NNHS Site Plan Approval: Traffic/Parking Conditions

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City Traffic Engineer

City of Newton Public Works Department

Engineering Division

Public Facilities Committee

February 4, 2009

Outline

- Review NNHS site access, Elm Rd
- Board Order Condition # 4
  - Walnut St, including Hull St intersection
- Board Order Condition # 5
  - Walnut/Trowbridge/NNHS driveway intersection
- Question/Answer

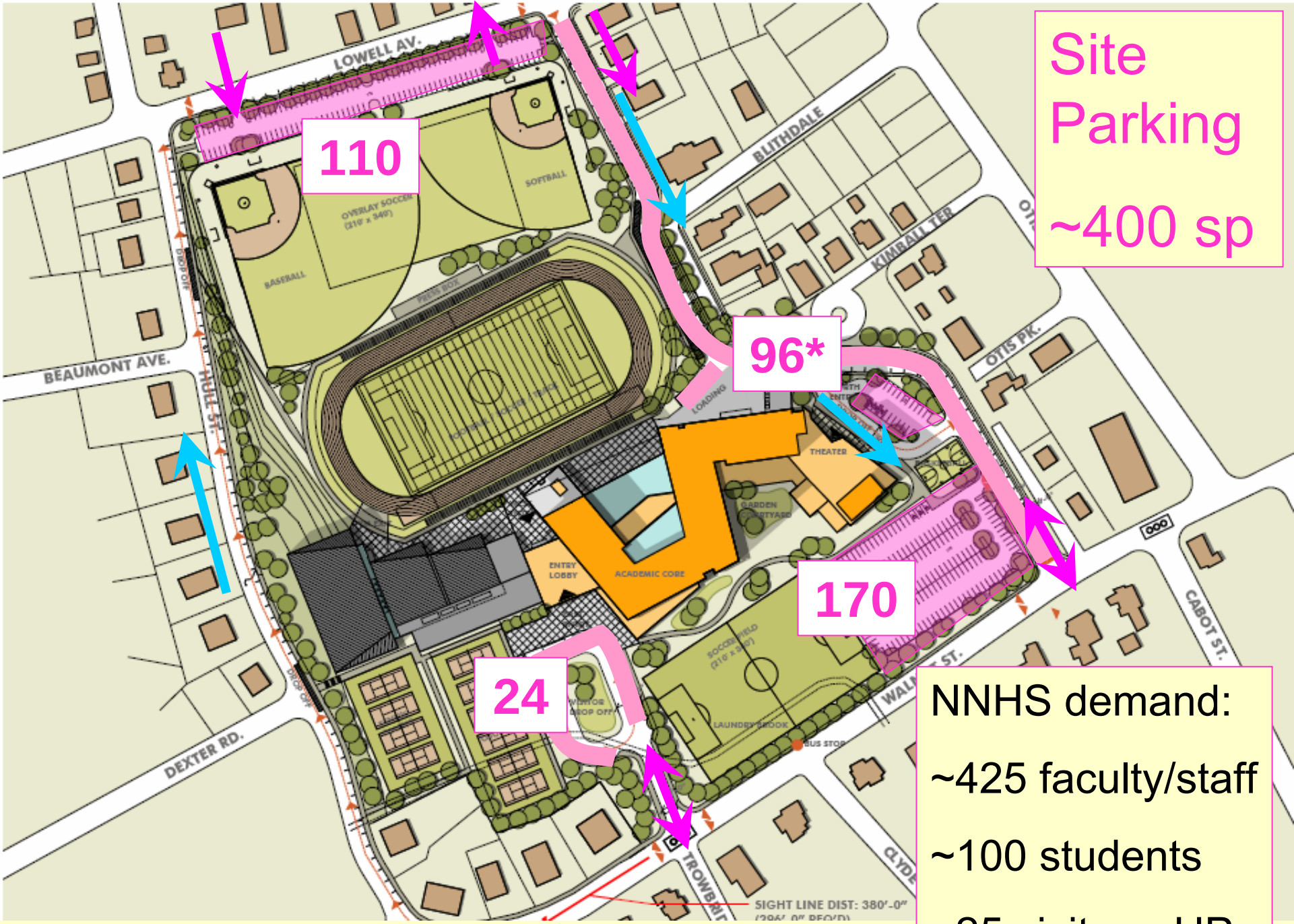
Site Plan Board Order # 224-06

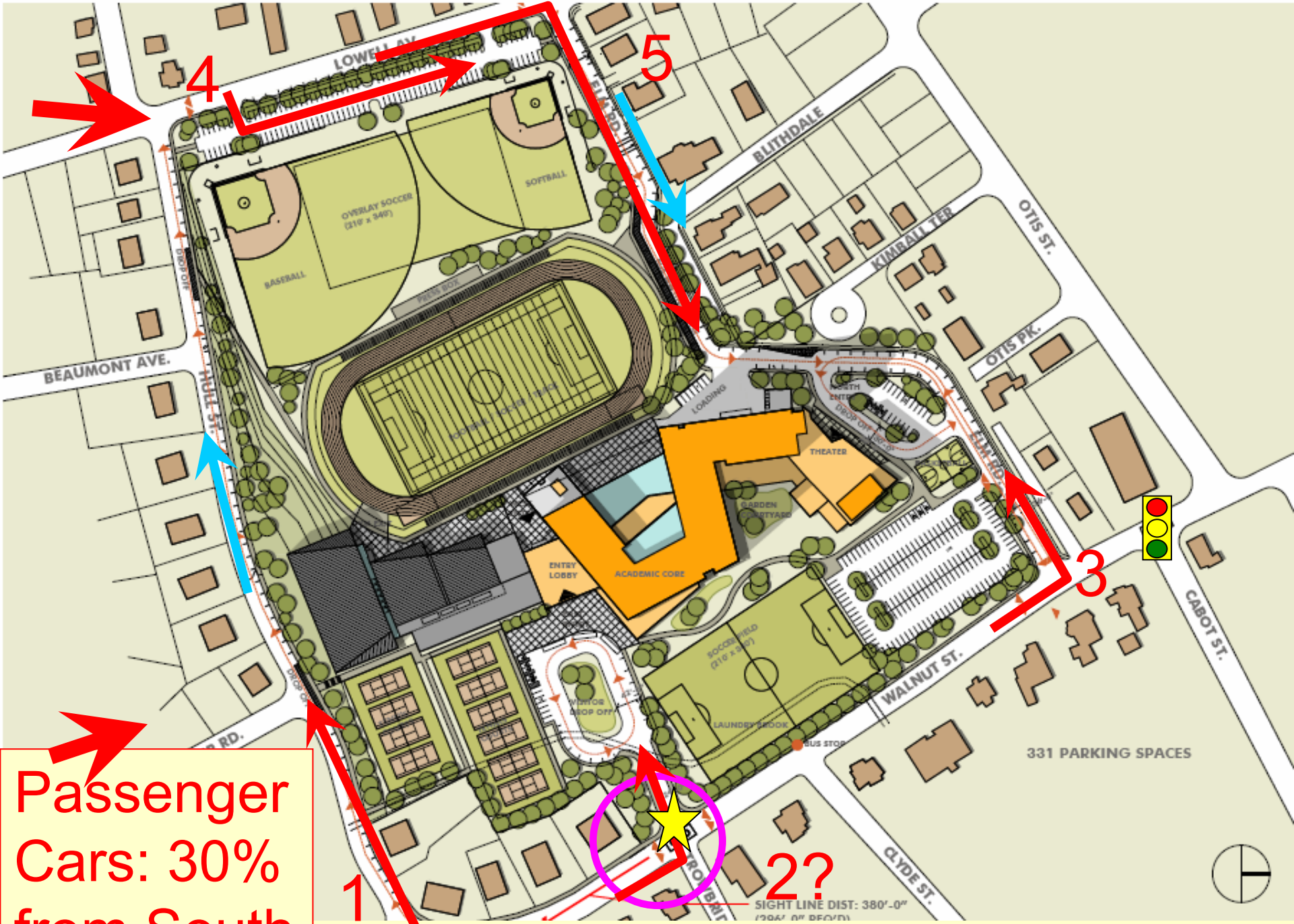
There are 7 traffic/parking-related conditions for a "comparative design":

