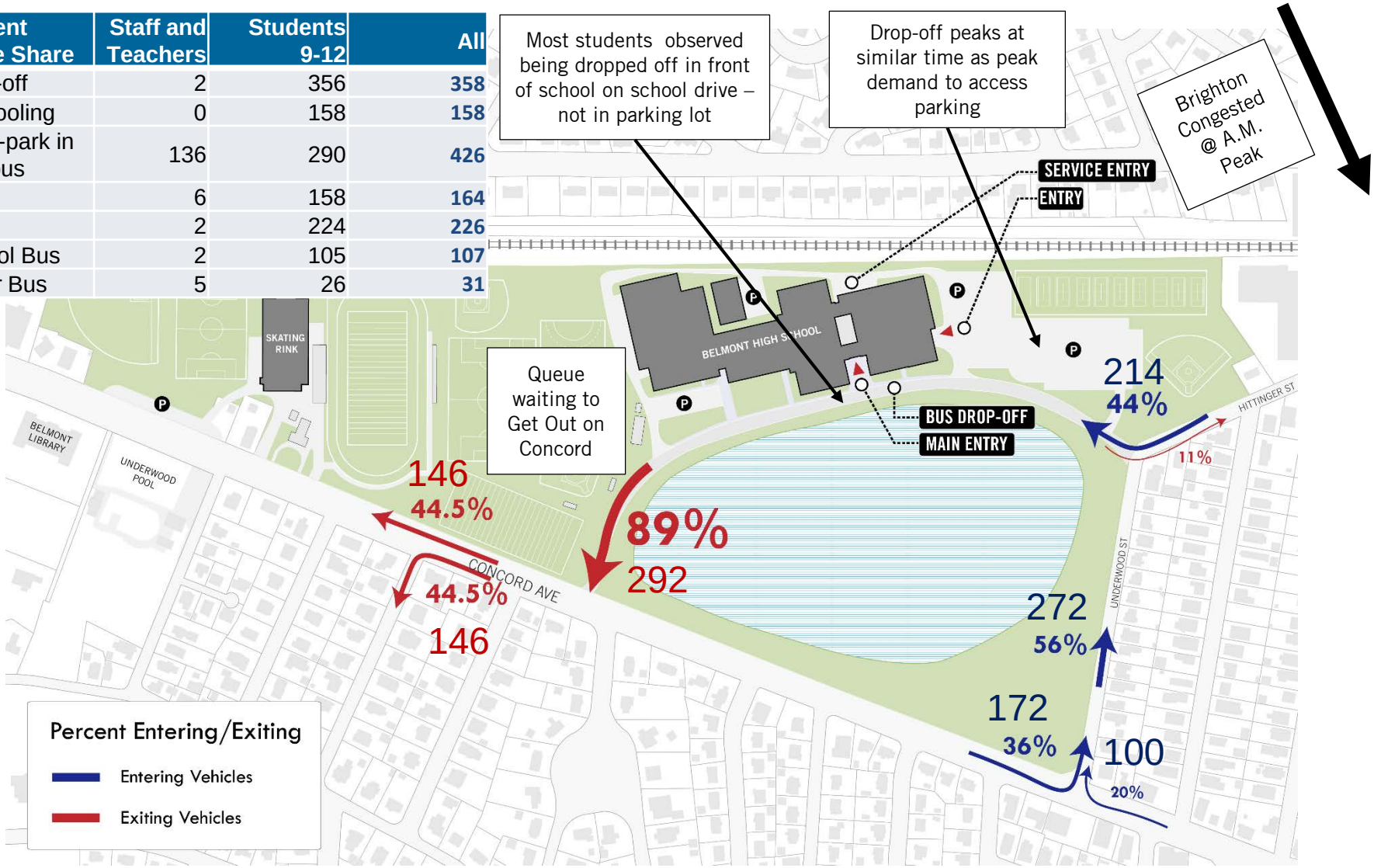
Current Mode Share	Staff and Teachers	Students 9-12
Drop-off	1%	27%
Carpooling	NA (see drive)	12%
Drive-park in campus	90%	22%
Bike	4%	12%
Walk	1%	17%
School Bus	1%	8%
Other Bus	3%	2%



Existing High School Access and Mode Shares (values)

Almost all staff drive and park, students use a variety of modes with most being dropped off or driving and parking

Current Mode Share	Staff and Teachers	Students 9-12	All
Drop-off	2	356	358
Carpooling	0	158	158
Drive-park in campus	136	290	426
Bike	6	158	164
Walk	2	224	226
School Bus	2	105	107
Other Bus	5	26	31



Existing Traffic Delays
AM Level of Service & Queues

Access Analysis – Meeting Agenda

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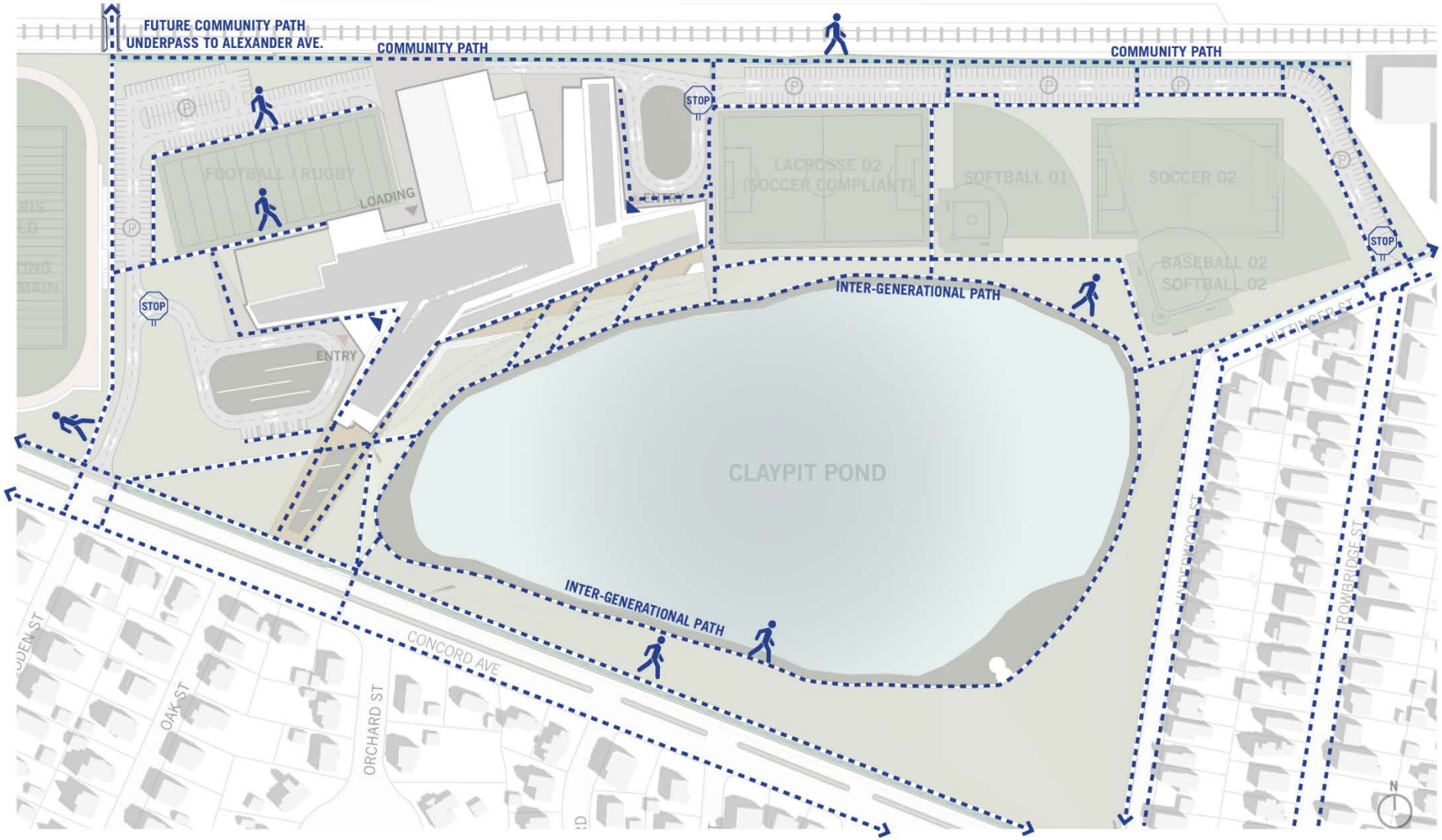
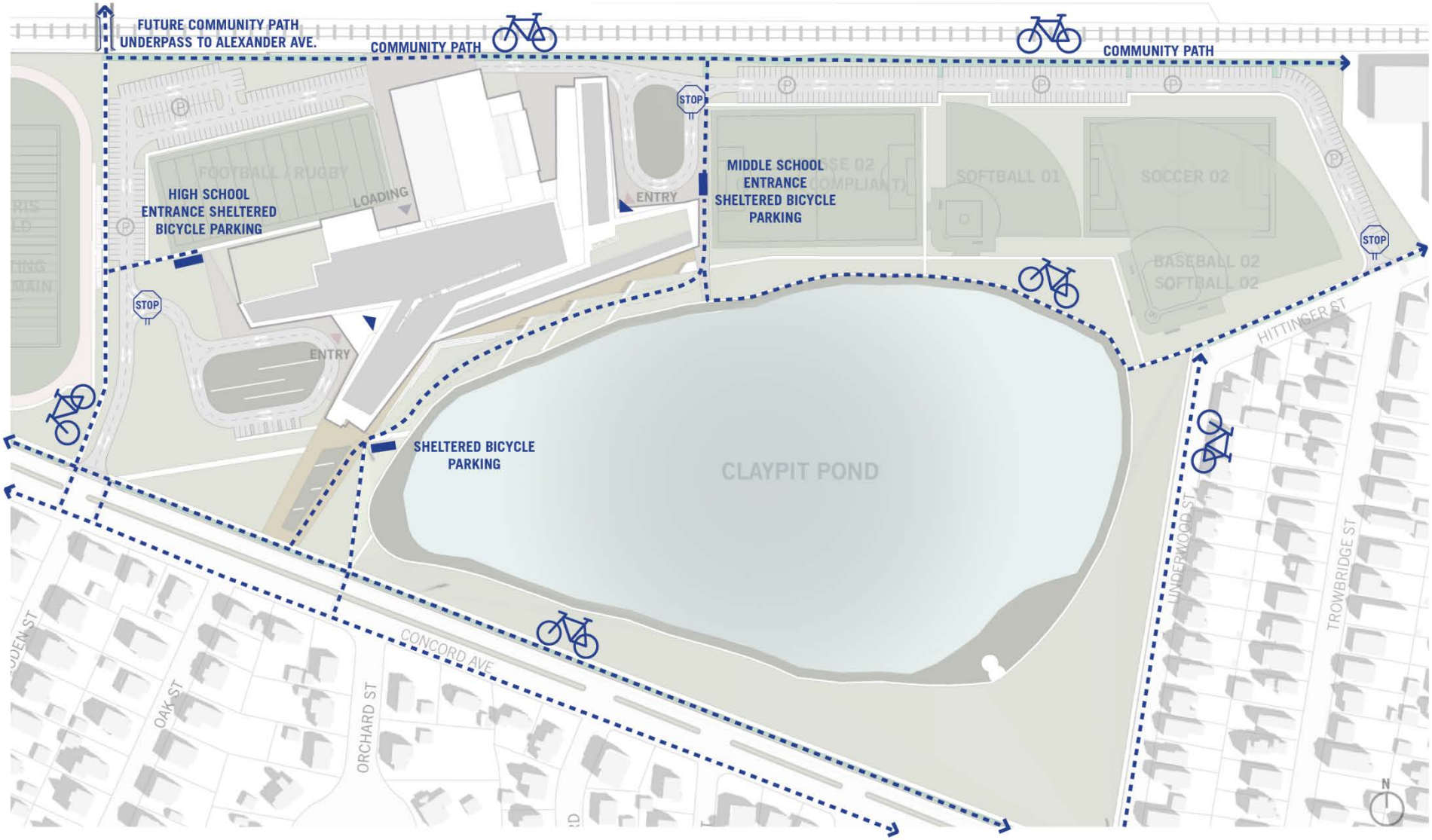
Future Site Plan Overview

1. Walking and biking intersection improvements throughout, Connections to existing and future multi-use paths
2. Enhanced emergency vehicle circulation
3. Reduced gameday parking spillover
4. Internal drop-off reduces queues in neighborhoods, while accommodating needed bus and ADA access.
5. Two full access drives distributes flow and reduces queues, provides options for all users

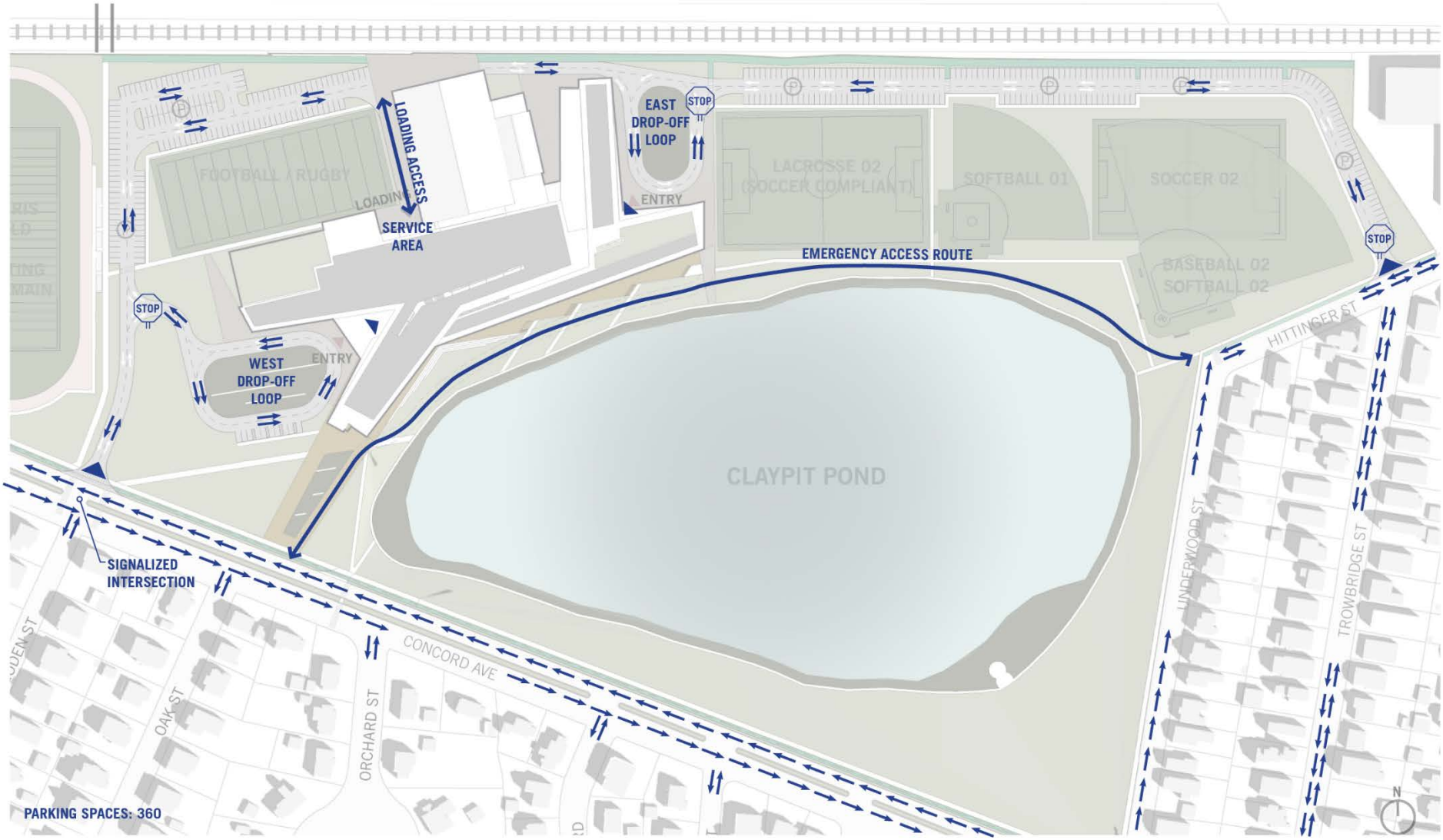
Enhanced Walking Circulation and Connections



