



Complete Streets in Constrained Corridors: Chicago's Central Loop BRT

NACTO Designing Cities Conference

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Luann Hamilton, Deputy Commissioner

What is BRT?

- Bus-based system that improves speed, reliability and passenger comfort
- Combines stations, vehicles, services, running ways and ITS into an integrated system
- Reliability of rail transit with flexibility of bus transit



Potential BRT Elements

- ✦ Exclusive Traffic Lanes
- ✦ Traffic Signal Priority
- ✦ Limited Stops
- ✦ Boarding Area Canopies
- ✦ Real Time Bus Arrival Signs
- ✦ Prepaid Boarding
- ✦ Streetscaping
- ✦ Wide Doors
- ✦ Bus Floor Level Boarding
- ✦ High Capacity



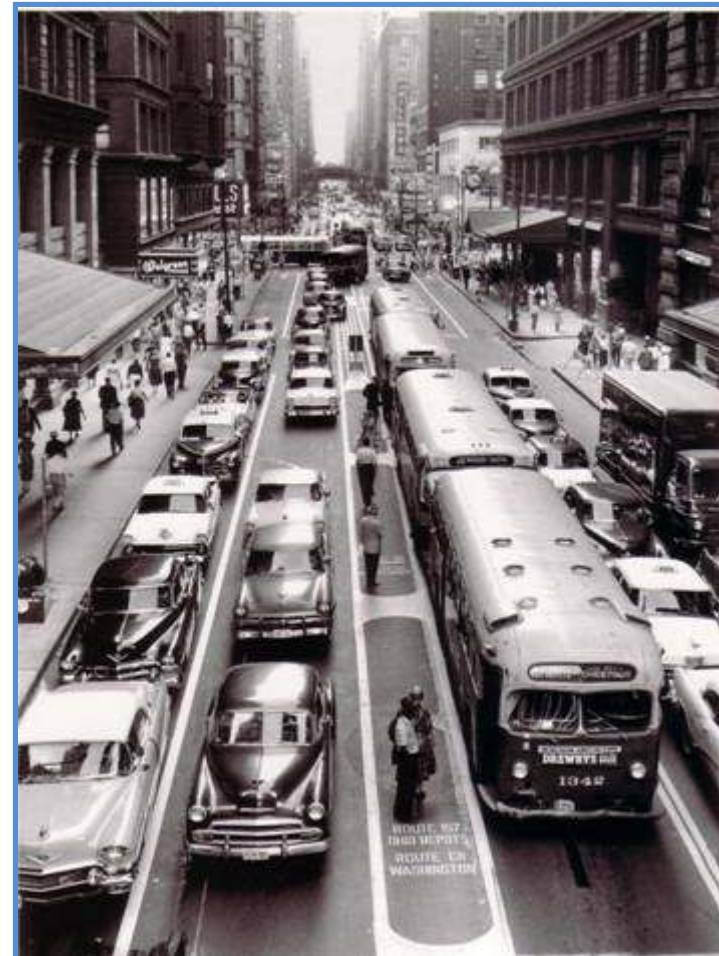
Metrobus, Mexico City



SBS New York City

BRT in Chicago

- ✦ First exclusive bus lane on Washington in 1939
- ✦ Jeffery Blvd. peak hour dedicated lanes later in 2012
- ✦ Central Loop BRT in 2014
- ✦ Western/Ashland BRT alternatives study underway
- ✦ A role between rail and bus levels of service



Central Area Plan

- ★ Transit Recommendations
 - ★ Increase CTA and Metra Rail and Bus Capacity into Downtown
 - ★ Provide improved transit distribution around downtown
 - ★ Improve intermodal connections including rail-to-rail and rail-to-bus
 - ★ Provide express rail service to the airports