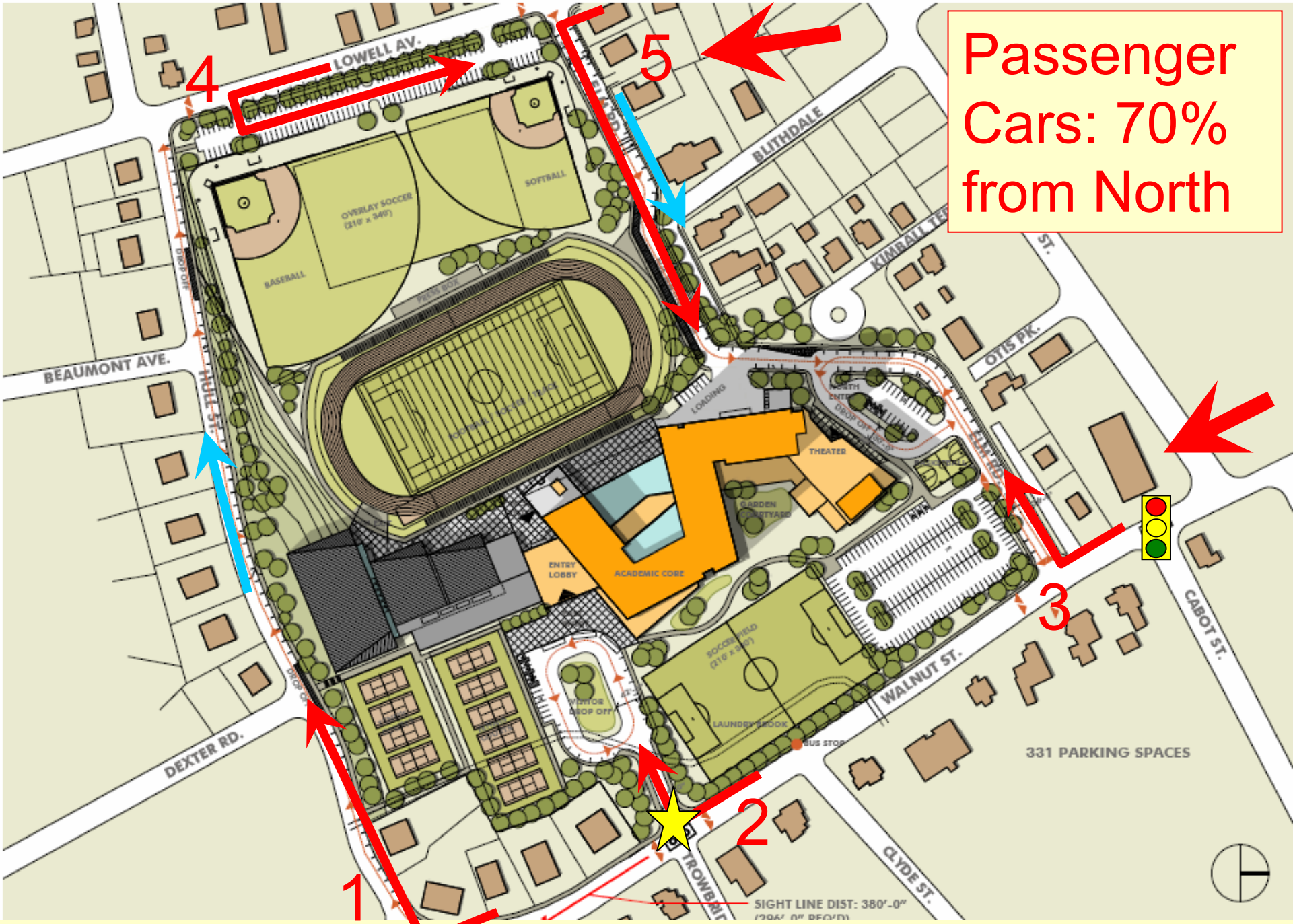
- ✓ 3d: Elm Road: <= 30 feet wide for max. buffers (2/6/08)
- ✓ 3e: Lowell Ave: drop-off area or alt. vehicle entrance, Elm Rd: alt. traffic patterns (2/6/08)
- ✓ 3f: Hull St: create drop-off areas (2007)
- ✓ 3j: Walnut St: create alt. bus drop-off area (2007)
- ☺ **4: Walnut St: safety improvements Mill to Cabot**
- ☺ **5: Walnut St/School Driveway signalization**
- ✓ 7: School Driveway: No added parking spaces (2007)