Enhanced Biking Circulation and Connections



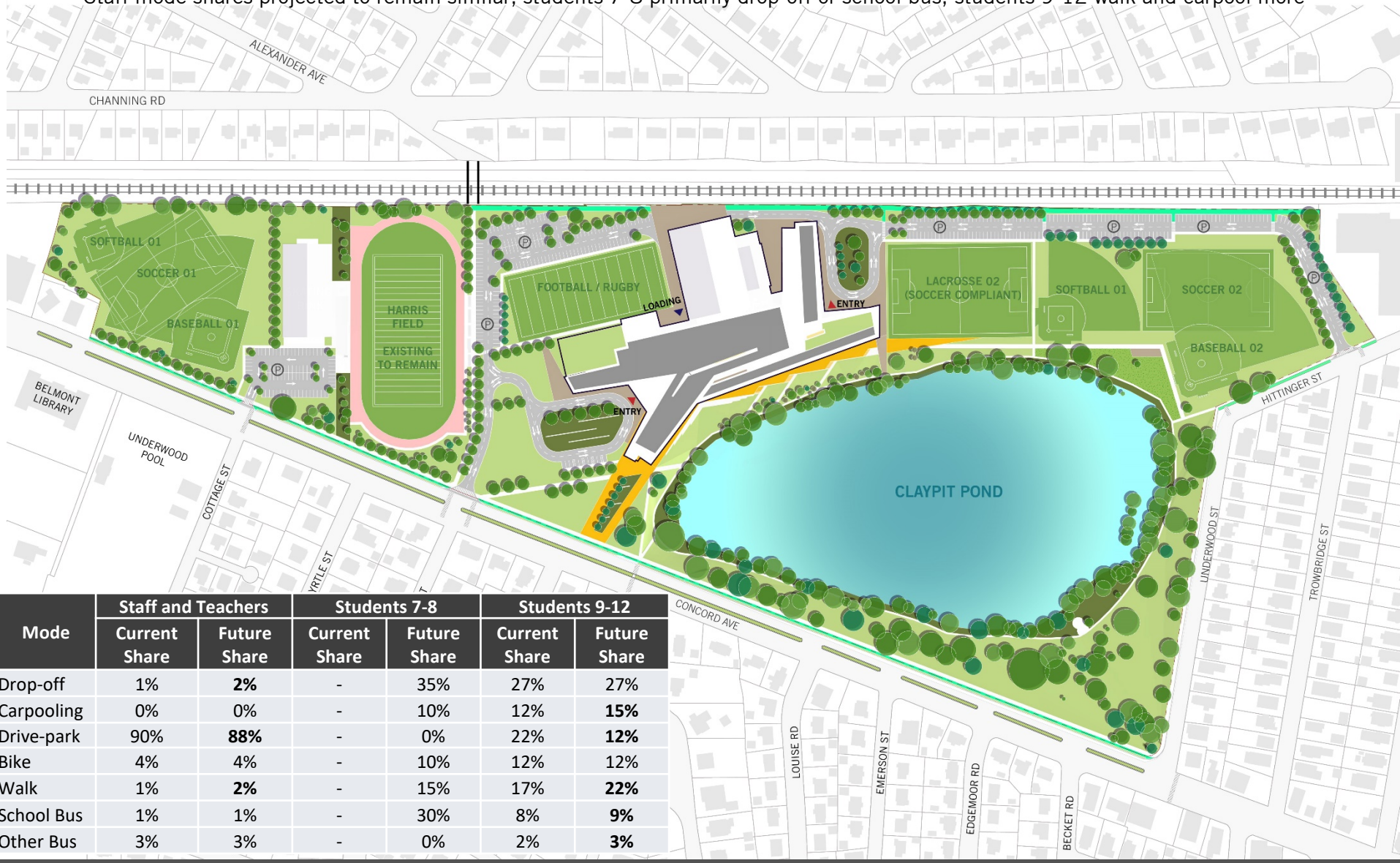
Vehicular and Emergency Access Circulation



Future Conditions: Shortened Delays and Queues near Campus

Projected Future Mode Share - Percentages

Staff mode shares projected to remain similar, students 7-8 primarily drop-off or school bus, students 9-12 walk and carpool more



Mode	Staff and Teachers		Students 7-8		Students 9-12	
	Current Share	Future Share	Current Share	Future Share	Current Share	Future Share
Drop-off	1%	**2%**	-	35%	27%	27%
Carpooling	0%	0%	-	10%	12%	**15%**
Drive-park	90%	**88%**	-	0%	22%	**12%**
Bike	4%	4%	-	10%	12%	12%
Walk	1%	**2%**	-	15%	17%	**22%**
School Bus	1%	1%	-	30%	8%	**9%**
Other Bus	3%	3%	-	0%	2%	**3%**

Projected Future Circulation Patterns – AM Entering Traffic

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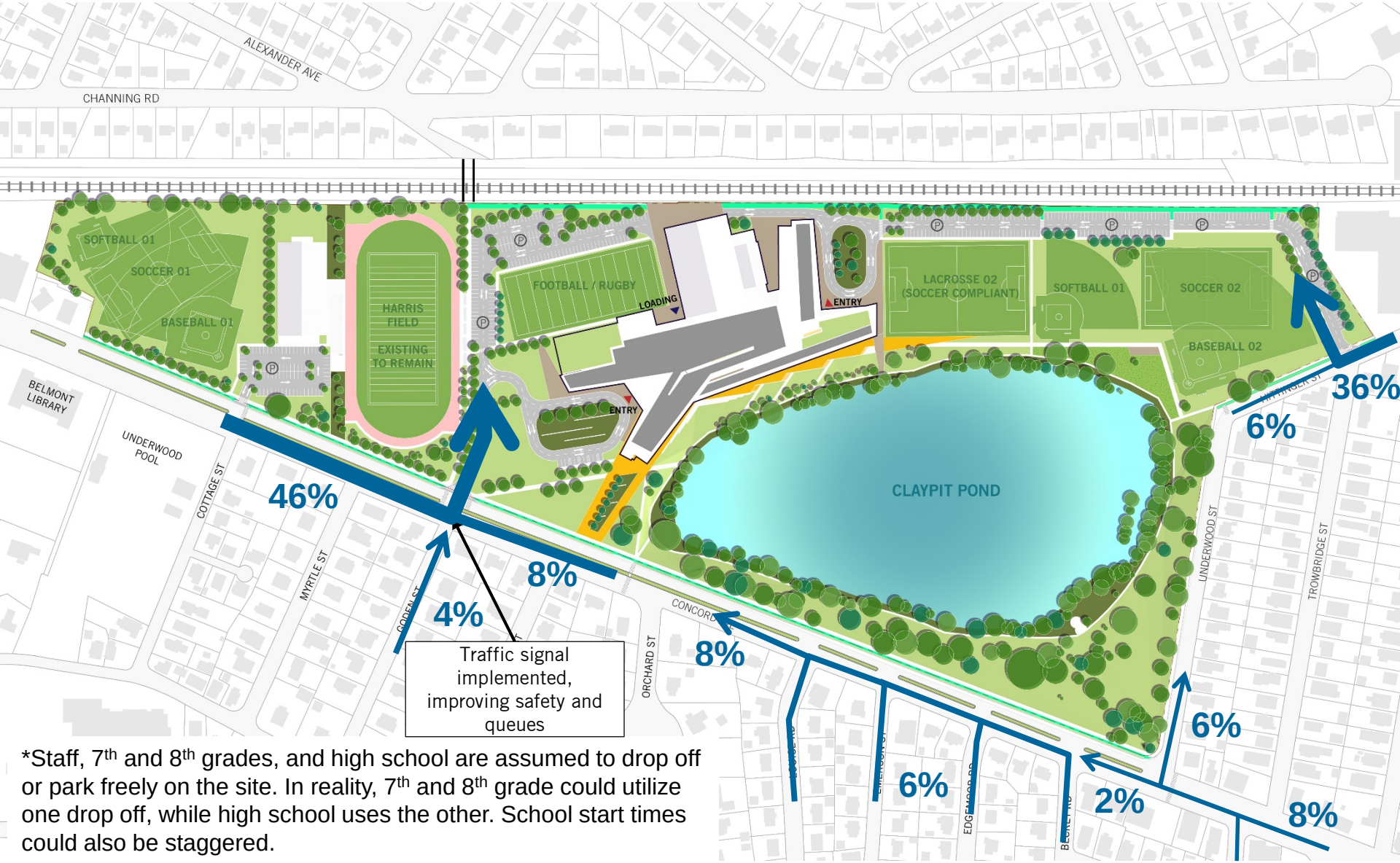

*Staff, 7th and 8th grades, and high school are assumed to drop off or park freely on the site. In reality, 7th and 8th grade could utilize one drop off, while high school uses the other. School start times could also be staggered.

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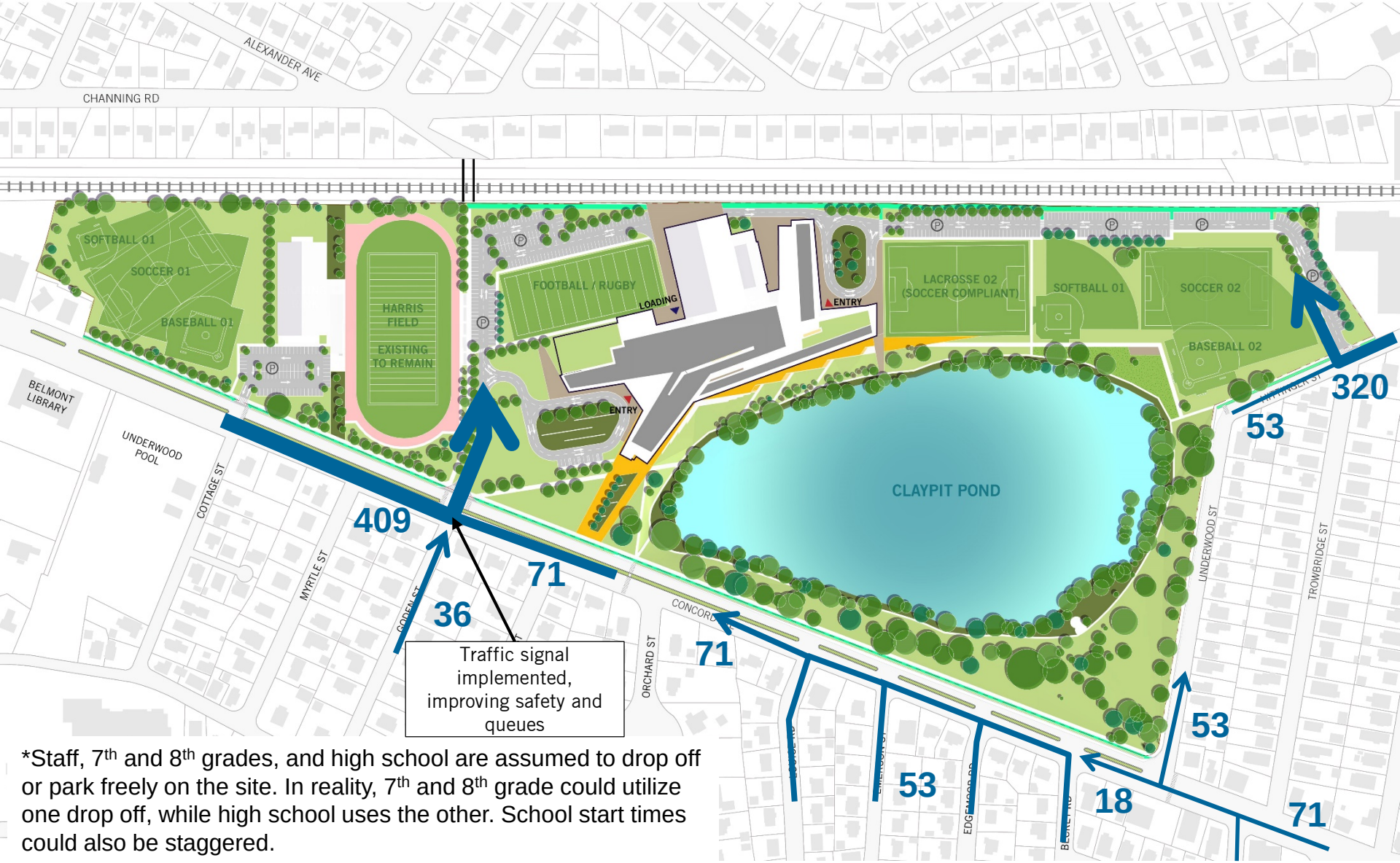