Project Purpose

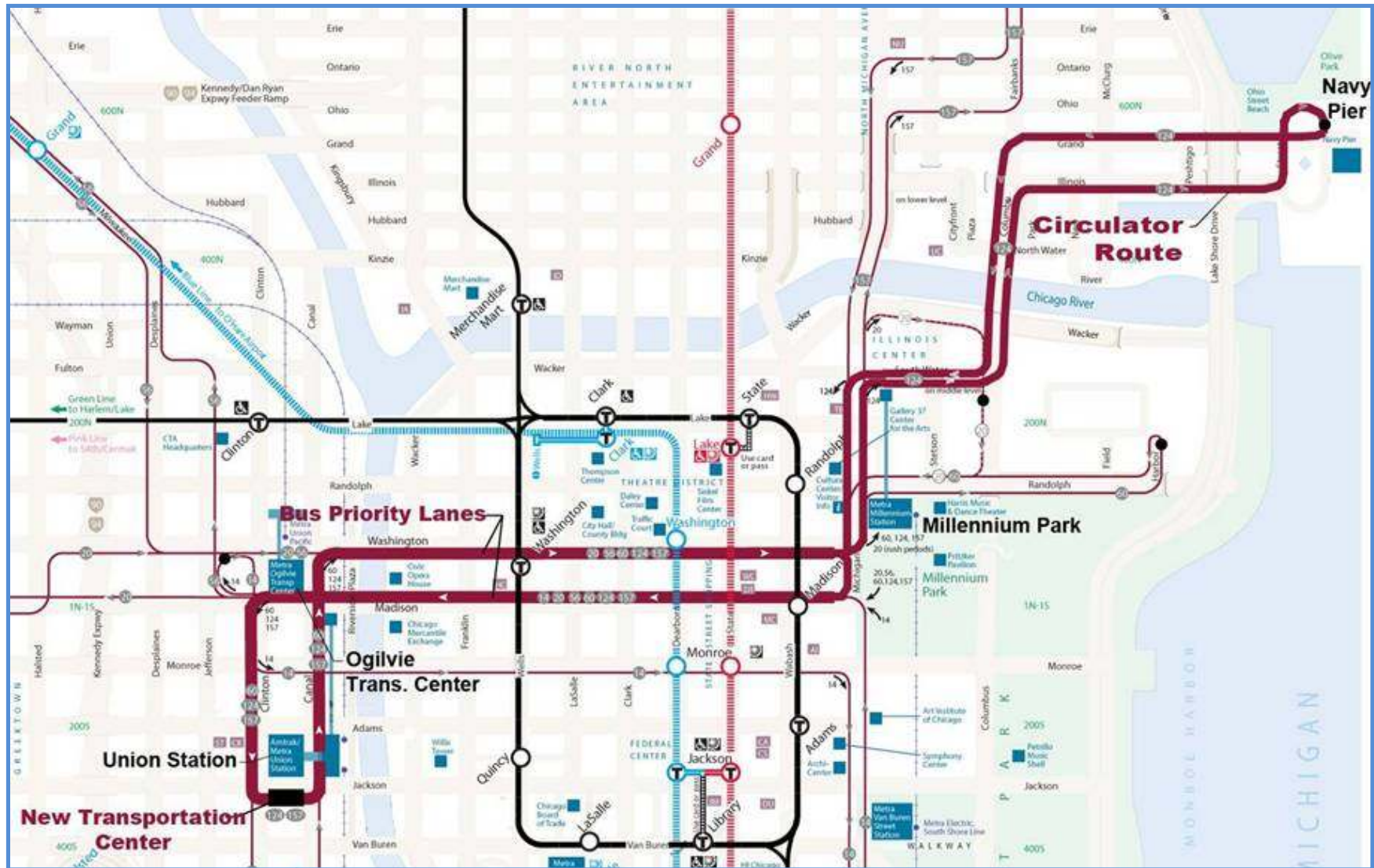
- Improve mobility in Central Area for residents, employees and businesses
- Provide faster, more reliable bus service
- Accommodate projected growth in trips
- Manage congestion
- Transit that is easy to use and understand
- Allow incremental improvements to service
- Build off of existing infrastructure
- Intermodal connections including rail-to-rail and rail-to-bus

FTA-Funded Work Plan

- * Bus Priority Lanes
 - * Tinted lanes on Madison, Washington, Canal, Clinton for six bus routes
 - * BRT Stations for level boarding
 - * Enhanced Enforceability and signal timing
- * Union Station Transit Center
 - * Sheltered boarding platforms for at least 6 CTA routes
 - * Connects to existing pedway under Jackson (by Track 2)
- * Branded, Enhanced “Urban Circulator” Bus Service
 - * Ogilvie & Union Stations to Navy Pier
- * Video screens with Bus Tracker and other travel info
- * Improvements for Pedestrians & Cyclists