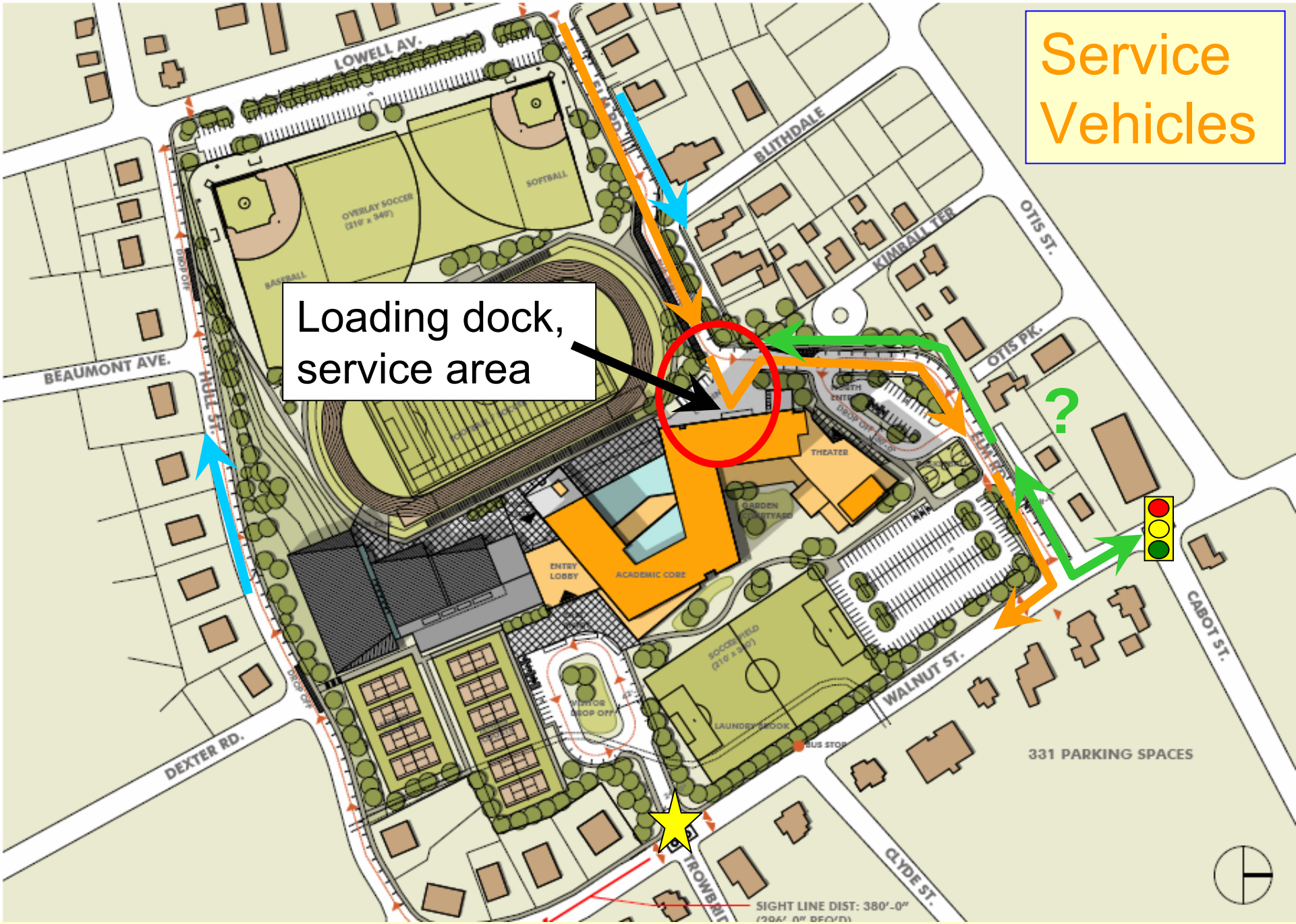
NNHS Traffic/Circulation Goals

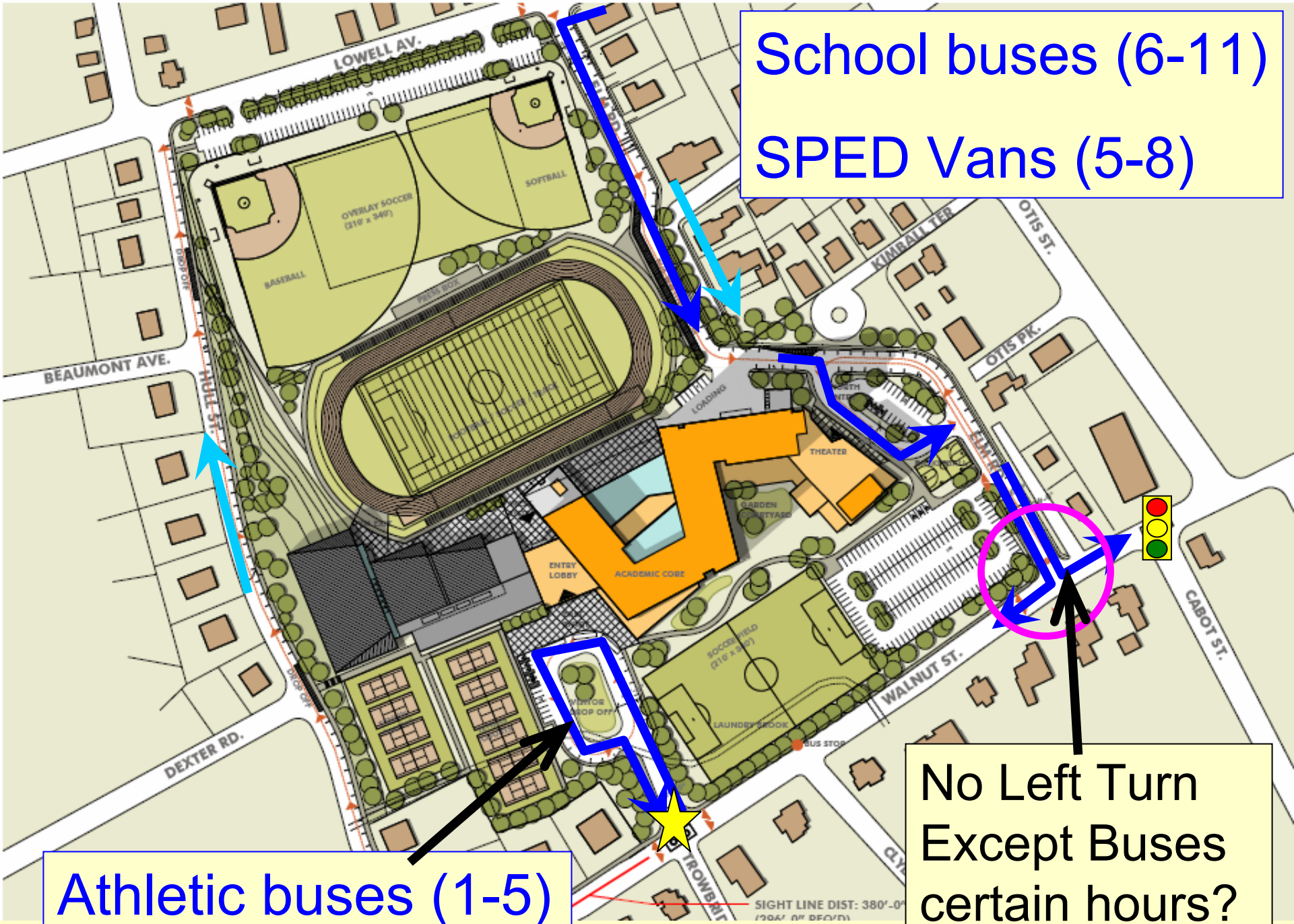
- Provide safe, convenient and preferred access for pedestrians, bicycles, and buses
  - Walnut St crossing for points south & east
  - Facilitate bus egress onto Walnut St
- Disperse vehicle access points and parking around the site
  - Over time, drivers will use the fastest route (they are smarter than traffic engineers)