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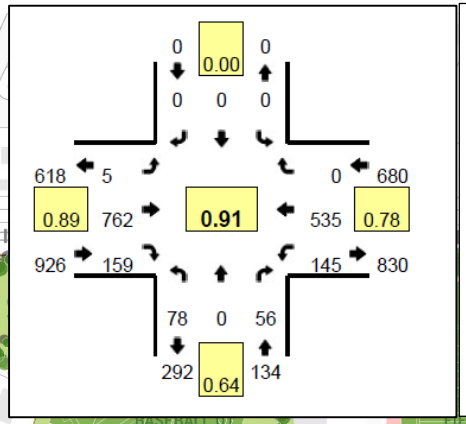
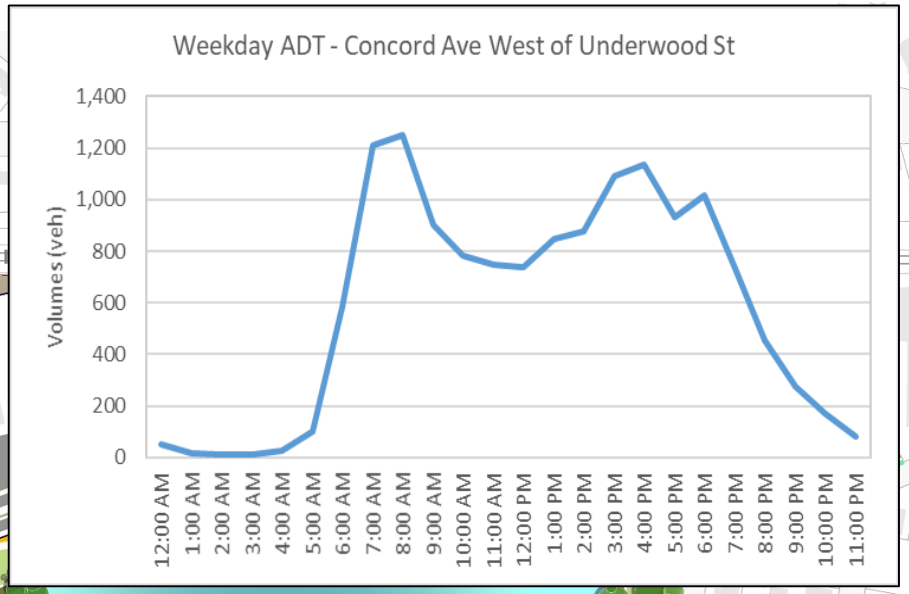
Concord Traffic Volumes Today

Less than half of vehicles on Concord during AM peak hour are related to the HS

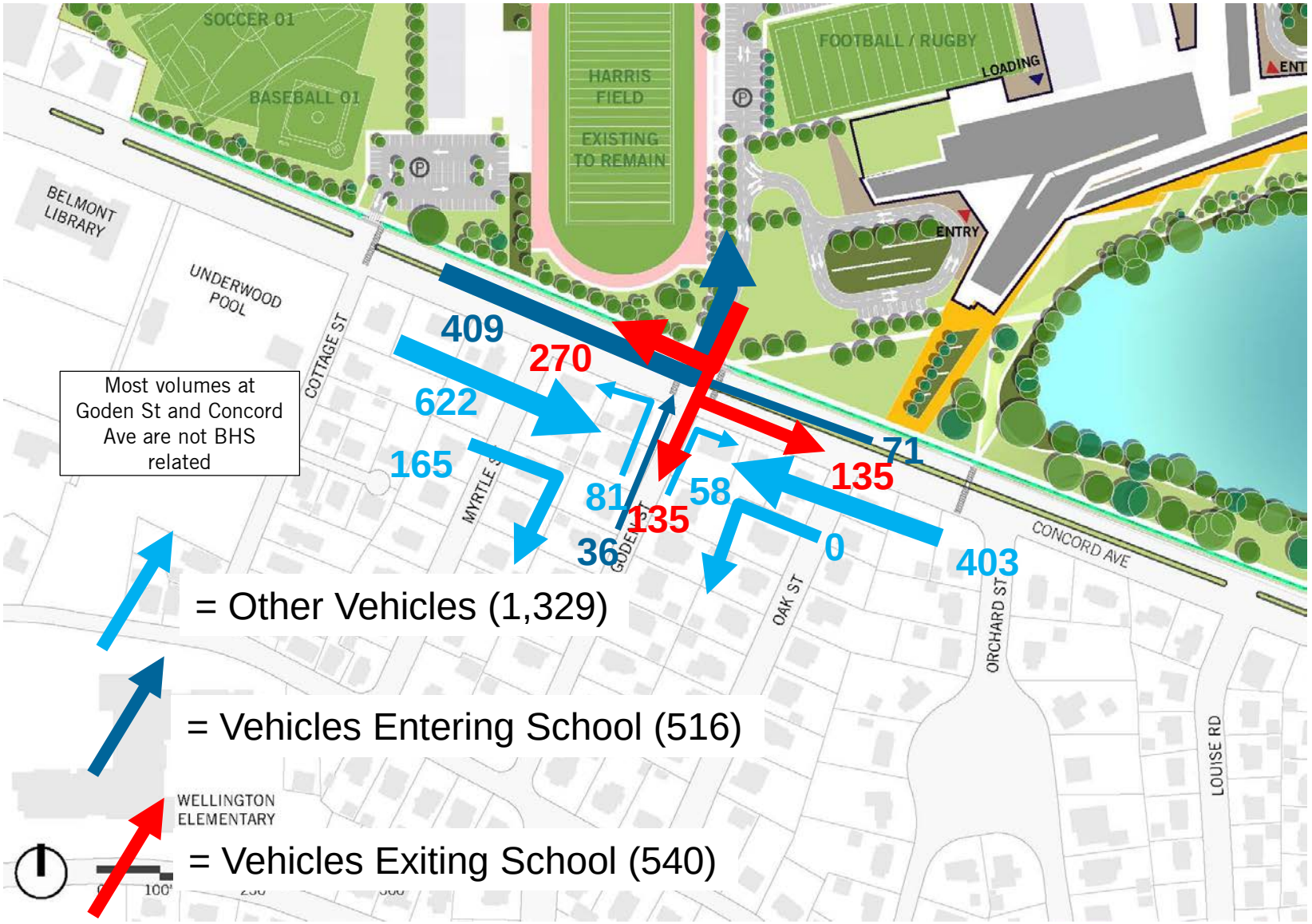


Total weekday ADT 7.30 am – 8.30 am: 1,200 vehicles WB flows: 680 (43% from the HS)



Projected Future Circulation Patterns – Concord School Entry

Staff mode shares projected to remain similar, students 7-8 primarily drop-off or school bus, students 9-12 walk and carpool more



Access Analysis – Meeting Agenda

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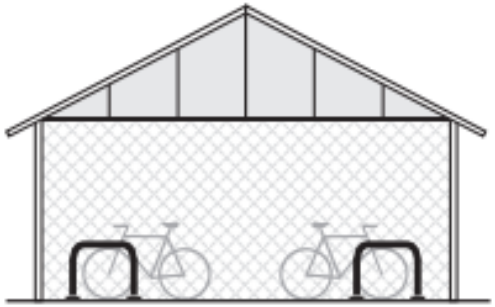
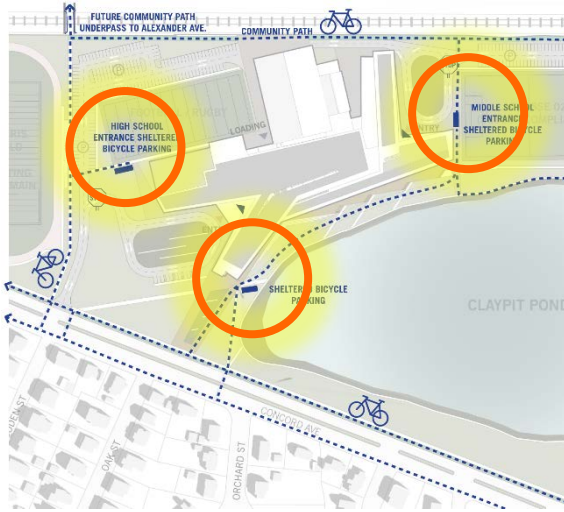
Agreed: Safe Pathways to Alexander Underpass and Harris Field

Agreed: Provide Sheltered Bike Racks

TODAY

BEST PRACTICE

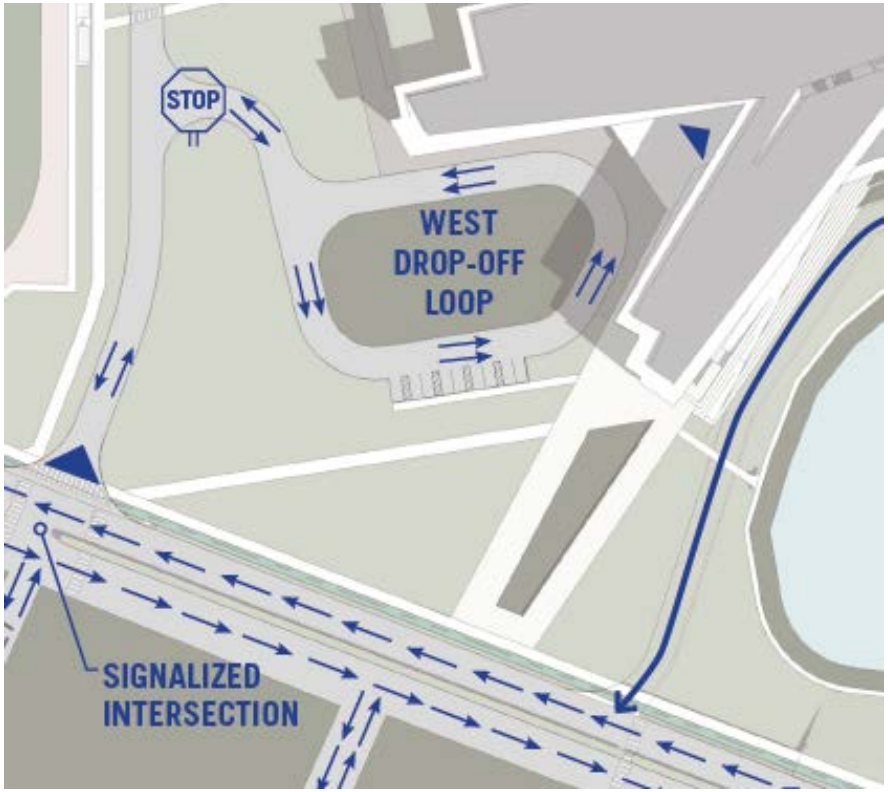




At minimum, triple the bike parking supply provided today and provide usable, secure, attractive, sheltered facilities.

Agreed: Create Walkway Bumpouts for Safer Crossings

Agreed: Create More Space for Students to Gather near Entrance away from Dropoffs



Site plan has been updated to allow a space for students to gather at the front of the campus and to ensure adequate pedestrian connections separate from driveway access connections.

Agreed: Move Parking away from Loop Entries & Allow Ample Space behind school for Traffic Lanes, Community Path, and Loading Dock turns

Removing parking close to drop-off loop entries would improve sightlines and enhance safety. Updated in plan.

All functions at back of house accommodated now in plan.

Not recommended: Bike paths along edge of pond

Not Recommended: Brick/Solid Green Crosswalks

Brick or green paint look are not the best practice standard for highest visibility according to multiple studies, and bricks pose challenges for wheelchair access. **Continental standard** (i.e. wide white bars, or "ladders") are planned for all crosswalks on and off campus. They provide the highest contrast visibility and warning to drivers that people are crossing the street.

Not Recommended: Move Pedestrian Crossings away from Intersections

Having crossings occur at street intersections allows people walking to cross along the desire line they follow from the sidewalk on which they were walking. It allows people to cross at predictable locations where motorists may expect walkers, as opposed to unexpected mid-block locations.

Not Recommended: Footbridge over Concord Avenue (like at Bentley University)

Concord Avenue has many crossing points and areas of desired crossings that would not all be satisfied by a bridge. With no topography, stairs and ramps would be required, adding crossing effort and time for walkers. Therefore, anticipated low usage does not warrant an investment this costly to build and maintain when multiple safe alternatives exist. Such a facility also does not fit into character with the neighborhood.

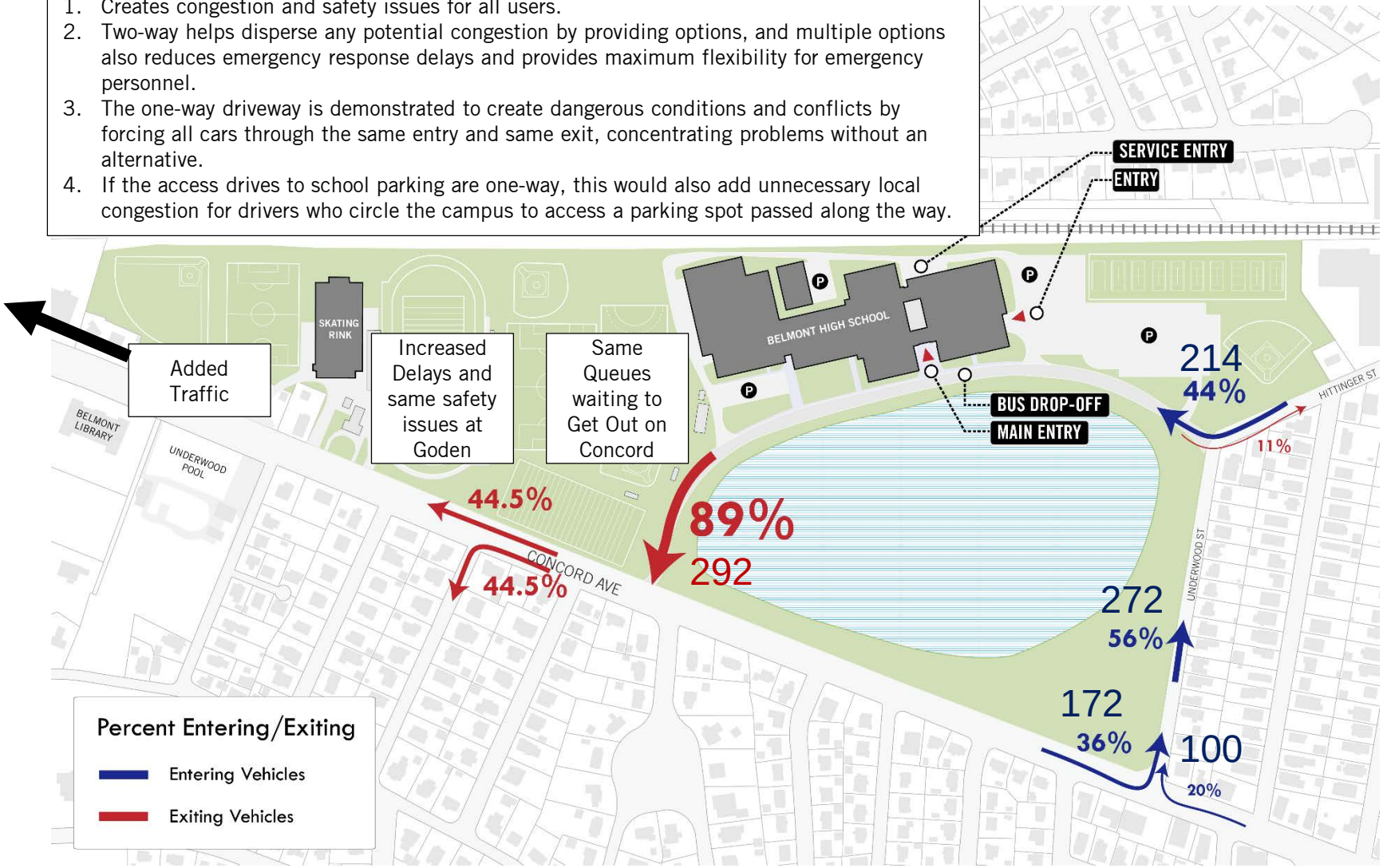
Not Recommended: Adding Fencing to Keep Pedestrians on Sidewalk and Not Crossing Traffic

Channelizing walkers to select entries/desire lines imposes a restriction and lengthens many walking routes, reducing the likelihood of increased walking.