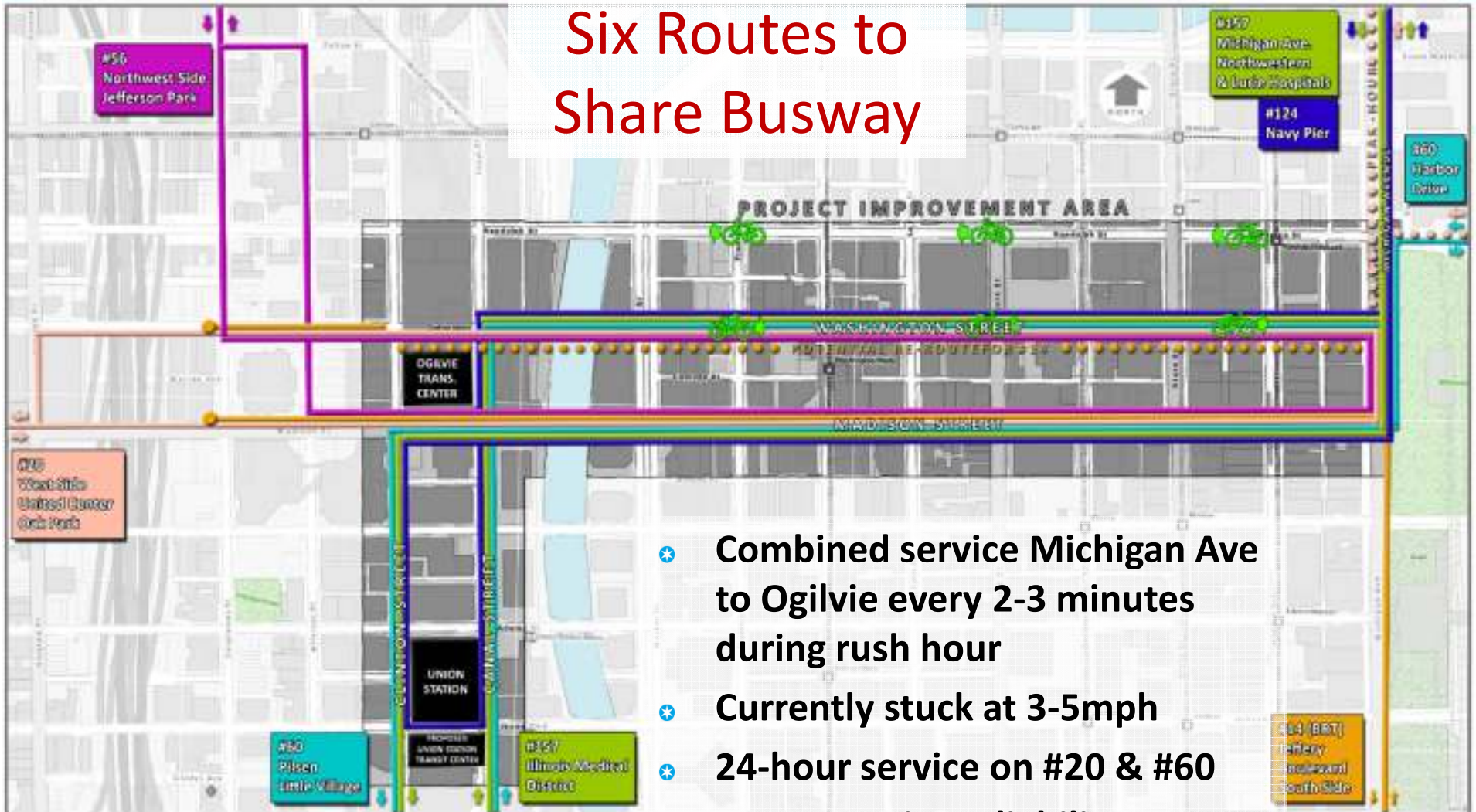
Metra-Navy Pier Circulator Route



Buses, Bikes, Parking, Cars?

- ✦ Four elements compete for street space
- ✦ Separation of modes key to safety and efficiency
 - ✦ Dedicated bus lanes
 - ✦ Dedicated bike lanes, cycle tracks
 - ✦ Buffer zones for parking
 - ✦ Turn Lanes
- ✦ Loop is a 400' x 450' grid of one-way & two-way streets
 - ✦ “Shoehorn” all competing elements on every street?
 - ✦ Balance elements across the Loop as a whole?