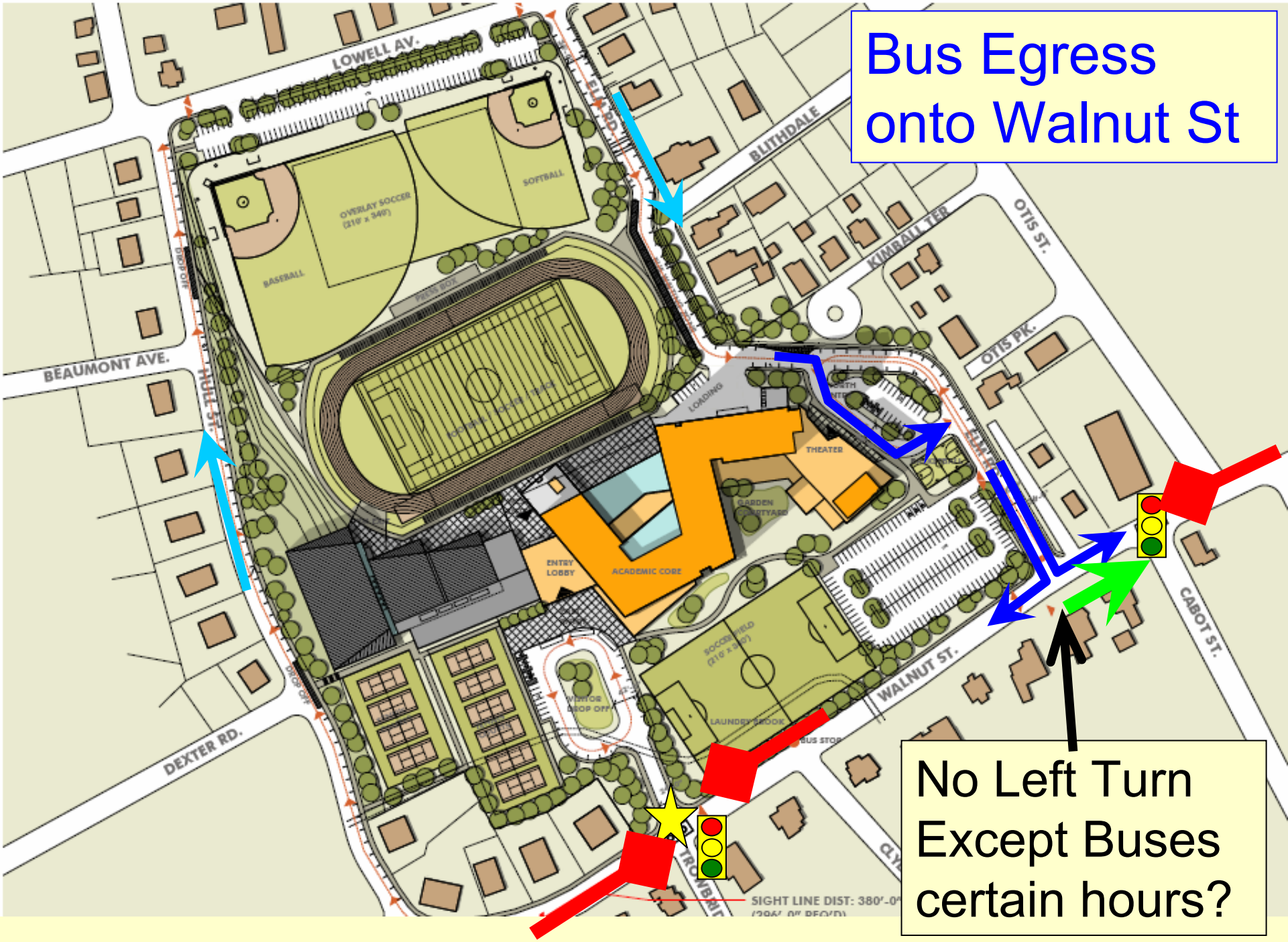

Site Parking
~400 sp
110
96*
170
24
NNHS demand:
~425 faculty/staff
~100 students
~25 visitors, HP
LOWELL AV.
BLITHDALE
KIMBALL TER
OTIS PK.
BEAUMONT AVE.
HULL ST.
DEXTER RD.
CABOT ST.
TROWBRIDGE
SOFTBALL
BASEBALL
OVERLAY SOCCER (310' x 340')
LOADING
THEATER
ENTRY LOBBY
ACADEMIC CORE
GARDEN COURTYARD
SOCCER FIELD (210' x 330')
VISITOR DROP OFF
LAUNDRY
BUS STOP
DROP OFF
SIGHT LINE DIST: 380'-0"


4
5
3
1
2?
Passenger Cars: 30% from South
BEAUMONT AVE.
BLITHDALE
OTIS ST.
OTIS PK.
KIMBALL TER
CABOT ST.
WALNUT ST.
CLYDE ST.
HULL ST.
OVERLAY SOCCER (310' x 340')
SOFTBALL
BASEBALL
ACADEMIC CORE
ENTRY LOBBY
THEATER
LOADING
331 PARKING SPACES
SIGHT LINE DIST: 380'-0"


Passenger Cars: 70% from North
LOWELL AV.
BEAUMONT AVE.
DEXTER RD.
BLITHDALE
KIMBALL TER.
OTIS PK.
WALNUT ST.
CABOT ST.
CLYDE ST.
HULL ST.
OVERLAY SOCCER (310' x 340')
SOFTBALL
BASEBALL
ACADEMIC CORE
ENTRY LOBBY
THEATER
LOADING
SOCCER FIELD (210' x 330')
331 PARKING SPACES
SIGHT LINE DIST: 380'-0"
1
2
3
4
5