Fencing of sufficient size to prevent students hopping over would not fit in with the character of a safe, walkable neighborhood.

Not Recommended: Keep One-Way Traffic East to West

1. Creates congestion and safety issues for all users.
2. Two-way helps disperse any potential congestion by providing options, and multiple options also reduces emergency response delays and provides maximum flexibility for emergency personnel.
3. The one-way driveway is demonstrated to create dangerous conditions and conflicts by forcing all cars through the same entry and same exit, concentrating problems without an alternative.
4. If the access drives to school parking are one-way, this would also add unnecessary local congestion for drivers who circle the campus to access a parking spot passed along the way.



Context: Concord Traffic Volumes

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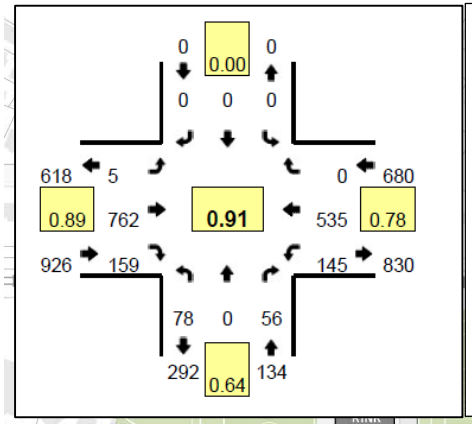

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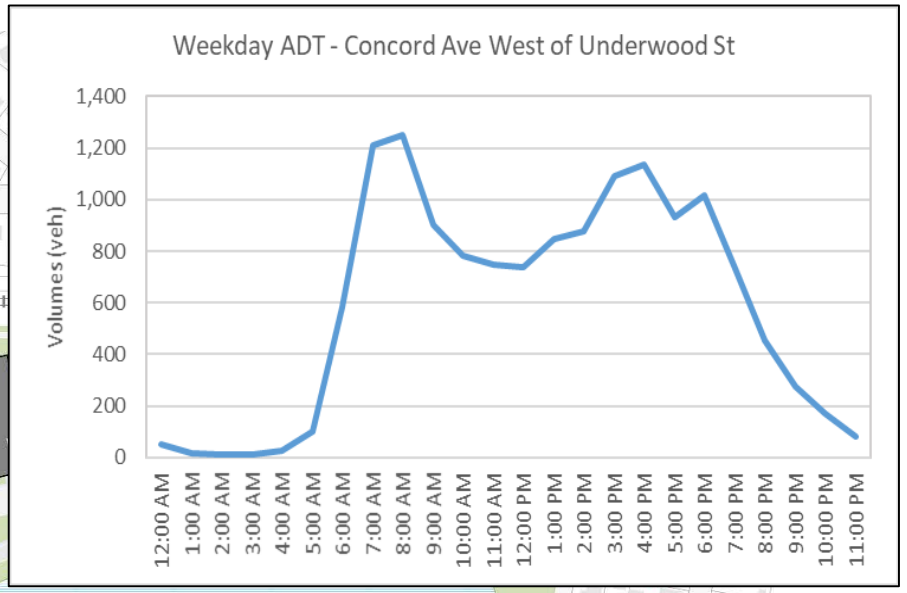
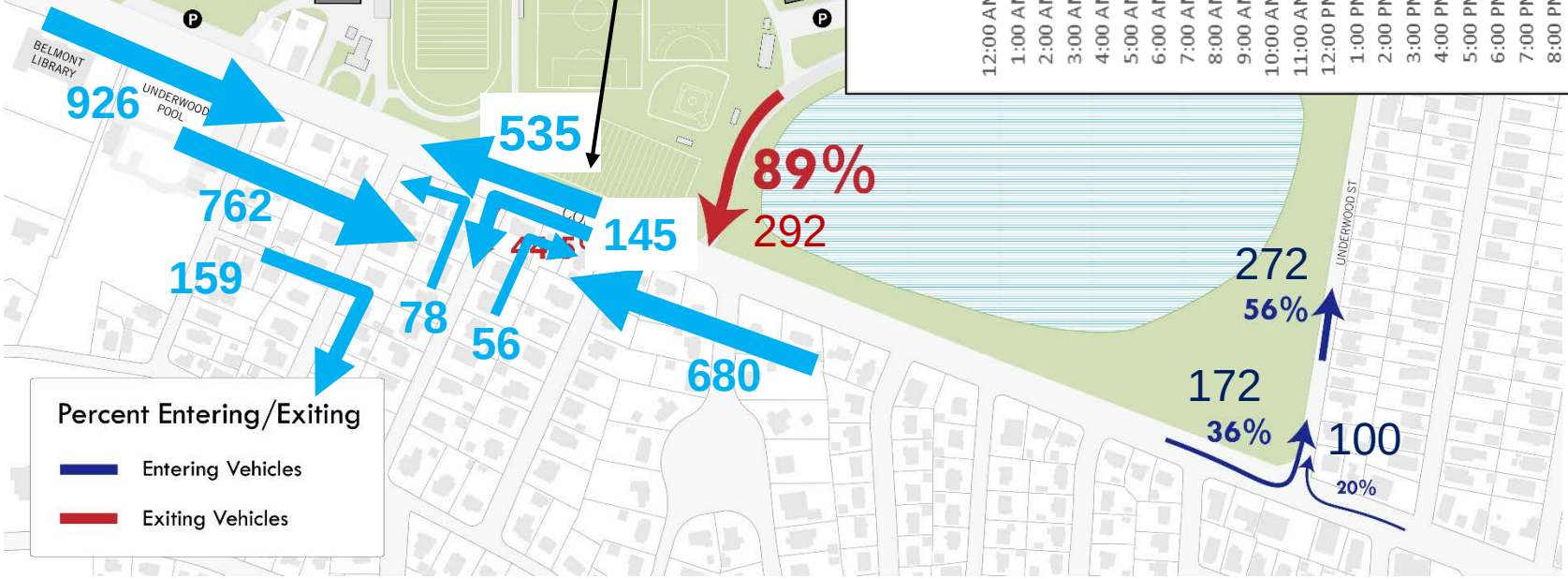


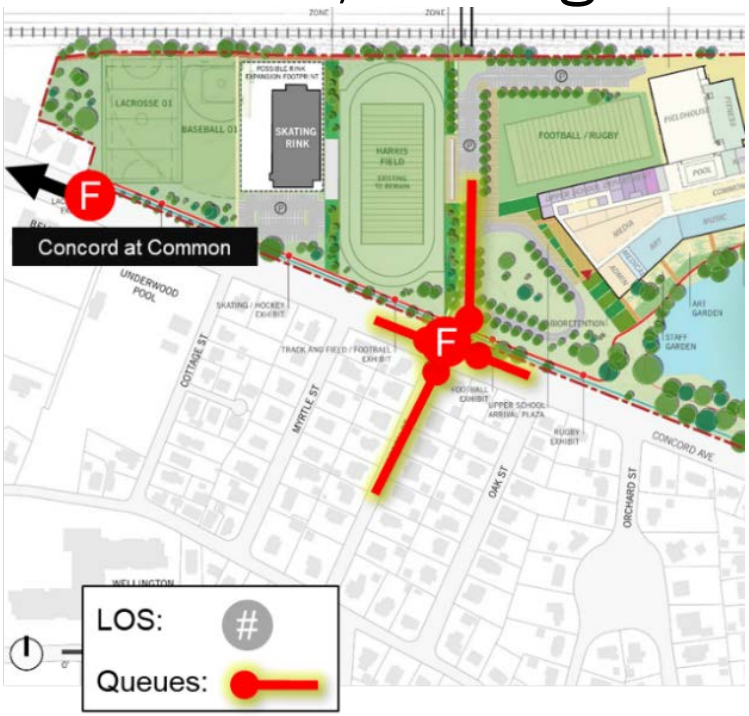


Context: Common/Concord Diversions Persist

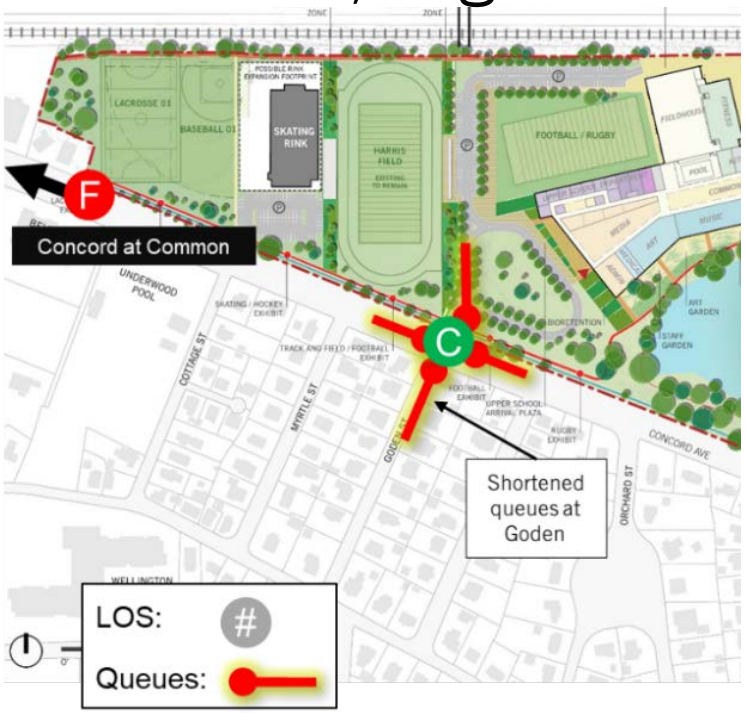
Not Recommended: No 4-way Stop at Goden

A signalized intersection has been proposed as it improves operations and safety for all existing and future users by protecting left-turns, eliminating current U-turn demand, and providing lefts out of the campus (an option motorists heading south and east do not have today).

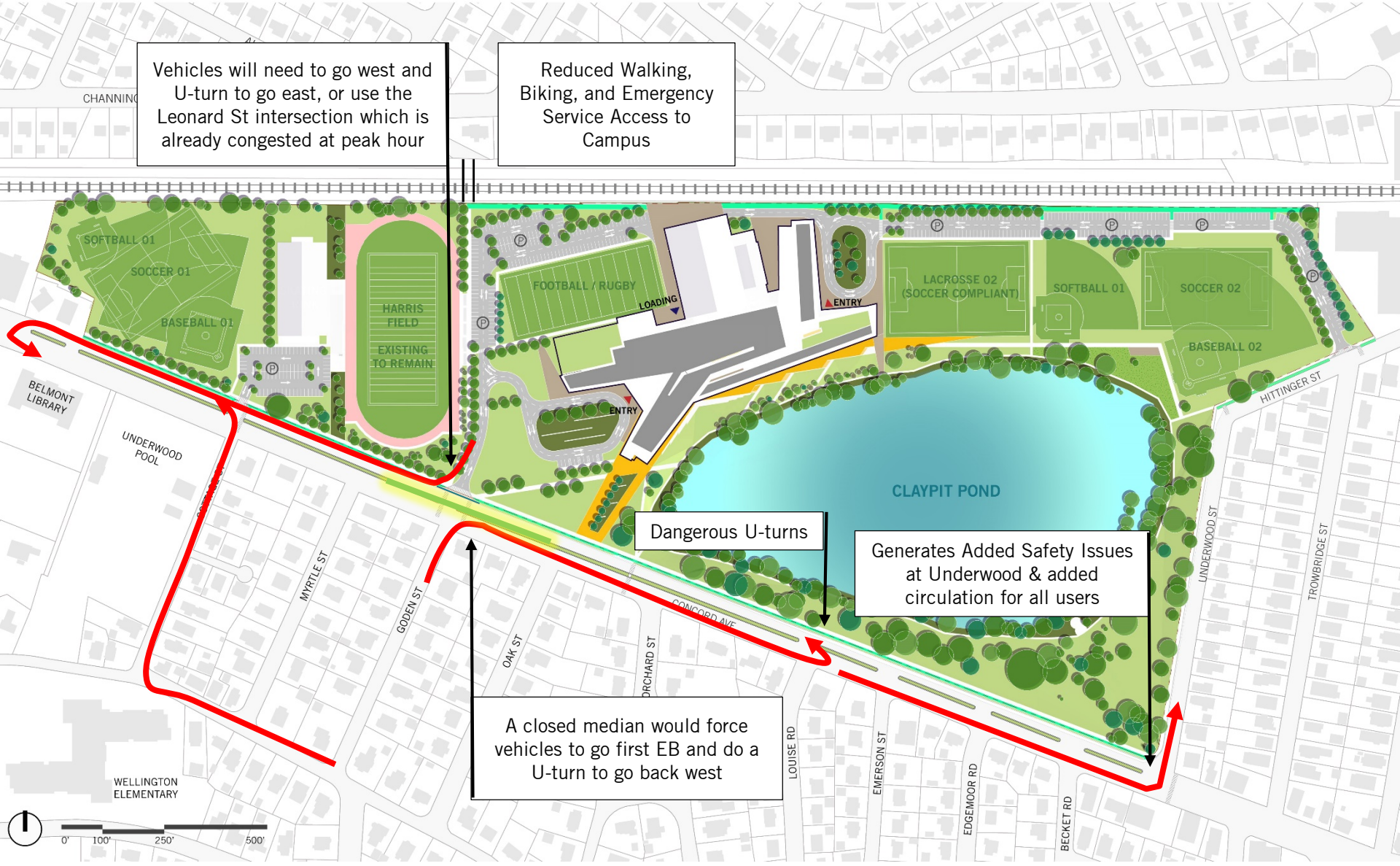
Future AM, No Signal



Future AM, Signal



Not Recommended: Close Goden Median



Not Recommended: Limiting Lefts and Throughs at Goden

- Goden is still needed for circulation to and from the school. Traffic will make u-turns at other locations to get to and from the intersection, also adding more circulation to Concord.
- Unsafe exiting conditions at present would be diverted to Cottage intersection.
- Entering drivers would weave to Myrtle. Insufficient length for right to left turn weave.
- Goden residents lose left turn to get to the Center.
- Would require a signal and crossings for people walking and biking.