Six Routes to Share Busway



- * Combined service Michigan Ave to Ogilvie every 2-3 minutes during rush hour
- * Currently stuck at 3-5mph
- * 24-hour service on #20 & #60
- * Better service reliability en route to destinations citywide
- * Also used by United Center Exp. and parts of other routes

E-W Loop Streets (existing)

	Randolph	Washington	Madison	Monroe	Adams	Jackson
Direction	WB	EB	WB	EB	WB	EB
Width	48'	48'	43'	38'	38'	38'
Travel & (Turn) Lanes	3(1)	3(1)	2(1)	2	2	2
Bus Lanes	0	2.5/8 blocks	4.5/8 blocks	0	5/8 blocks	2.5/8 blocks
Bike Lanes	0	0	1	0	0	0

E-W Loop Streets (existing)



Monroe (east of Franklin)



Adams (west of Michigan)



Jackson (west of Franklin)



Monroe (east of Dearborn)

LEFT Pay-to-Park (1 block): Franklin to Wells
 LEFT Off-Peak Loading: LaSalle to Clark
 RIGHT Valet (1 car): Italian Village (btw Clark & Dearborn)
 LEFT Loading (4 cars): Bank of America Theater (btw State & Dearborn)
 LEFT 15-Min. Standing (2 cars): 6 E. Monroe (btw State & Wabash)
 RIGHT Valet (1/2 block): Palmer House (btw State & Wabash)
 LEFT Valet (1/2 block): University Club (btw Wabash and Michigan)



Adams (west of Dearborn)

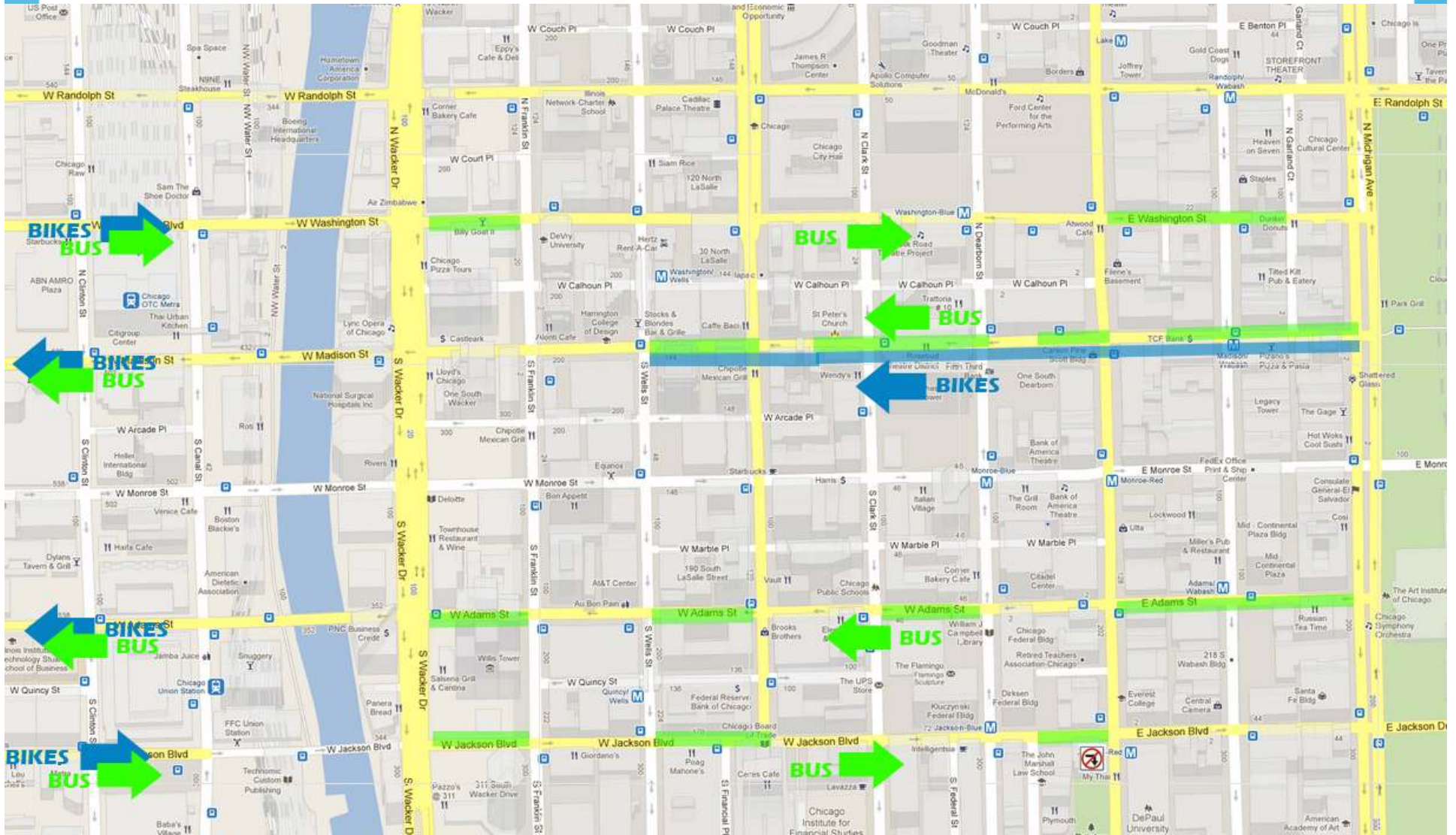
LEFT Pay-to-Park (1 block): Michigan to Wabash
 LEFT turn bay (1 block): Dearborn to Clark
 LEFT Valet (4 cars): Club Quarters w/o Clark
 RIGHT Valet (4 cars): W Hotel btw LaSalle & Wells (INSIDE BUS LANE)
 LEFT Free Off-Peak Parking: LaSalle to Wells (old)