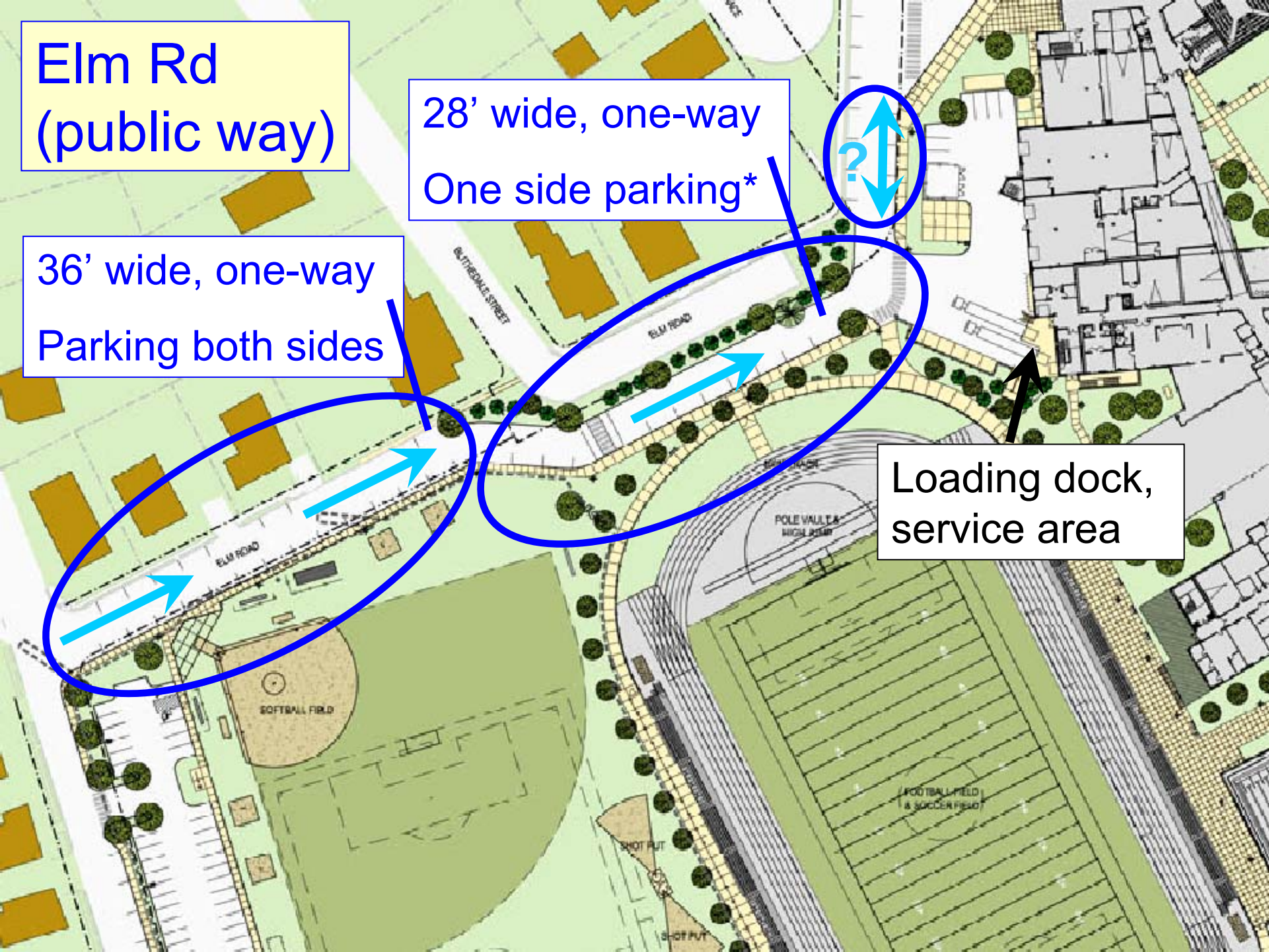

Service Vehicles
Loading dock, service area
LOWELL AV.
BEAUMONT AVE.
DEXTER RD.
BLITHDALE
KIMBALL TER
OTIS ST.
OTIS PK.
WALNUT ST.
CABOT ST.
CLYDE ST.
HULL ST.
OVERLAY SOCCER (310' x 340')
SOFTBALL
BASEBALL
THEATER
ENTRY LOBBY
ACADEMIC CORE
GARDEN COURTYARD
SOCCER FIELD (210' x 300')
LAUNDRY ROOM
331 PARKING SPACES
SIGHT LINE DIST: 380'-0"
?

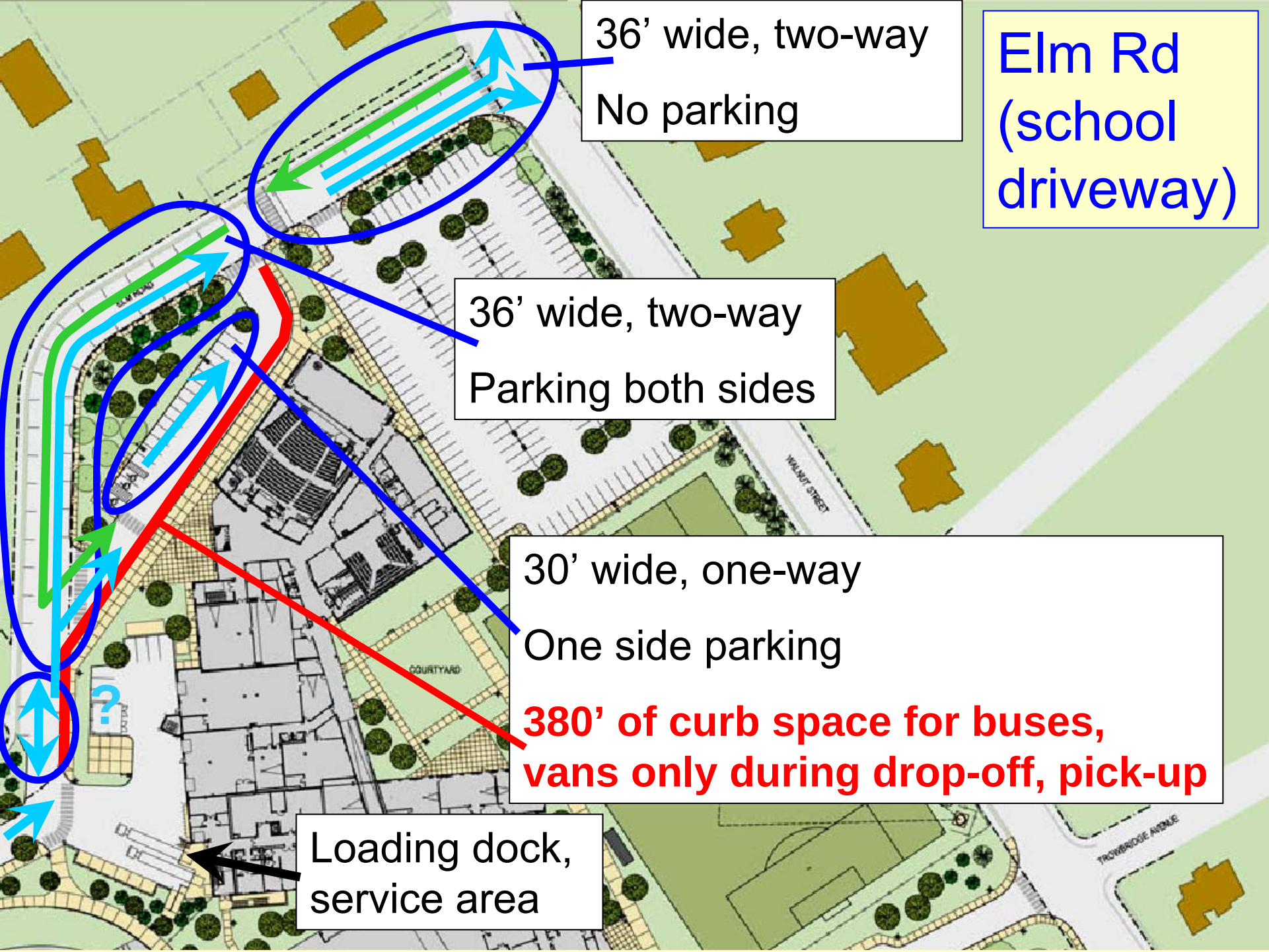

School buses (6-11)
SPED Vans (5-8)
Athletic buses (1-5)
No Left Turn
Except Buses
certain hours?
LOWELL AV.
BEAUMONT AVE.
DEXTER RD.
WALNUT ST.
CABOT ST.
OTIS ST.
OTIS PK.
KIMBALL TER
HULL ST.
OVERLAY SOCCER (310' x 340')
SOFTBALL
BASEBALL
ACADEMIC CORE
ENTRY LOBBY
THEATER
LOADING
GARDEN COURTYARD
SOCCER FIELD (210' x 330')
LAUNDRY BROOK
VISITOR DROP OFF
DROP OFF
SIGHT LINE DIST: 380'-0"