Insufficient length for right and left weave

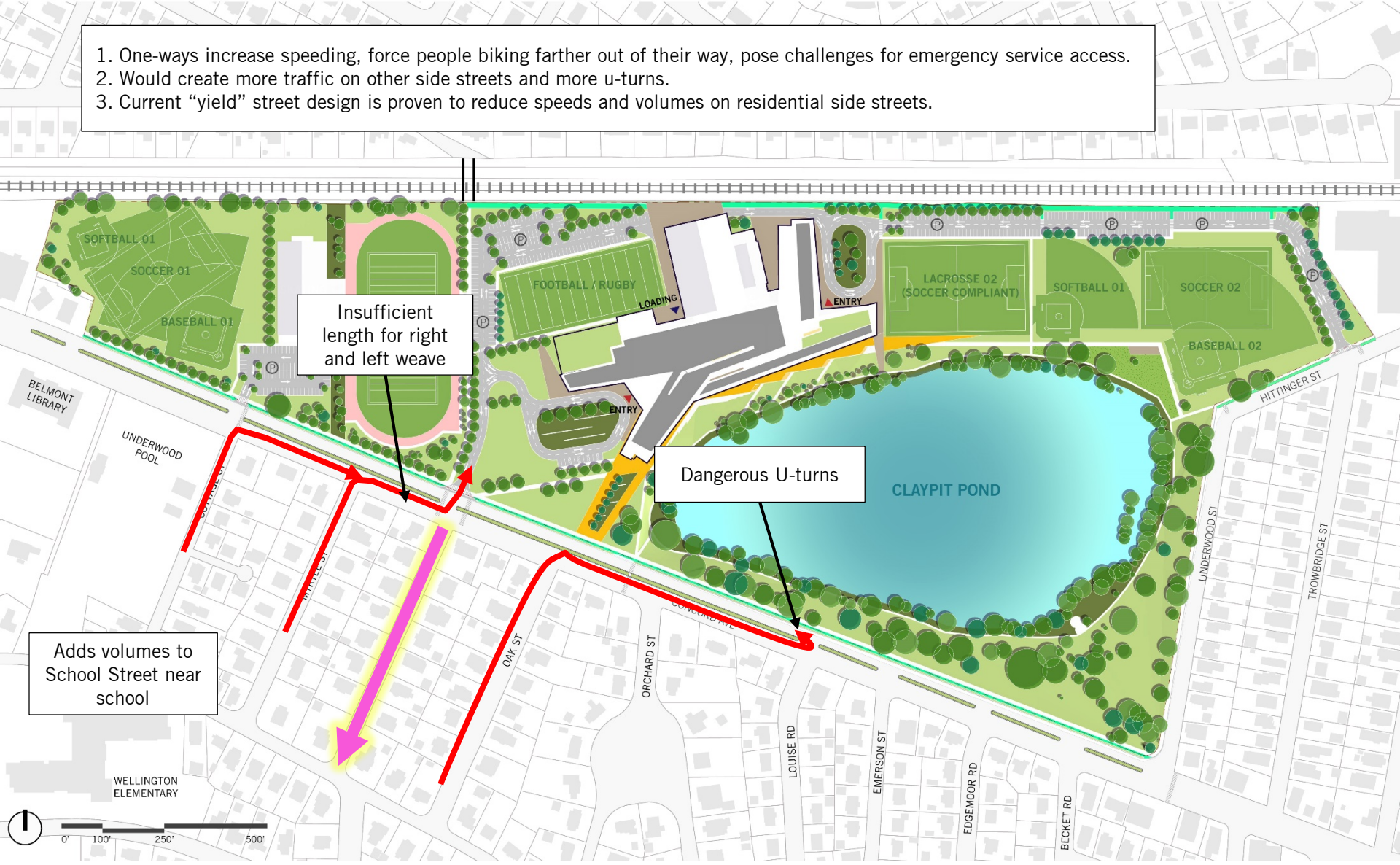
If U-turns disallowed, added issues at Underwood and circulation on campus.

Dangerous U-turns

If Myrtle right is disallowed, added congestion on School Street, which already has issues.

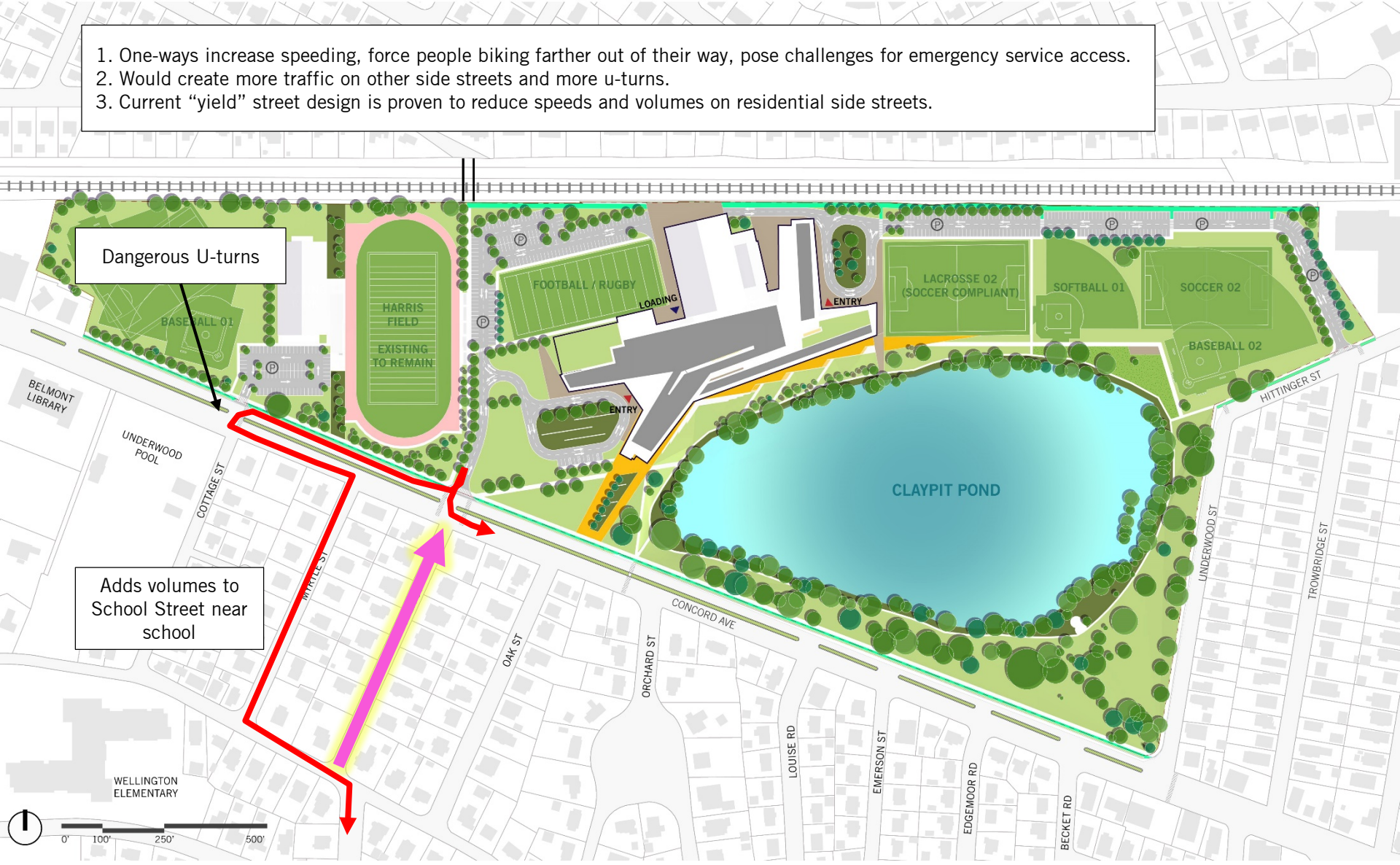
Not Recommended: Make Goden One-Way South

1. One-ways increase speeding, force people biking farther out of their way, pose challenges for emergency service access.
2. Would create more traffic on other side streets and more u-turns.
3. Current “yield” street design is proven to reduce speeds and volumes on residential side streets.



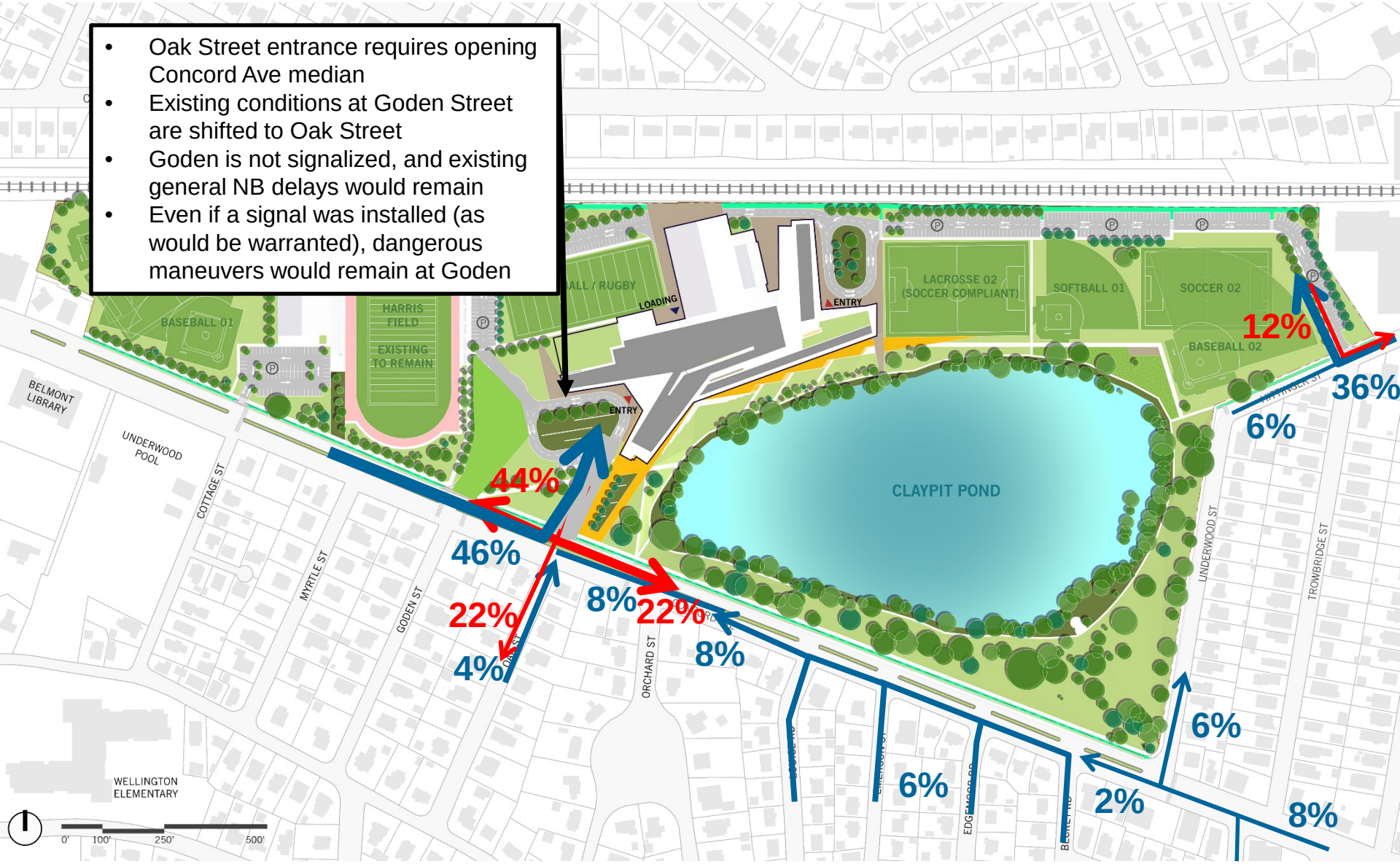
Not Recommended: Make Goden One-Way North

1. One-ways increase speeding, force people biking farther out of their way, pose challenges for emergency service access.
2. Would create more traffic on other side streets and more u-turns.
3. Current “yield” street design is proven to reduce speeds and volumes on residential side streets.