Jackson (east of Wells)

LEFT Handicapped (3 cars): 216 W Jackson (btw Franklin & Wells)
 LEFT Free Off-Peak Parking (1/3 block): e/o State (old)

Existing Bus & Bike Lanes



CHICAGO DEPARTMENT
OF TRANSPORTATION

E-W Loop Streets



- * BUS
 - * Primary EB BRT Route = Washington
 - * Primary WB BRT Route = Madison
 - * Existing bus lanes on Adams & Jackson remain
- * BIKE
 - * Bike lane on Madison?
 - * Dedicated lanes or Cycle Track on Monroe?
 - * Dedicated lanes or Cycle Track on Adams & Jackson? (avoid ex. turn bays and parking/loading)
 - * No dedicated striping for bikes on Washington?
 - * What about Randolph?
- * CAR
 - * Minimum of 2 travel lanes for each roadway
 - * Consider turn restrictions case-by-case
- * PARKING
 - * Consider Pay-to-Park relocations case by case

Design Concepts Developed

- 3 design concepts with varying degrees of separation between buses, bikes and regular traffic lanes:
 - Option 1 - Basic
 - Option 2 - Balanced
 - Option 3 - Focused
- Final design may combine elements of different options

Option 1 - Basic

On Washington & Madison:

- ✦ Bus Lane on right curb
- ✦ Left turns cross Bike Lane
- ✦ Right turns enter Bus Lane
- ✦ Queue Jump signals at selected intersections
- ✦ Protected Bike Lane on Washington, regular Bike Lane on Madison



Example - Washington



Example - Madison

Option 2 – Balanced

On Washington:

- * Bus Lane adjacent to Bike
- * Island Boarding Platforms
- * Buffered from Auto Lanes
- * 2-Thru Auto Lanes with Turn Lane Pockets
- * Curbside Protected Bike Lane

On Madison:

- * Bus and Auto Lanes similar to existing
- * Curb Extension Boarding Platforms
- * 2-Thru Auto Lanes with Turn Lane Pockets
- * Bike facilities relocated to Protected Bike Lane on Randolph



Example - Washington



Example - Madison

Option 3 - Focused

- * Bi-directional Busway on Madison
- * No Thru Vehicular Traffic (moves to Randolph & Adams)
- * Single, Intermittent Access Lane to Alleys and Garages
- * Block-long Curb extensions for Boarding Platforms and public open space
- * Protected bike lanes on Washington and Randolph
- * *NOTE: Requires outside funding beyond current grant.*



Example - Madison



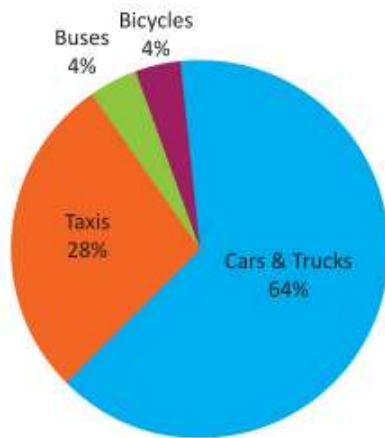
Example - Washington/Randolph

Evaluation of Options:

Factors to consider

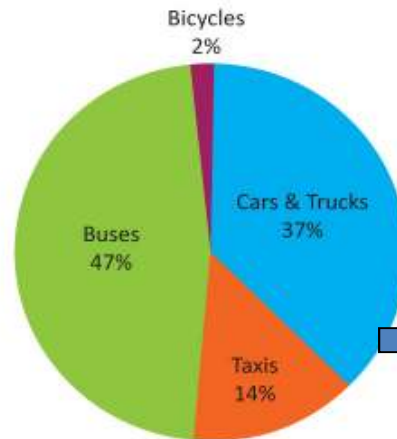
- ✦ Travel time savings of bus service
- ✦ Traffic Impacts
- ✦ Parking and Curb Use Impacts
- ✦ Benefits or Impacts for Pedestrians
- ✦ Capital Cost
- ✦ Ridership
- ✦ Stakeholder and civic acceptance