Bus Egress
onto Walnut St
No Left Turn
Except Buses
certain hours?
LOWELL AV.
BLITHDALE
KIMBALL TER
OTIS ST.
OTIS PK.
BEAUMONT AVE.
HULL ST.
DEXTER RD.
WALNUT ST.
CABOT ST.
OVERLAY SOCCER (310' x 340')
SOFTBALL
BASEBALL
ACADEMIC CORE
ENTRY LOBBY
THEATER
LOADING
GARDEN COURTYARD
SOCCER FIELD (210' x 300')
VISITOR DROP OFF
LAUNDRY ROOM
BUS STOP
DROP OFF
SIGHT LINE DIST: 380'-0"

Elm Road

- Public way between Lowell Ave & Kimball Terrace
  - Traffic Council has jurisdiction over parking, direction of flow
- School driveway between Kimball Terrace & Walnut St
  - School Dept. has jurisdiction over parking, direction of flow
- The design of Elm Road accommodates various traffic flow/parking options, as intended
- Elm Road parking & traffic flow remain under study, with some decisions likely deferred until after the new school opens and the old school is torn down


Elm Rd
(public way)
28’ wide, one-way
One side parking*
?
36’ wide, one-way
Parking both sides
Loading dock,
service area
ELM ROAD
BUTTERNUT STREET
SOFTBALL FIELD
POLE VAULT &
HIGH JUMP
FOOTBALL FIELD
& SOCCER FIELD
SHOT PUT
DISCUS


36’ wide, two-way
No parking
Elm Rd (school driveway)
36’ wide, two-way
Parking both sides
30’ wide, one-way
One side parking
380’ of curb space for buses, vans only during drop-off, pick-up
Loading dock, service area
?
COURTYARD
WALNUT STREET
TROWBRIDGE AVENUE

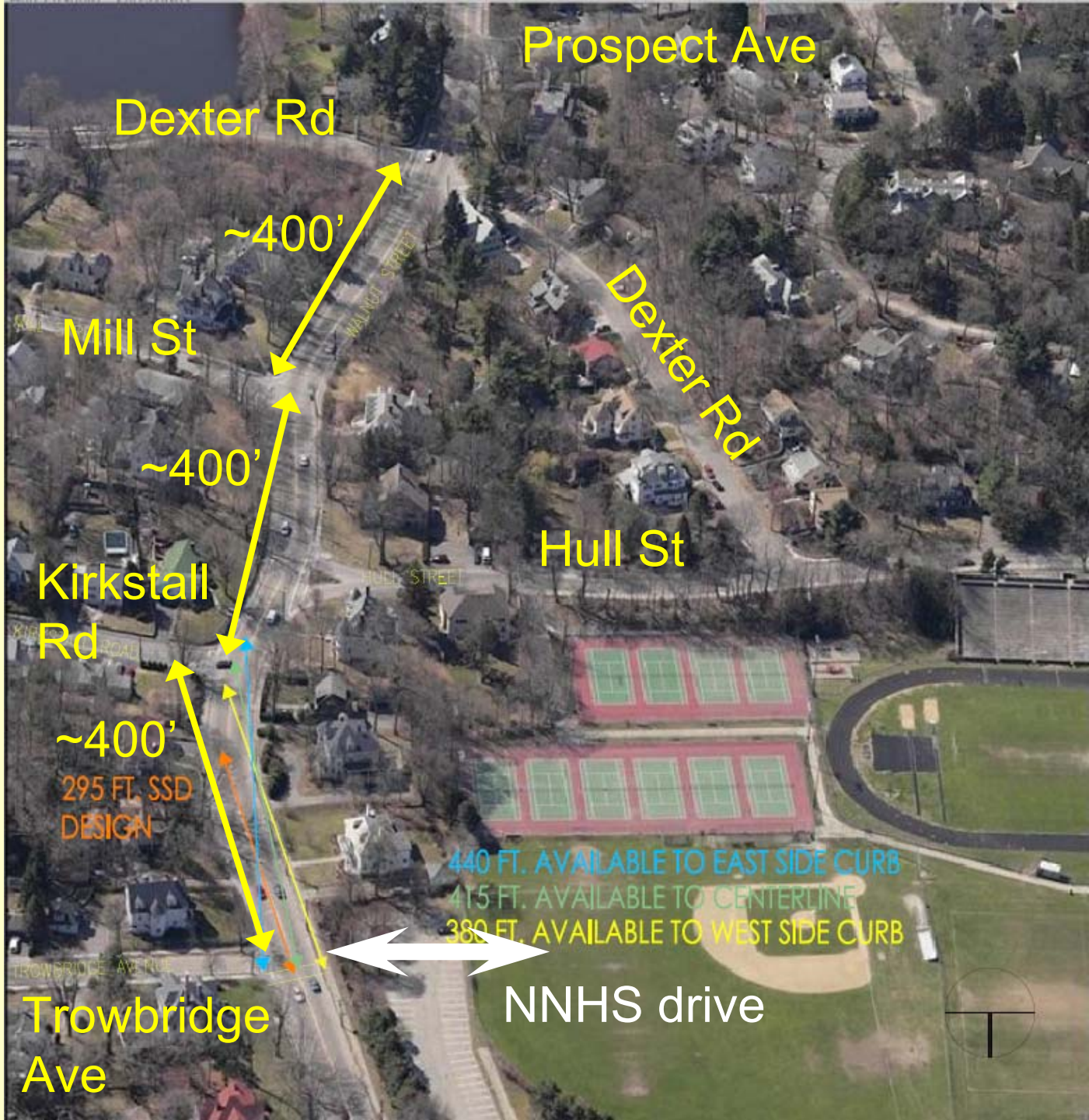
Board Order # 224-06, Condition # 4

4. “The Public Works Commissioner shall recommend to the Board of Aldermen possible street improvements to promote safety on Walnut Street from Mill Street to Cabot Street, including at the intersection of Hull Street and Walnut Street. Such street improvements might include, but not be limited to, signage and the narrowing of the intersection at Hull Street and Walnut Street. Such improvements as approved by the City shall be undertaken as soon as possible and in no event later than the Project's opening.”