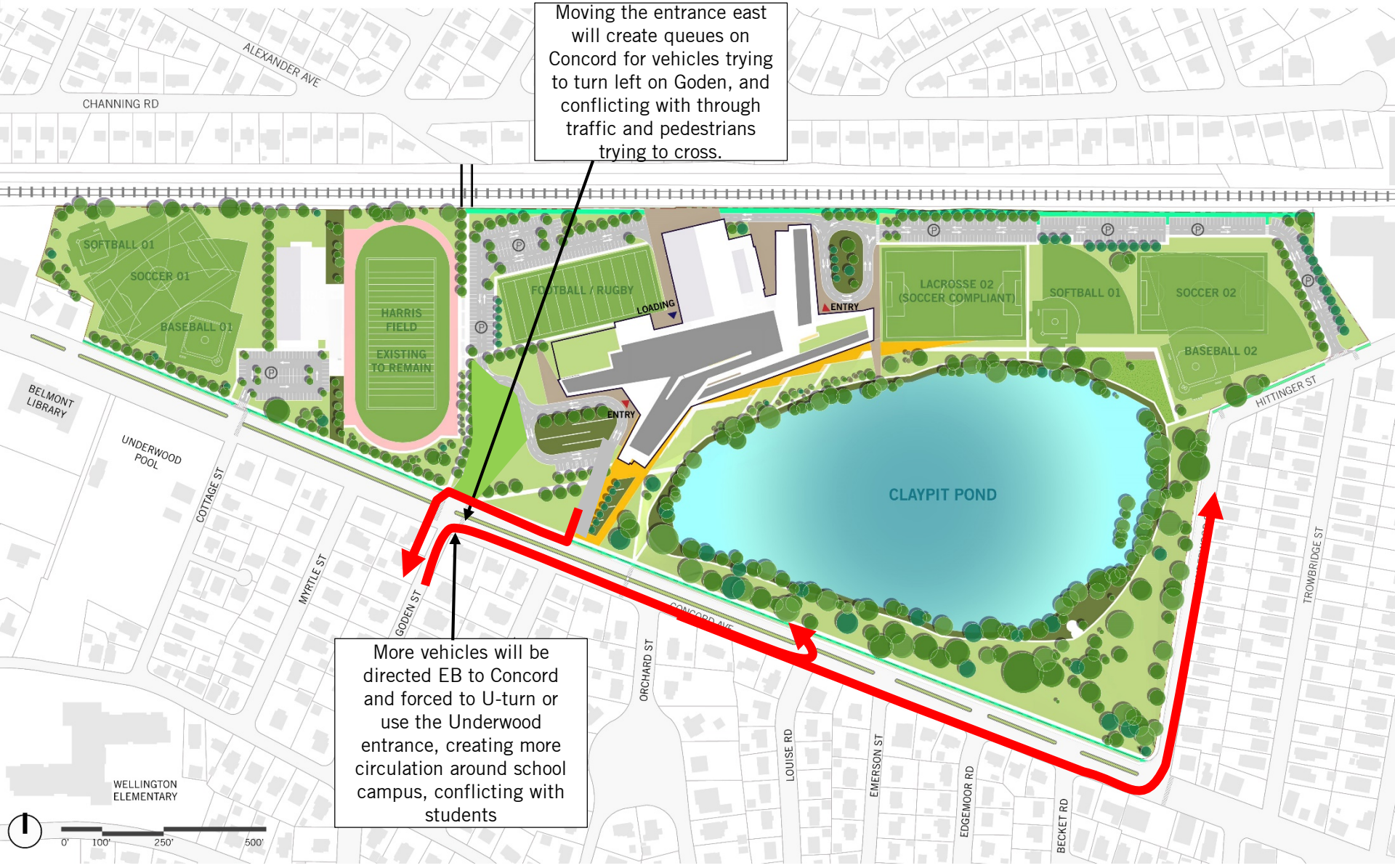


Not Recommended: Entrance at Oak / eastward

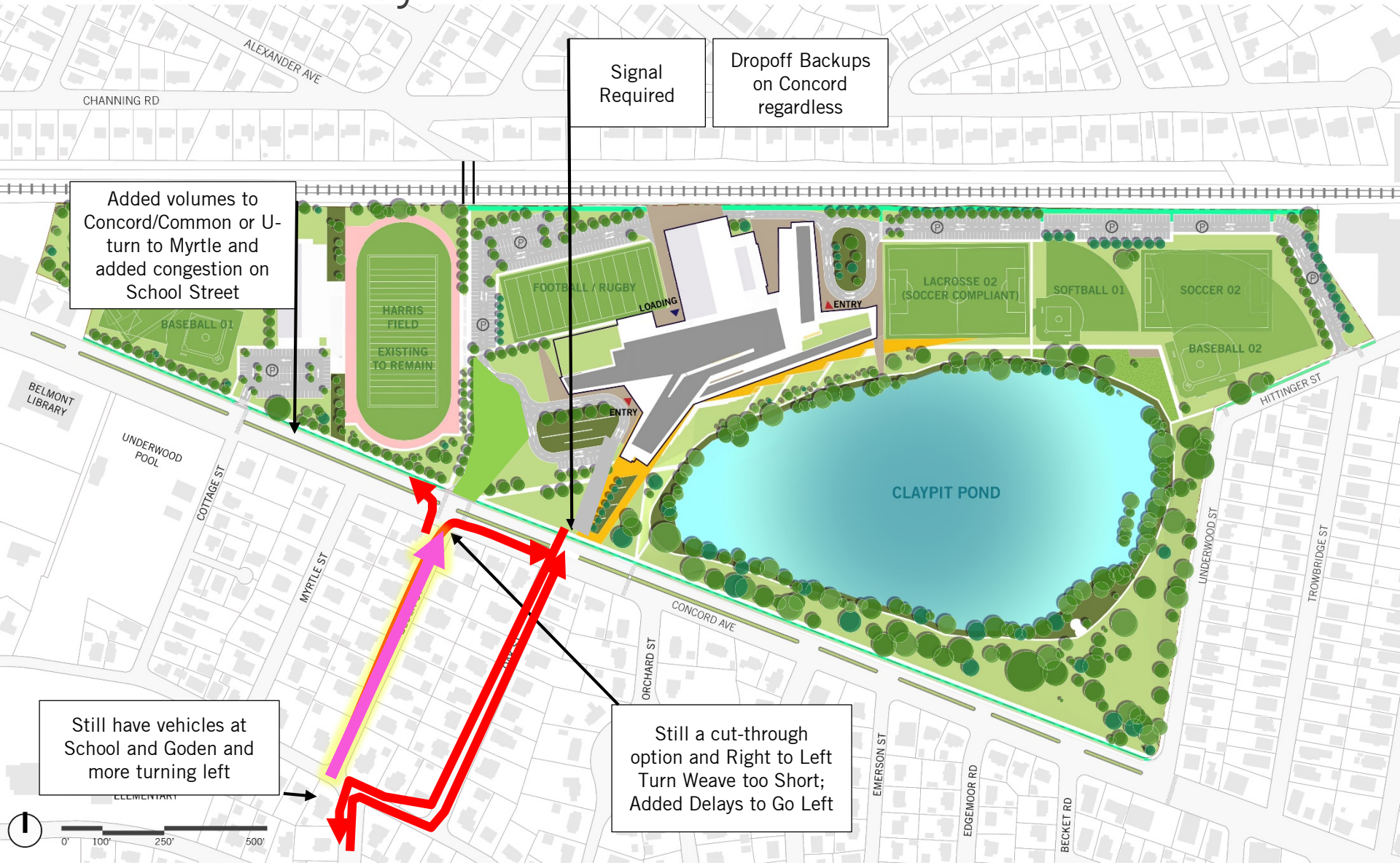
- Oak Street entrance requires opening Concord Ave median
- Existing conditions at Goden Street are shifted to Oak Street
- Goden is not signalized, and existing general NB delays would remain
- Even if a signal was installed (as would be warranted), dangerous maneuvers would remain at Goden



Not Recommended: Entrance at Oak / eastward

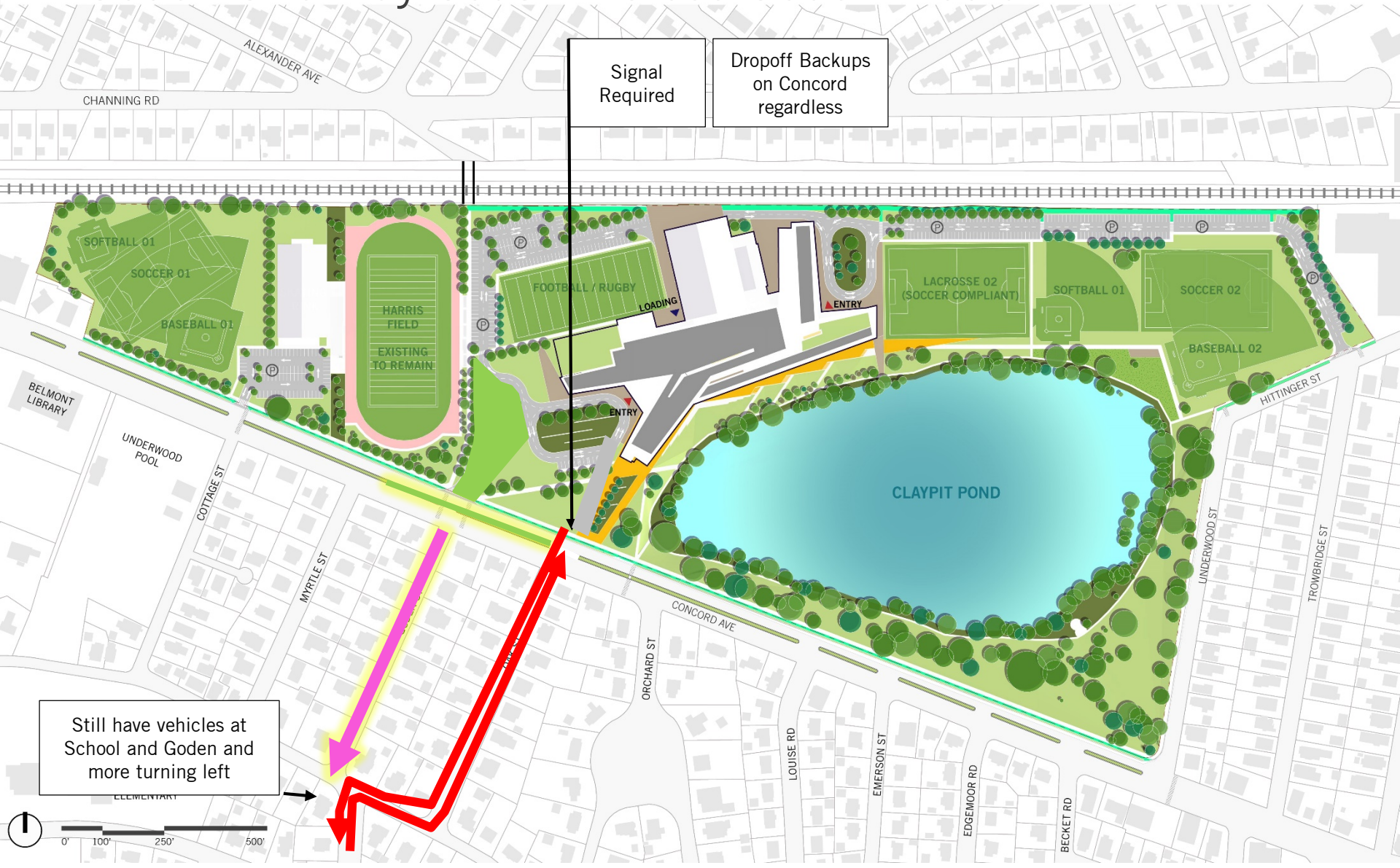


Not Recommended: Entrance at Oak + Open Median + Goden One-Way North



Not Recommended: Entrance at Oak + Open Median + Goden One-Way South

Not Recommended: Entrance at Oak + Open Median + Goden One-Way South + Close Goden Median



Not Recommended: Extend School Drive to West

Not Recommended: Moving the entry/exit to Myrtle / westward

Not Recommended: Trowbridge as 1-way to, Underwood 1-way out

Not Recommended: Break High School Drive

Not Recommended: Bus drop-off/pick-up on Underwood

Not Recommended: Create dropoff cut-out

1. Compromises sidewalk and cycletrack safety, creates backups on Concord Avenue.
2. Would require taking of parkland or taking of residential property.
3. Creates difficult sightlines for exiting/conflicts with adjacent intersections.

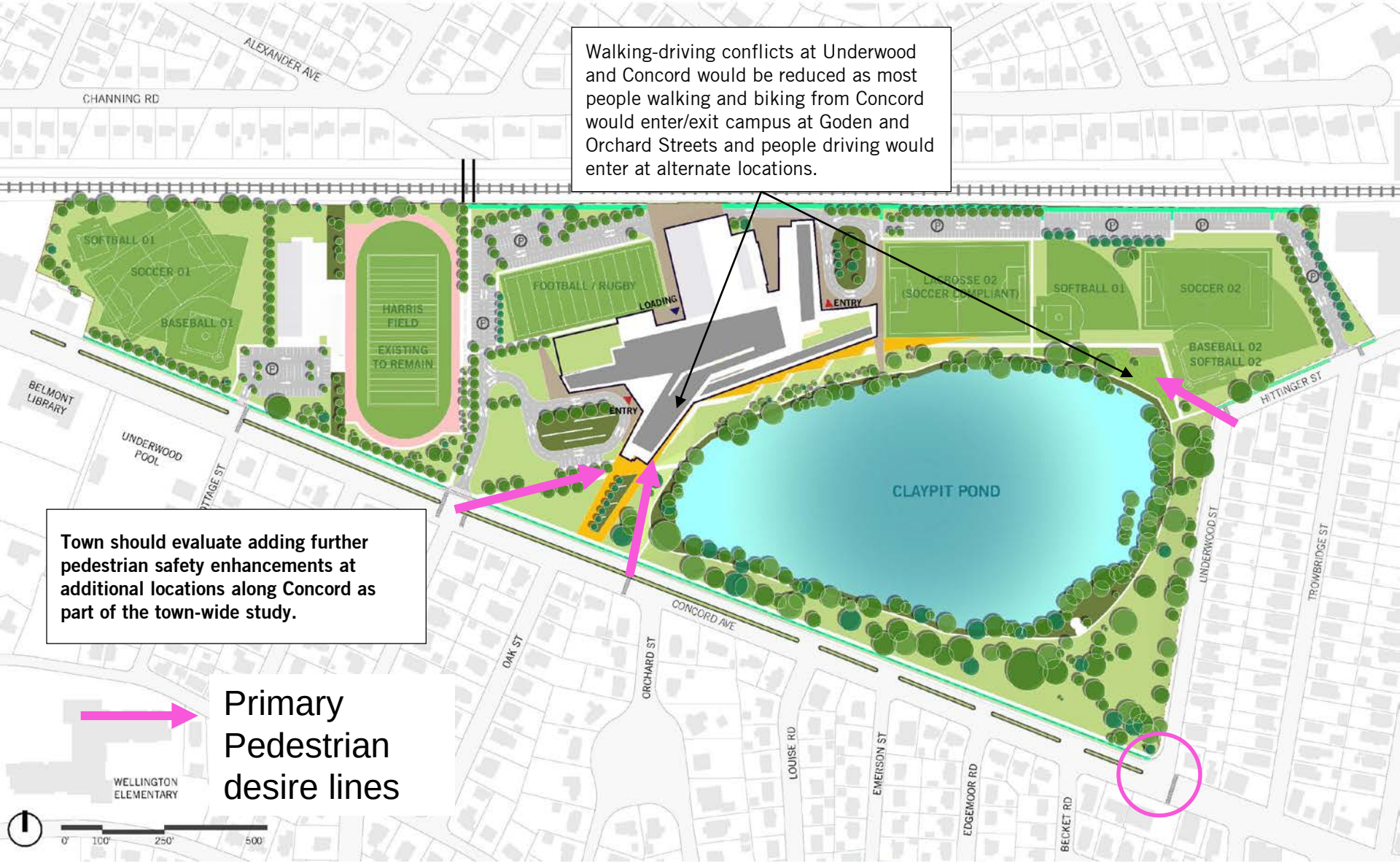
Not recommended: Eliminate drop-off loops on campus

- Drop-off loops on campus improve safety for students and reduce conflicts between cars pulling in/out of the curb and through traffic on Concord
- Drop-off loops are designed for all students (ADA compliance) and are required for bussing.
- Drop-off loops on campus remove traffic on Concord, Underwood and Hittinger getting in/out of the campus

Optional: Drop-off/Pick-up lanes on Concord

- Significant impact on the integrity of the bike lane unless the bike lanes are raised cycletracks on both sides of the street (currently proposed for the north side of Concord).
- Idling cars could block sightlines for pedestrians
- Blindspot issues for cars pulling out of lane into traffic
- Need more enhanced and dedicated crossings for students dropped-off across street
- Decrease of supply of on-street parking
- Parking pillover in residential streets
- Increase queues on Concord due to parking maneuvers
- Require school personnel to patrol, monitor and manage queuing and safe pickup/dropoff