Traffic Stats



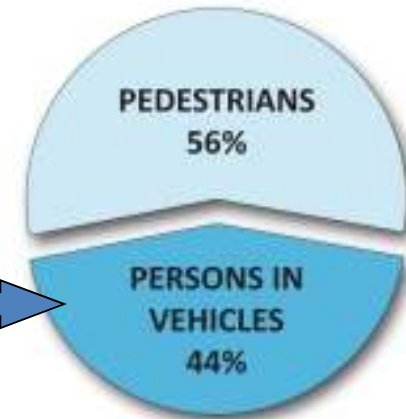
Vehicles

*Traffic on Washington & Madison
between Clark & LaSalle*



Persons in Vehicles

*On Washington & Madison between
Clark & LaSalle*



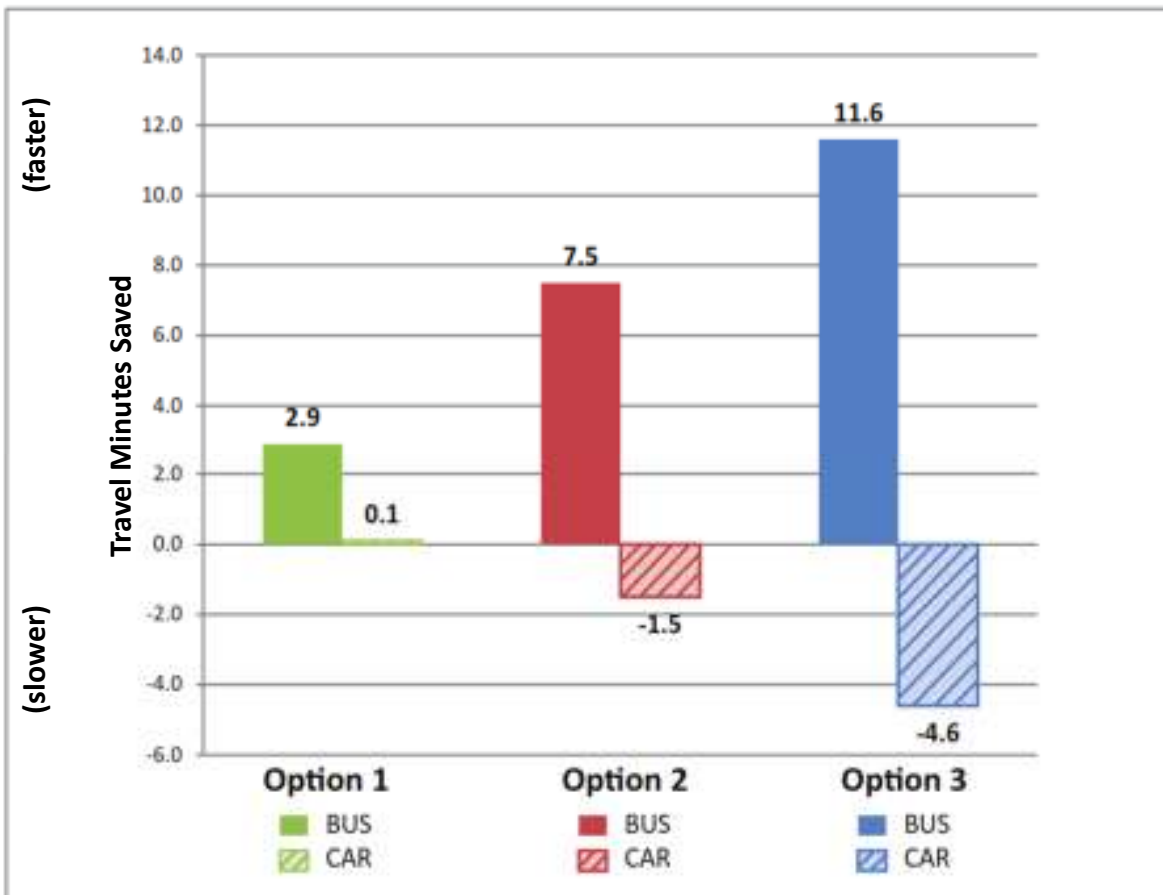
Daily Volumes

	Vehicles	Pedestrians
Washington	14,000	27,000
Madison	11,000	16,000
Canal	11,000	5,000
Clinton	4,000	5,000

Traffic Facts

- Cars and trucks represent 64% of the traffic mix but only carry 37% of the total trips made by people across the Loop. Taxicabs are similar, being 28% of the traffic mix while carrying only 14% of trips.
- Because a single bus can carry so many people, while buses are only 4% of the total traffic mix they carry 47% of the trips made by people across the Loop in vehicles – a much more efficient means of travel.
- BRT improvements could improve overall bus travel times through the Central Loop corridor roadways by 3 to 9 minutes.
- BRT improvements such as dedicated lanes could reduce bus-related crashes by over 50%.