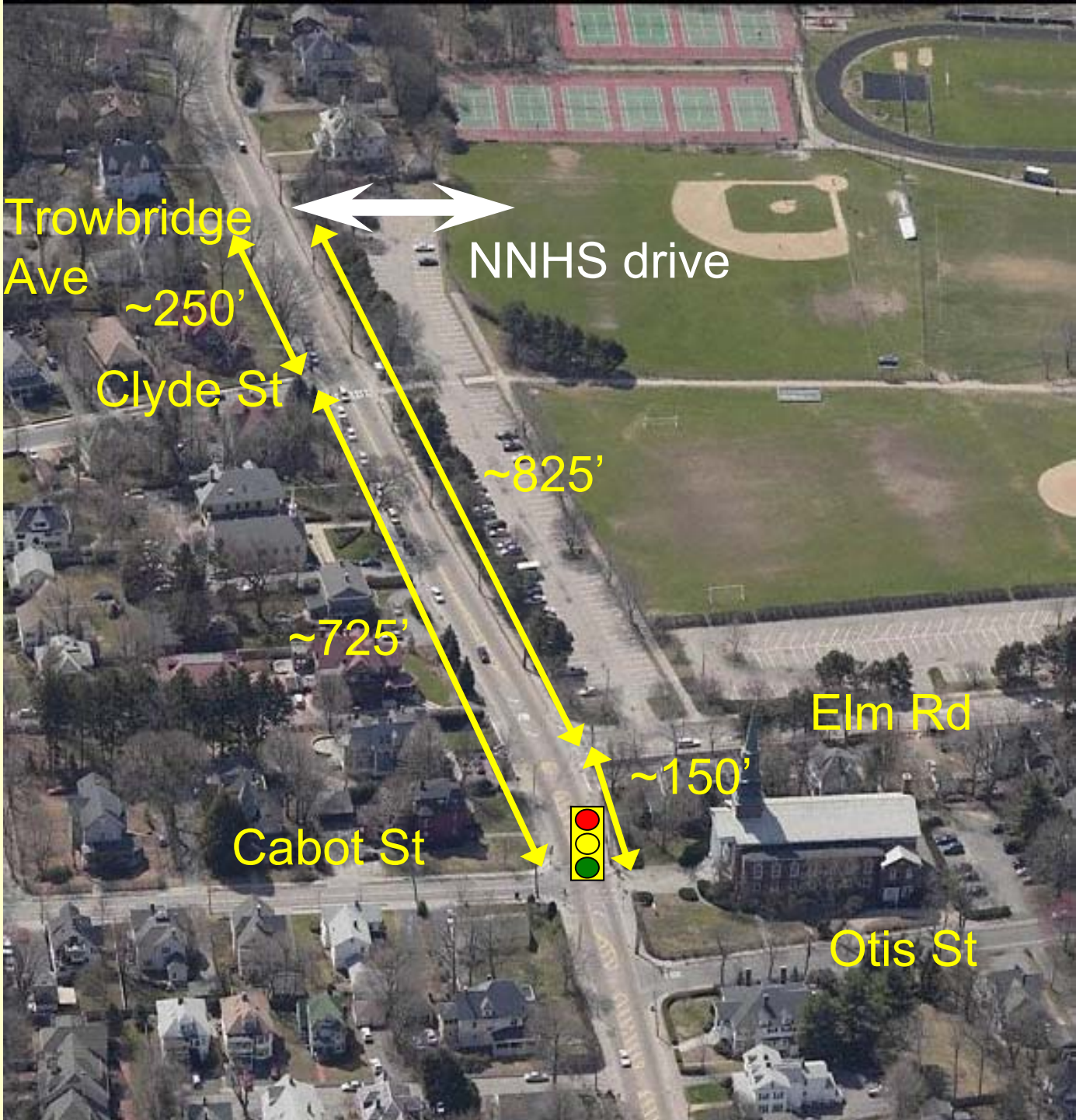
Walnut St near NNHS

- Approximately 15,000 cars per day
  - (vs. ~7,000 per day on Lowell Ave)
- 34’ wide +/-
- Speed limit is 25 mph
- Design speed is 40 mph

Walnut St. looking <u>south</u> from NNHS



Walnut St. looking north from NNHS



Walnut St @ Hull St

503
Kirkstall
Hull St
90 feet
508
515
Walnut St
NORTH
HULL ST.-WALNUT ST. INT
SCALE: 1" = 16'


Kirkstall
503
Hull St
~41 feet
508
515
Walnut St
NORTH
HULL ST.-WALNUT ST. INT
SCALE: 1" = 16'


503
18,227 S.F. EXISTING LOT AREA
850 S.F. +/- PROPOSED 'GREEN AREA'
HAY BALES REQ'D
ONE WAY
HULL ST.
WALNUT ST.
508
515
NORTH
HULL ST.-WALNUT ST. INT
SCALE: 1" = 16'

Board Order # 224-06, Condition # 5

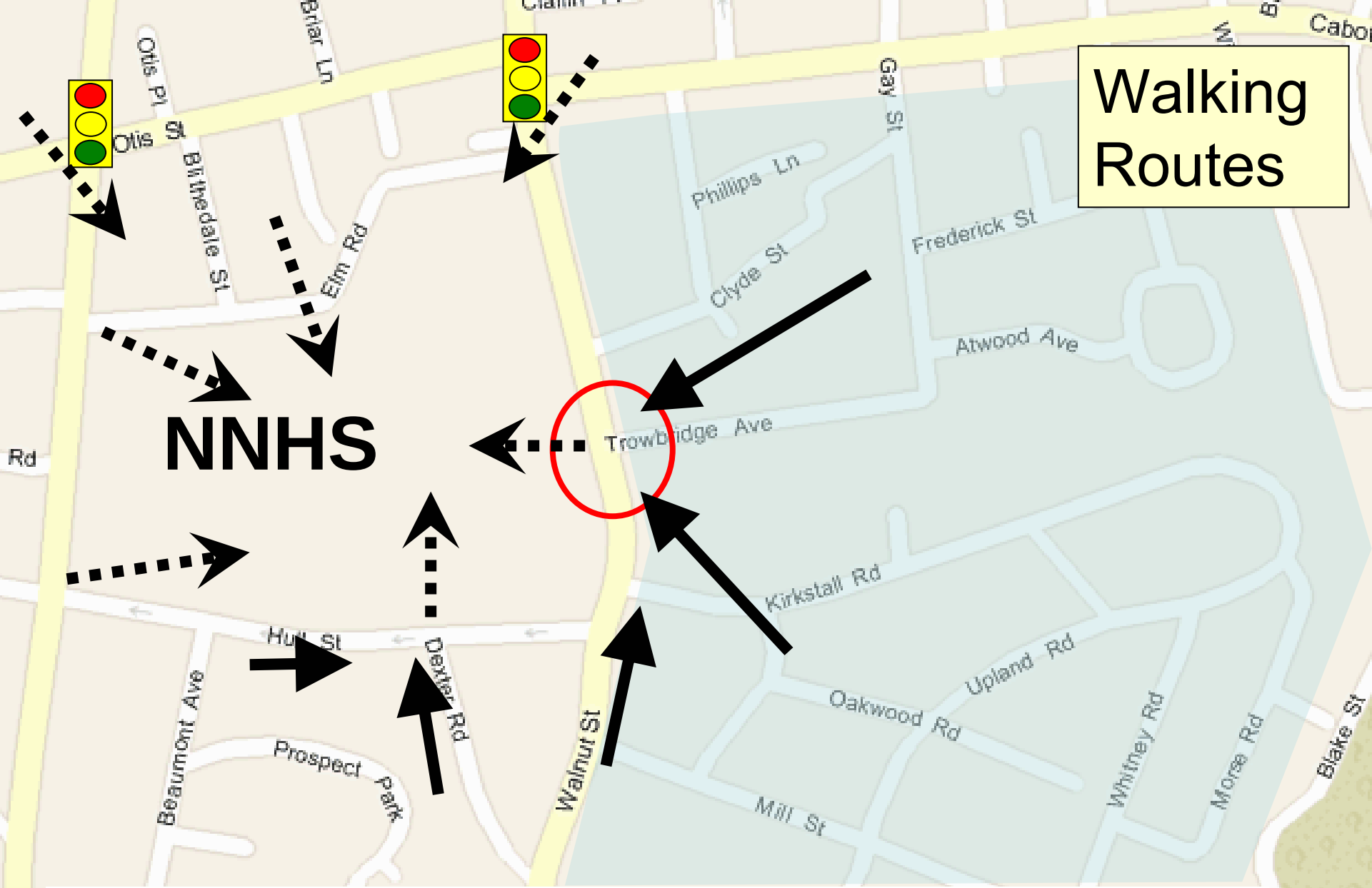
5. "The Design Team shall study the effect on traffic circulation if the turning movements are limited to a right turn into and out of the driveway to the project entrance on Walnut Street (Alt. 3,6), and shall also study providing a pedestrian crossing north of such driveway.