Optional: Added safety improvements at Underwood and Concord intersection



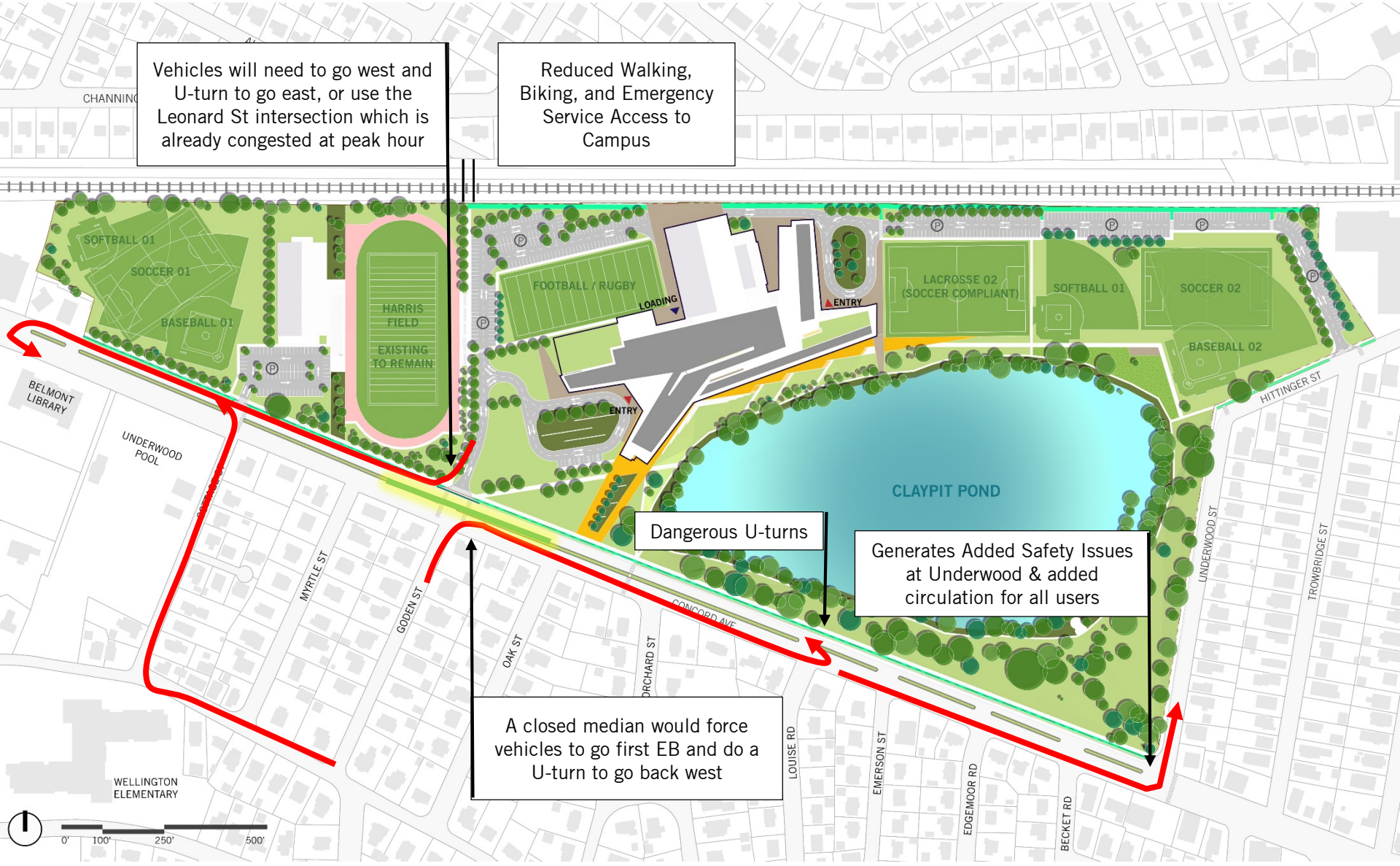
Optional: Parking Management

1. Permit parking for students along Concord and Underwood:
   a) Parking utilization is <25% on both streets during drop-off
   b) On-street parking would reduce speeding
   c) Enforcement of parking would be required
   d) Required bumpouts the width of the parking lane at all pedestrian crossings
2. Do limited parking with lottery for students
   a) Would reduce overall driving demand, incentivizing walking, biking and busing.
   b) Required on-street parking management program on nearby streets to mitigate spillover.
   c) Need to accommodate demand during special events.
3. Park busses in Rink lot (or off-site)
   a) Feasible if off-site location is available – Town has confirmed yes.
4. Change parking configuration for parking spaces directly off HS driveway to eliminate cars backing into travel lane
   a) Removing perpendicular spaces would improve safety, but reduce supply.
5. No on-site drop-off for students, add card access for teachers
   a) See past slide for full list of safety risks.
   b) Risk of spillover parking on residential streets
   c) Redesign Concord to manage drop-off issues that would block traffic.
   d) Special permit for students with special needs, deliveries, etc.
   e) Requires parking and traffic plan during during special events, like games.

Access Analysis – Meeting Agenda

1. Existing Transportation Conditions
2. Future Recommendations and Conditions
3. Feedback Evaluations
4. **Alternatives Discussion**

Close Goden Median



Limiting Lefts and Throughs at Goden

- Goden is still needed for circulation to and from the school. Traffic will make u-turns at other locations to get to and from the intersection, also adding more circulation to Concord.
- Unsafe exiting conditions at present would be diverted to Cottage intersection.
- Entering drivers would weave to Myrtle. Insufficient length for right to left turn weave.
- Goden residents lose left turn to get to the Center.
- Would require a signal and crossings for people walking and biking.

Insufficient length for right and left weave

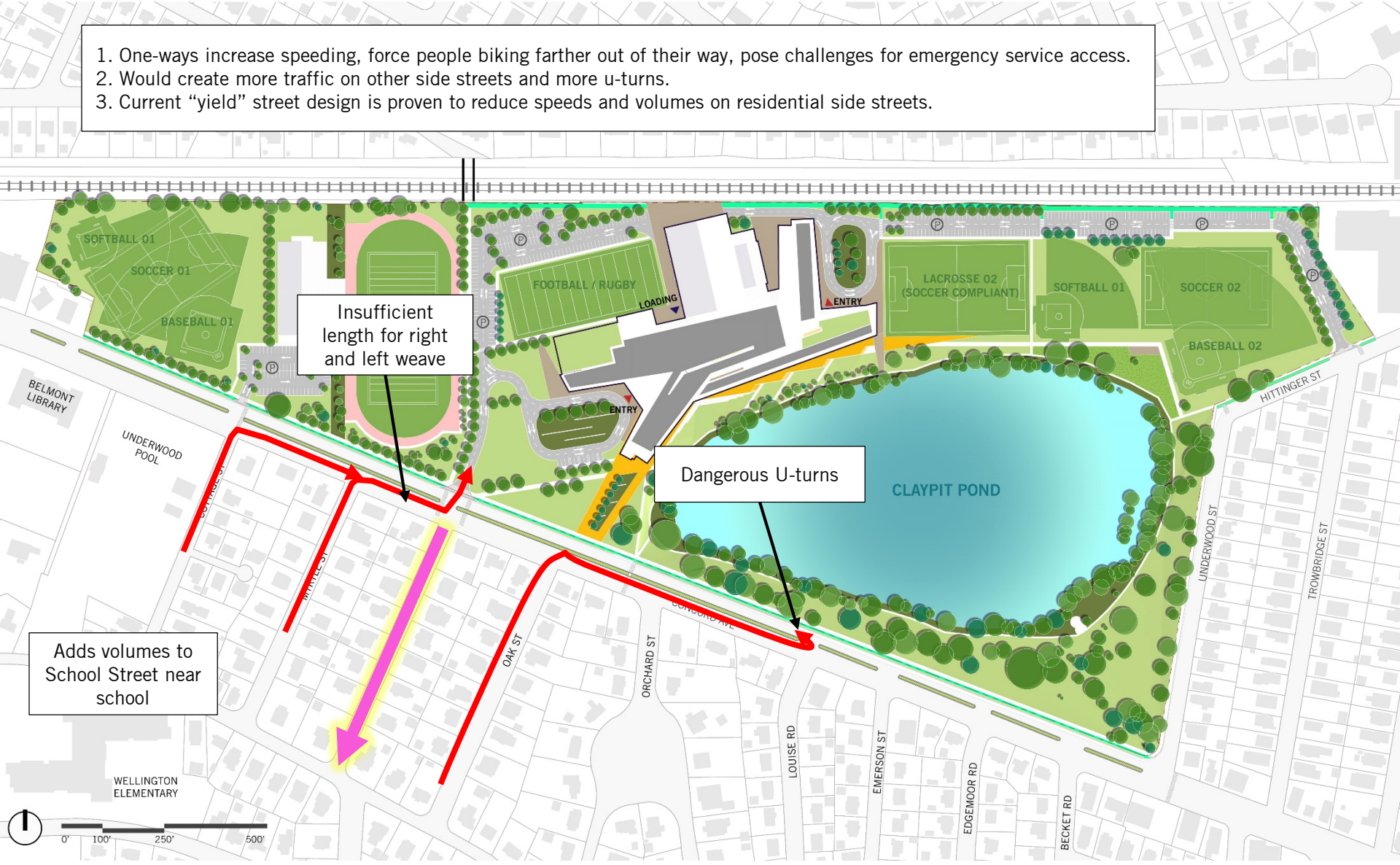
If U-turns disallowed, added issues at Underwood and circulation on campus.

Dangerous U-turns

If Myrtle right is disallowed, added congestion on School Street, which already has issues.

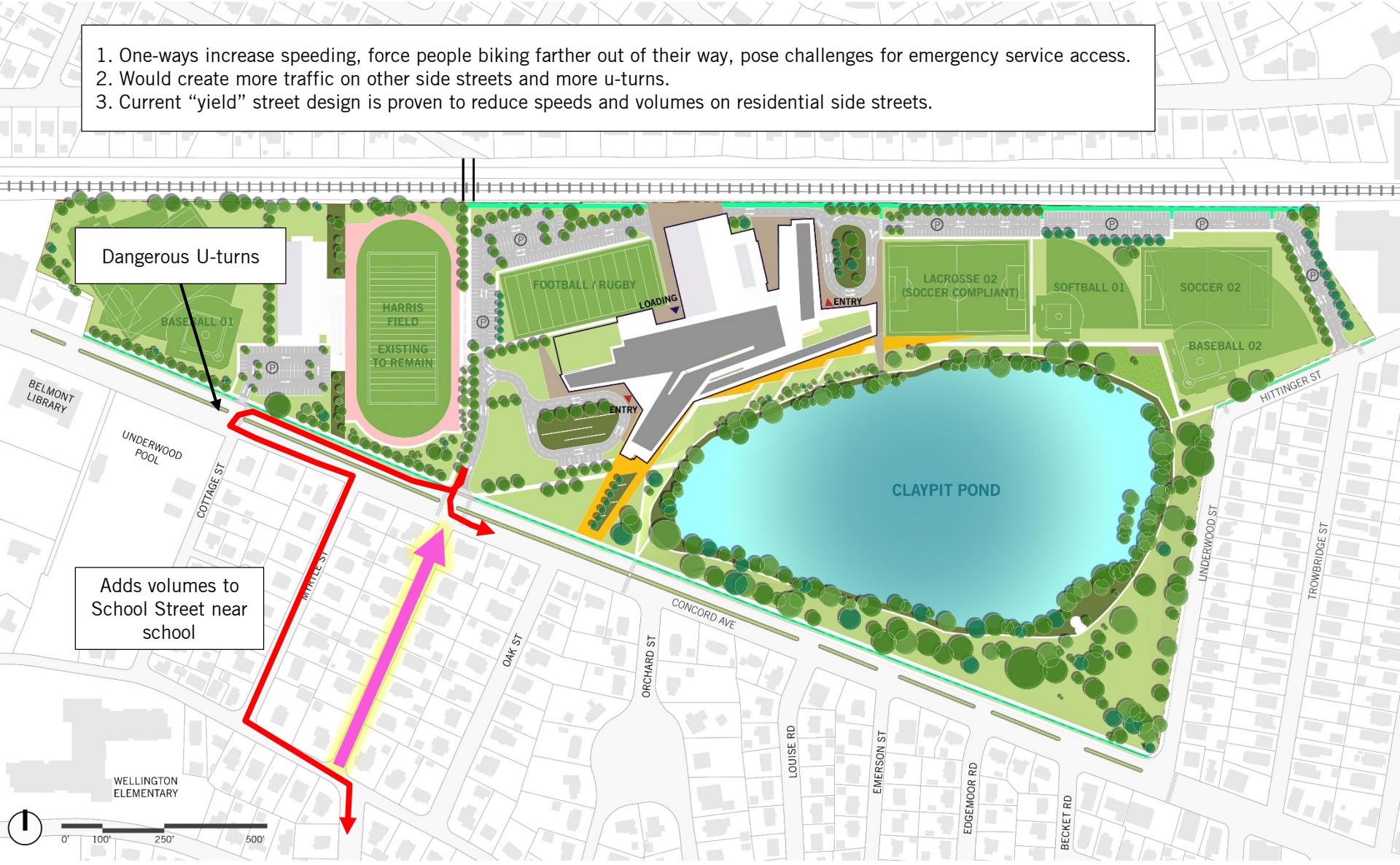
Make Goden One-Way South

1. One-ways increase speeding, force people biking farther out of their way, pose challenges for emergency service access.
2. Would create more traffic on other side streets and more u-turns.
3. Current “yield” street design is proven to reduce speeds and volumes on residential side streets.



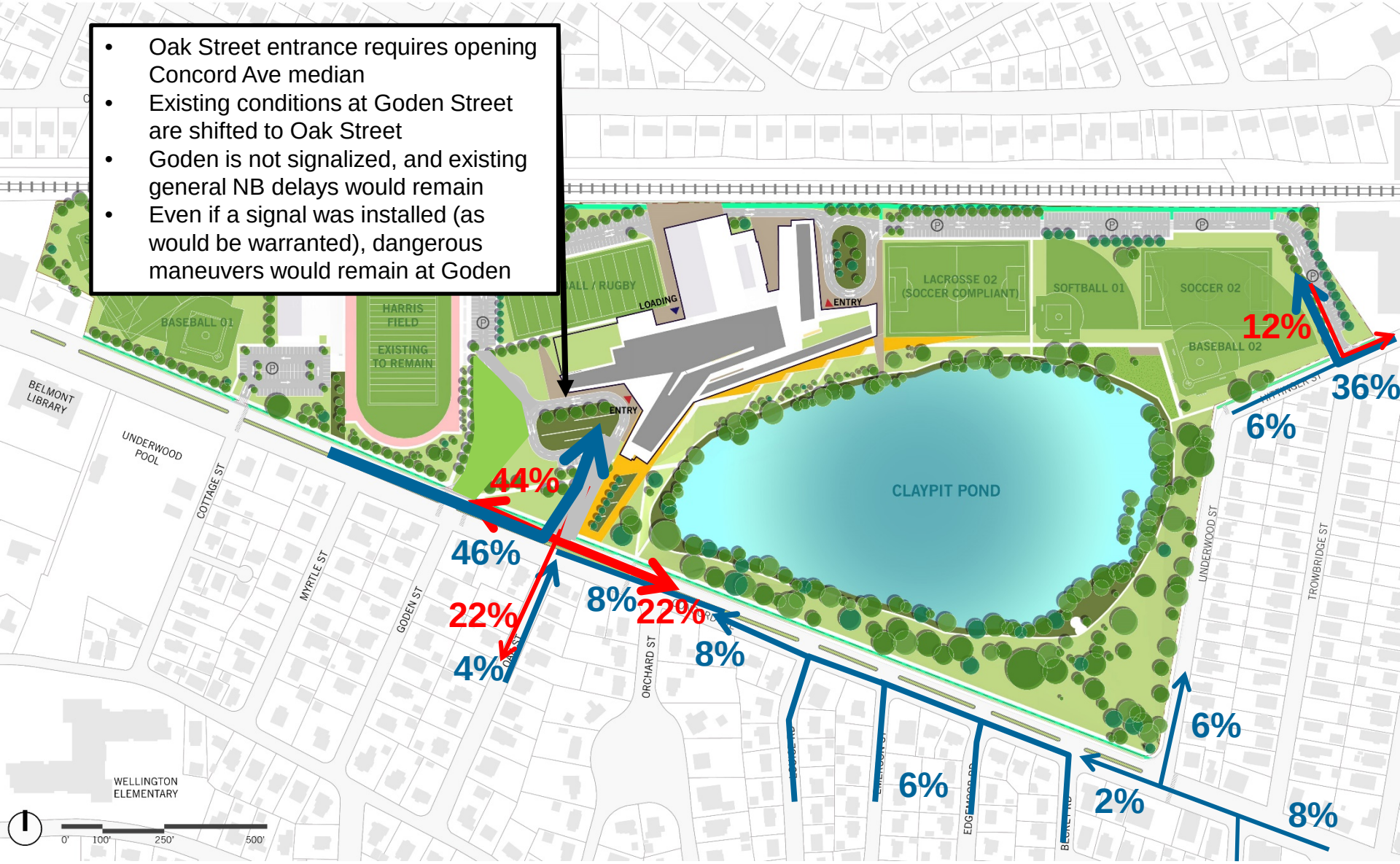
Make Goden One-Way North

1. One-ways increase speeding, force people biking farther out of their way, pose challenges for emergency service access.
2. Would create more traffic on other side streets and more u-turns.
3. Current “yield” street design is proven to reduce speeds and volumes on residential side streets.