Total round-trip travel time benefit



Net average user benefit

(47% Bus; 51% Car/Taxi)

Option 1: +1.41 min

Option 2: +2.76 min

Option 3: +3.11 min

Bus Travel Time Savings are a factor of introducing:

- Dedicated Bus Lanes
- Turn Restrictions
- Optimized Traffic Signals
- Increased Stop Spacing
- Queue Jumps for Buses
- Level Boarding Platforms

Benefits and Drawbacks

- * Option 1 - Basic
 - * Benefits: Simplest to install, fewest impacts, within grant.
 - * Drawbacks: Fewest benefits to transit users
- * Option 2 – Balanced
 - * Benefits : Most cost-effective, looks like a real improvement without dramatic change to traffic; closest scope to current grant amount.
 - * Drawbacks : Greatest amount of curb use impacts to be resolved
- * Option 3 – Focused
 - * Benefits : Most like rail transit, best separation of bus from auto, creates new pedestrian and public space at corners
 - * Drawbacks : More expensive, disruptive to westbound motorists, requires additional outside funds beyond current grant

Selected: Option 2 – Balanced



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NOTES

CTA BRT Preferences

1. Lane width requirements
 - Preferred: 12'; Minimum: 11'
 - 12' Berthing, 13' Passing
2. Do not remove existing bus lane on Madison
3. Need to keep #20 Madison and #56 Milwaukee on Madison. May consider moving circulator and other routes to Randolph.
4. Washington must be the EB BRT Route
5. Either relocate existing bike lane on Madison to left side of the street or remove it completely from the corridor.
 - Providing better bike facility on parallel corridor could lessen the need to accommodate bikes specifically on Madison
6. No shared bus/bike lanes downtown (keep to separate, dedicated facilities)
7. Curbside/bumpout boarding platforms preferred over median boarding
8. Must allow accommodations for buses to pass
9. Need enforcement of bus lanes.

Bike Preferences (CDOT)

1. Protected Bike Lanes (Cycle Track)
 - Mayor's initiative for 100 miles of Cycle track in 4 years
 - 11' preferred width (7' bike lane, 4' separation)
 - 8' minimum width (5' bike lane, 3' separation)
 - If parking is necessary, put cycle track between curb and parking
 - If lane is to be on the left, it must be protected
2. Dedicated Striped Lane
 - 6' preferred width
 - 5' minimum width (assuming gutter does not interfere)
 - Standard bike lane placement on right side of travel lanes
 - No part-time bike lanes
3. Shared Bus & Bike Lane
 - 21' preferred (12' bus, 6' bike, 3' separation)
4. General
 - Bikes will go all the way to their final destination regardless of accommodations.
 - Concentrating amenities on a specific corridor may have some effectiveness but will not pull all bikers away from parallel corridors
 - Cycle tracks currently being considered on Randolph (WB), Des Plaines (SB), and Jefferson (NB)

Car Preferences (CDOT)

1. CDOT requirements are already a compromise
 - AASHTO/IDOT preferred lane width 12'
 - Typical minimum lane width 11'
 - Minimum through lane width 10' (only allowed case-by case)
 - Minimum turn lane width 9' (only when no other alternative!)
 - Turn lanes need 10:1 tapers
2. Must provide access to alleys, driveways, and loading zones
3. Two travel lanes must be provided so blockages do not cripple the system
4. With current traffic volumes, 2 or 3 travel lanes are typically needed

Car Preferences (continued)