   (Alt 1-6)

   If the results of the said study so recommend, a traffic signal shall be considered by the City at such driveway. If approved by the Board of Aldermen, such signal shall be operational at the time of the Project's opening." (Alt. 2-6)

In other words…

- NNHS site plan Board approval + Jan ’07 referendum has already established location of a NNHS driveway across from Trowbridge Ave
- Condition # 5 asks:
  - Should school driveway turns be restricted to right-in and right-out only?
  - Should a pedestrian crossing be provided there?
  - Should there be a traffic signal at, or near the school driveway?
  - If yes, should it operate as a pedestrian crossing only, or for both pedestrians and vehicles?



A pedestrian crossing is less attractive the further it moves north from Trowbridge Avenue

NNHS Vehicle Trips

- Traffic study estimates 550-600 cars travel in/out of site during peak pick-up/drop-off hour
  - AM: 350 cars (60% in), 250 cars (40% out)
  - PM: 250 cars (40% in), 350 cars (60% out)
- Traffic assumptions
  - 5% increase over 2006
  - Counts from 2006 when NNHS had 2000+ students
- Geographic distribution:
  - 70% from North
  - 30% from South
- Focus on AM peak
  - Coincides with commuter peak
  - Higher peak in cars due to after school activities

NNHS 2008-2009: 1,865 Students

- Walk/bike (?%)
- School bus (13% have bus passes)
  - 18% (235) of 1,304 eligible > 1 mile away
  - Actual ridership is lower
- Carpool (?%)
- Drive alone (?%)
  - Drop-off or park off-site
  - Drop-off or park on-site

Walnut/NN driveway/Trowbridge Ave Alternatives

- Alt 1: No signal, no turn restrictions
- Alt 2: Mid-block pedestrian crossing signal, no turn restrictions
- Alt 3: Mid-block pedestrian crossing signal, w/ delta island
- Alt 4: Full signal, no turn restrictions
- Alt 5: Full signal, w/ no side street thru movement
- Alt 6: Full signal, w/ delta island


PLAY AREA
VISITOR DROP OFF
PARKING AREA
WALNUT STREET
CLYDE STREET
TROWBRIDGE AVENUE
Alt 1

Alternative 1: Painted Crosswalk

- Pros
  - Lowest cost
  - Less delay for Walnut Street
- Cons
  - No controlled crossing for pedestrians
  - Crossing location is less attractive for pedestrians
  - Long delays for vehicles to turn left onto Walnut St
  - Does not create gaps in Walnut St traffic for Elm Rd


PLAY AREA
PARKING AREA
TENNIS COURTS
HALKET STREET
CLYDE STREET
TROWBRIDGE AVENUE
Alt 2

Alternative 2: Mid-block Crossing Signal

- Pros
  - Improves pedestrian safety over Alt. 1
  - Helps create gaps in Walnut St traffic for Elm Rd
  - Lower cost than a full signal

- Cons
  - Crossing location is less attractive for pedestrians
  - Long delays for vehicles to turn left onto Walnut St


PLAY AREA
VISITOR DROP OFF
PARKING AREA
HALKET STREET
CLYDE STREET
Alt 3

Alternative 3: Mid-block Crossing Signal, with Delta Island

- Pros
  - Does not rely solely on enforcement to restrict turns
  - Helps create gaps in Walnut St traffic for Elm Rd
  - Lower cost than a full signal

- Cons
  - Crossing location is less attractive for pedestrians
  - Long delays for vehicles to turn left onto Walnut St
  - Increased traffic on Hull St (~60 cars during AM peak)
  - Confusing to visitors, buses, etc. arriving via northbound Walnut St


PLAY AREA
VISITOR DROP OFF
PARKING AREA
TENNIS COURTS
HALKET STREET
CLYDE STREET
TROWBRIDGE AVENUE
Alt 4

Alternative 4: Full Signal

- Pros
  - Controlled, more convenient crossing location for pedestrians
  - Helps create gaps in Walnut St traffic for Elm Rd
  - Provides controlled vehicle access onto Walnut St where delays can be managed
- Cons
  - Higher cost
  - Allows direct access from Trowbridge Ave


PLAY AREA
VISITOR DROP OFF
PARKING AREA
TENNIS COURTS
HALKET STREET
CLYDE STREET
CAMBRIDGE AVENUE
Alt 5

Alternative 5: Full Signal, with posted restrictions

- Pros
  - Controlled, more convenient crossing location for pedestrians
  - Helps create gaps in Walnut St traffic for Elm Rd
  - Provides controlled vehicle access onto Walnut St where delays can be managed
- Cons
  - Higher cost
  - Relies on enforcement to discourage access from Trowbridge Ave
  - Increased traffic on Hull St (~60 cars during AM peak)
  - Confusing to visitors, buses, etc. arriving via northbound Walnut St


PLAY AREA
VISITOR DROP OFF
PARKING AREA
TENNIS COURTS
HALKET STREET
CLYDE STREET
Alt 6

Alternative 6: Full Signal, with delta island

- Pros
  - Controlled, more convenient crossing location for pedestrians
  - Helps create gaps in Walnut St traffic for Elm Rd
  - Provides controlled vehicle access onto Walnut St where delays can be managed
  - Does not rely solely on enforcement to restrict turns
- Cons
  - Higher cost
  - Increased traffic on Hull St (~60 cars during AM peak)
  - Confusing to visitors arriving via northbound Walnut St

Midblock Crossing Alternatives (1,2,3)

- Pros
  - Less cost than a full signal
  - Provides signalized pedestrian crossing for Walnut St (2,3)
  - Helps create gaps in Walnut St traffic for Elm Rd

- Cons
  - Location ~65 feet north of driveway less attractive for pedestrians to use
  - Long delays for vehicles to turn left on Walnut St

Right In/Right Out Alternatives (3,6)

- Pros
  - Does not rely solely on enforcement to restrict turns
  - Less delay for cars to enter/leave school driveway
  - Discourages use of Trowbridge to access school
- Cons
  - Long delays for vehicles to turn left onto Walnut St
  - Shift of 60 cars during AM drop-off to Hull St, increased vehicle miles of travel
  - Does not allow left-turns in or out of the site, may complicate “wayfinding” for those unfamiliar with area

Full Signal Alternatives (4,5,6)

- Pros
  - Provides best location for pedestrian crossing
  - Provides controlled vehicle access onto Walnut St where delays can be managed
- Cons
  - Higher cost
  - Without island or new restrictions, provides direct access from Trowbridge Ave to school driveway