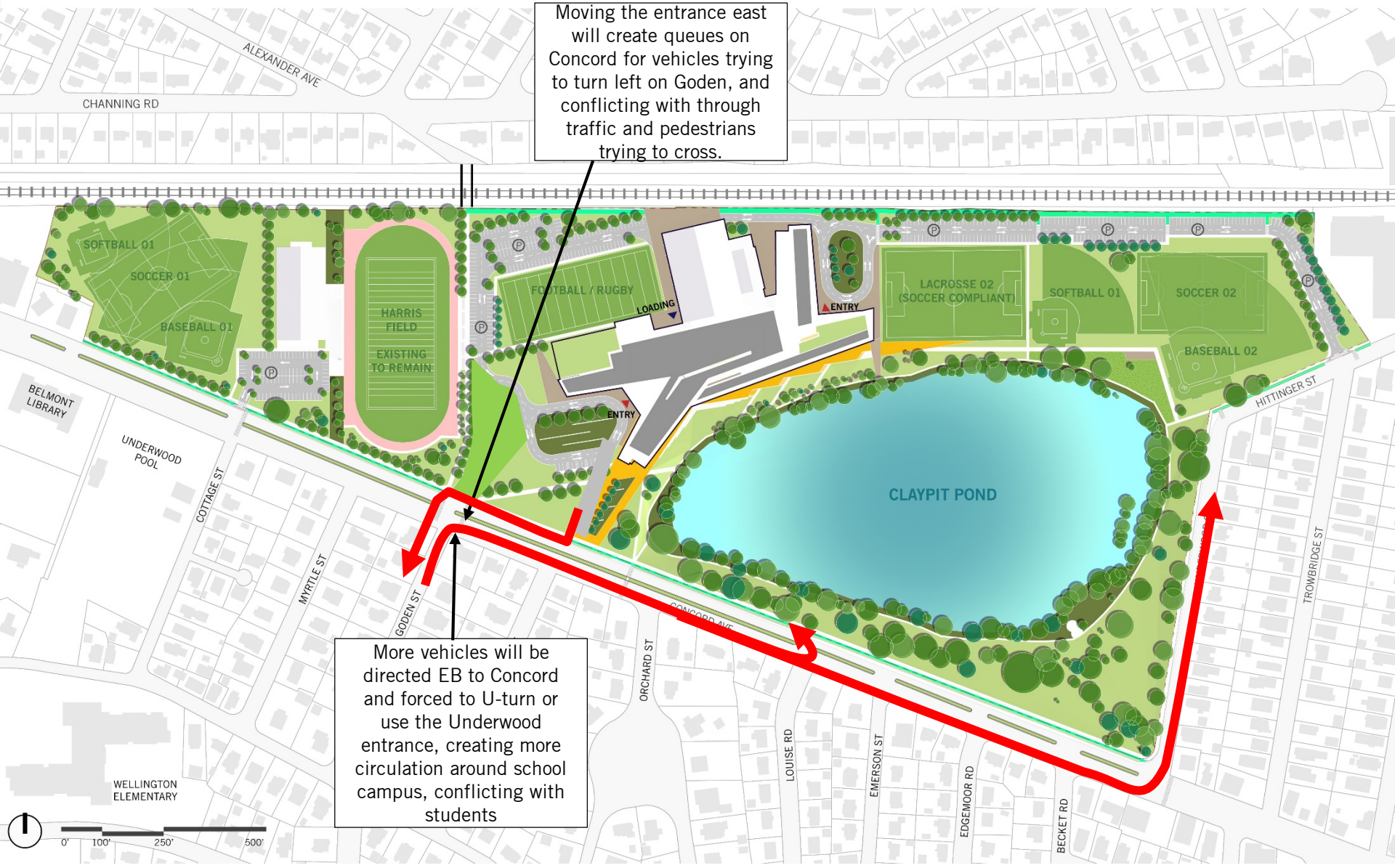


Entrance at Oak / eastward

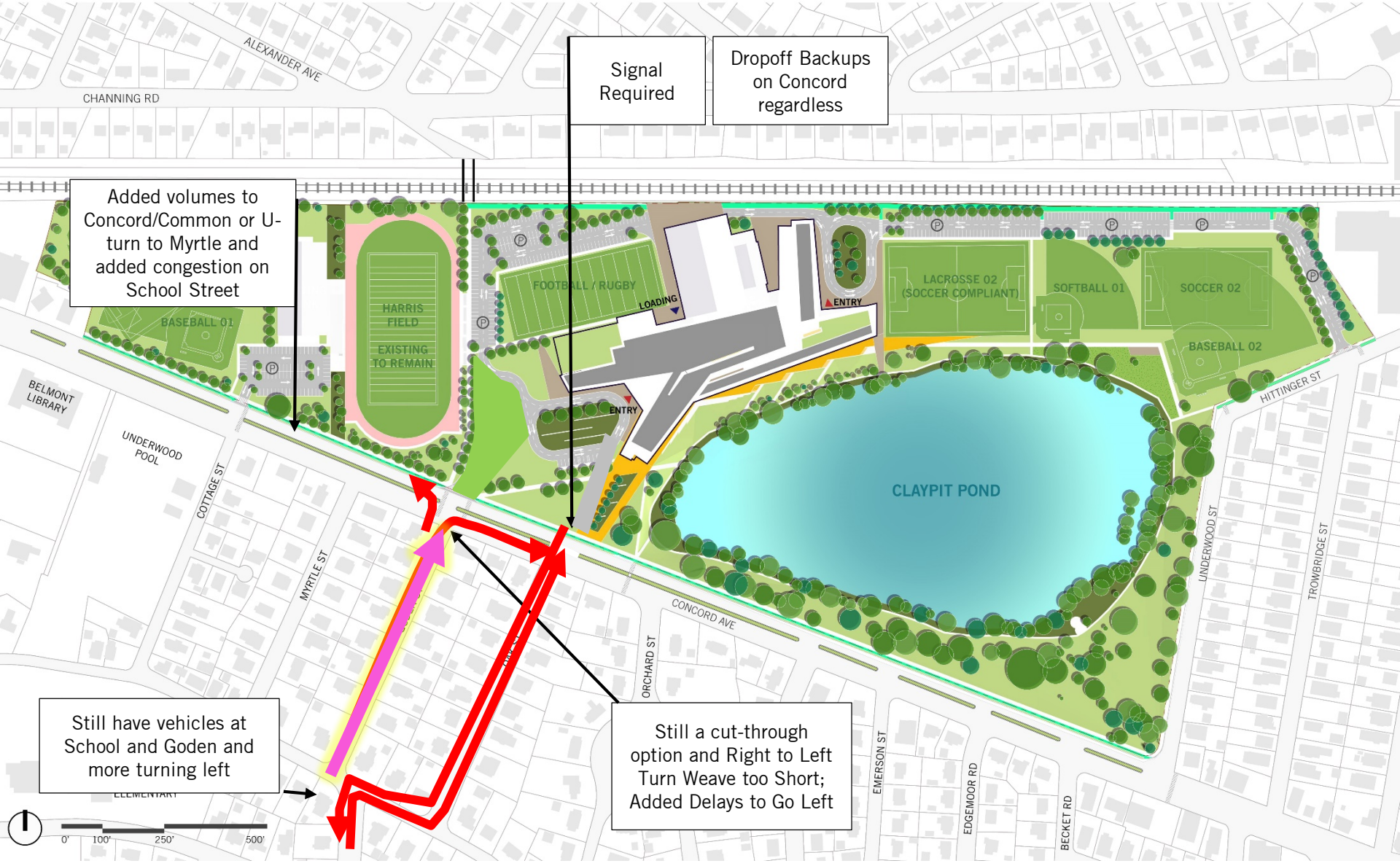
- Oak Street entrance requires opening Concord Ave median
- Existing conditions at Goden Street are shifted to Oak Street
- Goden is not signalized, and existing general NB delays would remain
- Even if a signal was installed (as would be warranted), dangerous maneuvers would remain at Goden



Entrance at Oak / eastward

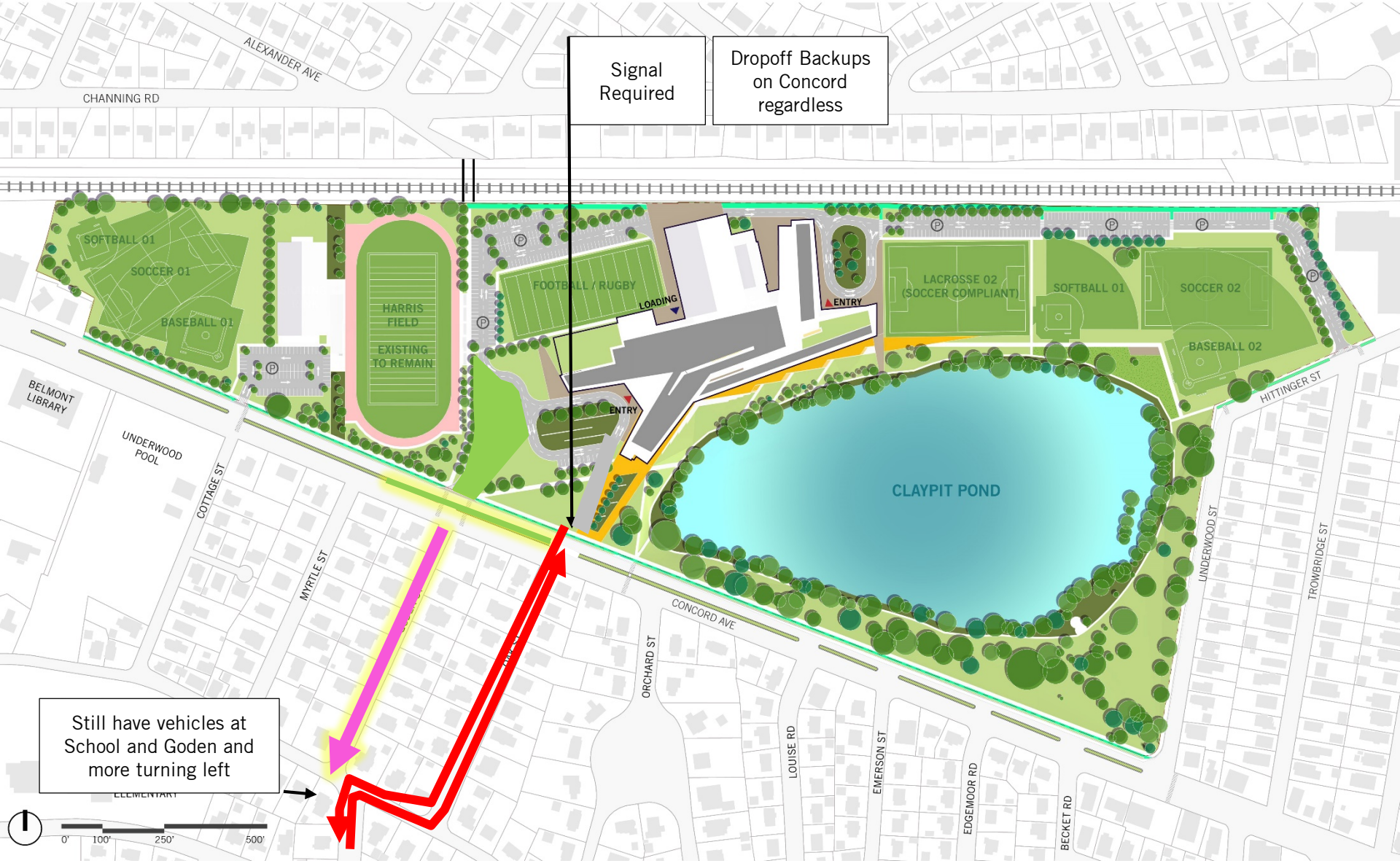


Entrance at Oak + Open Median + Goden One-Way North



Entrance at Oak + Open Median + Goden One-Way South

Entrance at Oak + Open Median + Goden One-Way South + Close Goden Median



APPENDIX

Site Plan Reference

Projected Future Mode Share - Values

Staff mode shares projected to remain similar, students 7-8 primarily drop-off or school bus, students 9-12 walk and carpool more

Mode	Staff and Teachers		Students 7-8		Students 9-12	
	Current Share	Future Share	Current Share	Future Share	Current Share	Future Share
Drop-off	2	**5**	-	261	356	397
Carpooling	0	0%	-	75	158	221
Drive-park	136	**213**	-	0	290	175
Bike	6	10	-	75	158	176
Walk	2	**5**	-	112	224	323
School Bus	2	2	-	224	105	134
Other Bus	5	7	-	0	26	44

Projected Future Mode Share

Staff mode shares projected to remain similar, students 7-8 primarily drop-off or school bus, students 9-12 walk and carpool more

Trip Projections

Existing Travelers		Projected Travelers			
	Grades 9-12		Grades 9-12	Grades 7-8	Total
Students	1,317	Students	1,470	745	2,215
Staff & Teachers	151	Staff & Teachers	169	72	241
	= 1,468 total				= 2,457 total

Existing Travel Profile				Projected Travel Profile				
Mode	Staff & Teachers	Students 9-12	Trips	Mode	Staff & Teachers	Students 7-8	Students 9-12	Trips
Drop-off	1%	27%	357	Drop-off	1%	35%	27%	662
Carpooling	N/A	12%	158	Carpooling		10%	12%	251
Drive & park	90%	22%	426	Drive & park	90%	0%	22%	536
Bike	4%	12%	164	Bike	4%	10%	12%	261
Walk	1%	17%	225	Walk	1%	15%	17%	336
School Bus	1%	8%	107	School Bus	1%	30%	8%	344
Other Bus	3%	2%	31	Other Bus	3%	0%	2%	51
	= 941 by car (64%)							= 1,450 cars (59%)

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Goden St is a Desire line for Traffic Movements, regardless of the HS

AM peak:

- WB left are 10% of total WB volumes, up to 37% during HS drop-off
- EB right are 12% total EB volumes, up to 21% from 7.30 am to 8 am
- NB left is consistent and unrelated to the HS
- NB right peaks during the HS drop-off period

PM peak:

- EB right are consistent and unrelated to the HS
- WB left on Goden are 12% of the WB volumes and reach 20-30% during the HS dismissal
- NB left to Concord increase after HS dismissal, coinciding with PM peak of overall traffic