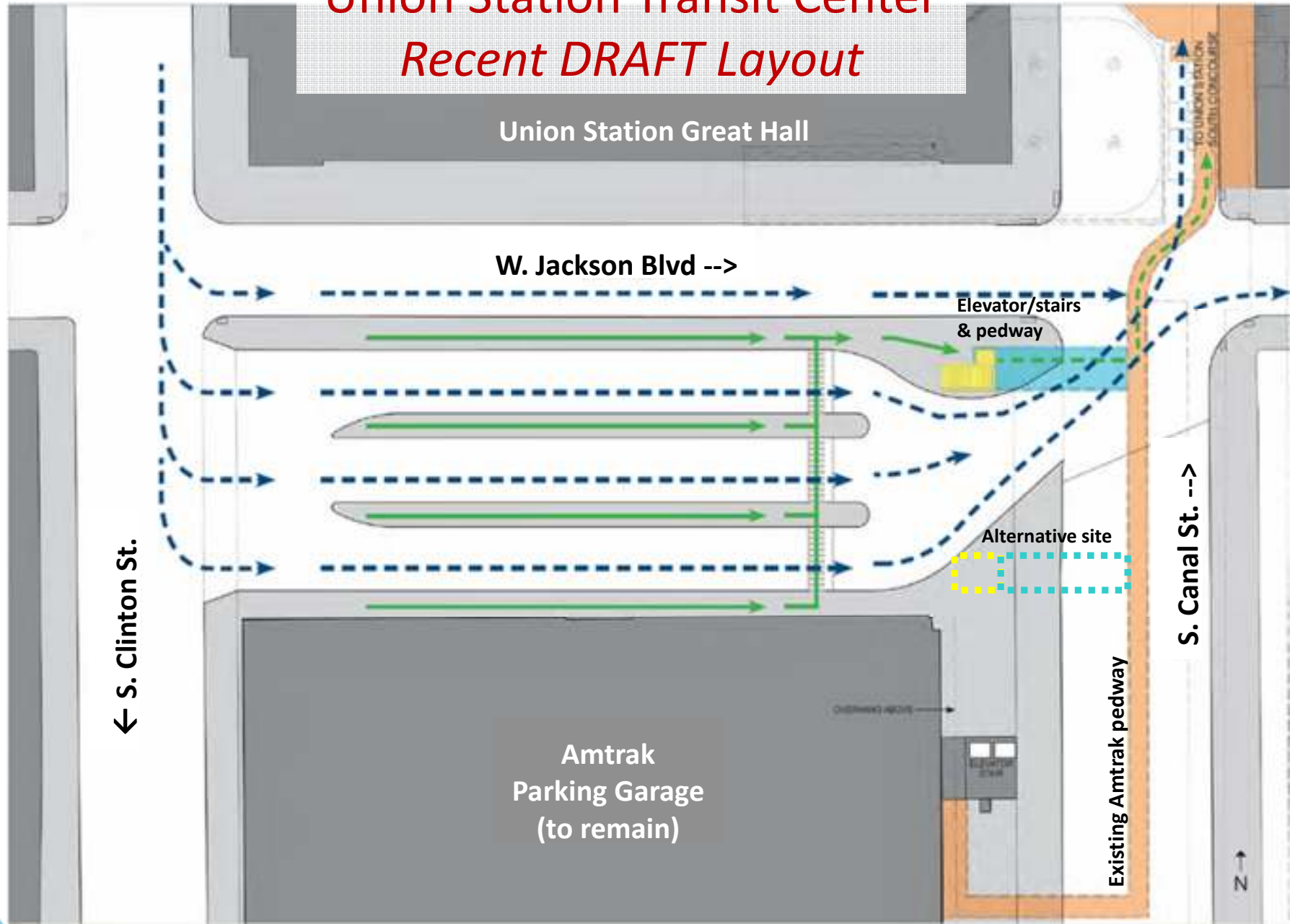
5. Left and Right turn bays

- Provide an area for cars to queue as pedestrians cross
- Allow through movements to pass
 - Length of turn bay designed to queues, with absolute min. length = 60'
 - Backups from turns spilling back into through lanes are a primary source of congestion
- Elimination of turns may:
 - Inconvenience businesses
 - Put additional burden on other turn movements

Curbside Preferences

1. General Dimensions
 - 8' preferred width
 - 7' minimum width
2. Pay-to-Park Spaces
 - Leased by LAZ
 - Contract requires removals or relocations to be compensated with revenue-neutral alternatives or cash reimbursement
3. Handicapped Spaces
 - Residential Spaces paid for by applicant (set up plus annual fee)
 - Requires Aldermanic approval to remove or relocate
 - ADA compliance is a top priority
4. Loading Zones
 - Set up and annual maintenance fee paid for by applicant.
 - Requires Aldermanic approval to remove or relocate
 - Loading zones can be critical to business operations (hotels)

Union Station Transit Center *Recent DRAFT Layout*



Union Station Transit Center

Original concept design



DRAFT

TERRY GUEN DESIGN ASSOCIATES
APRIL 26, 2007