Community Transportation Service Delivery Methods

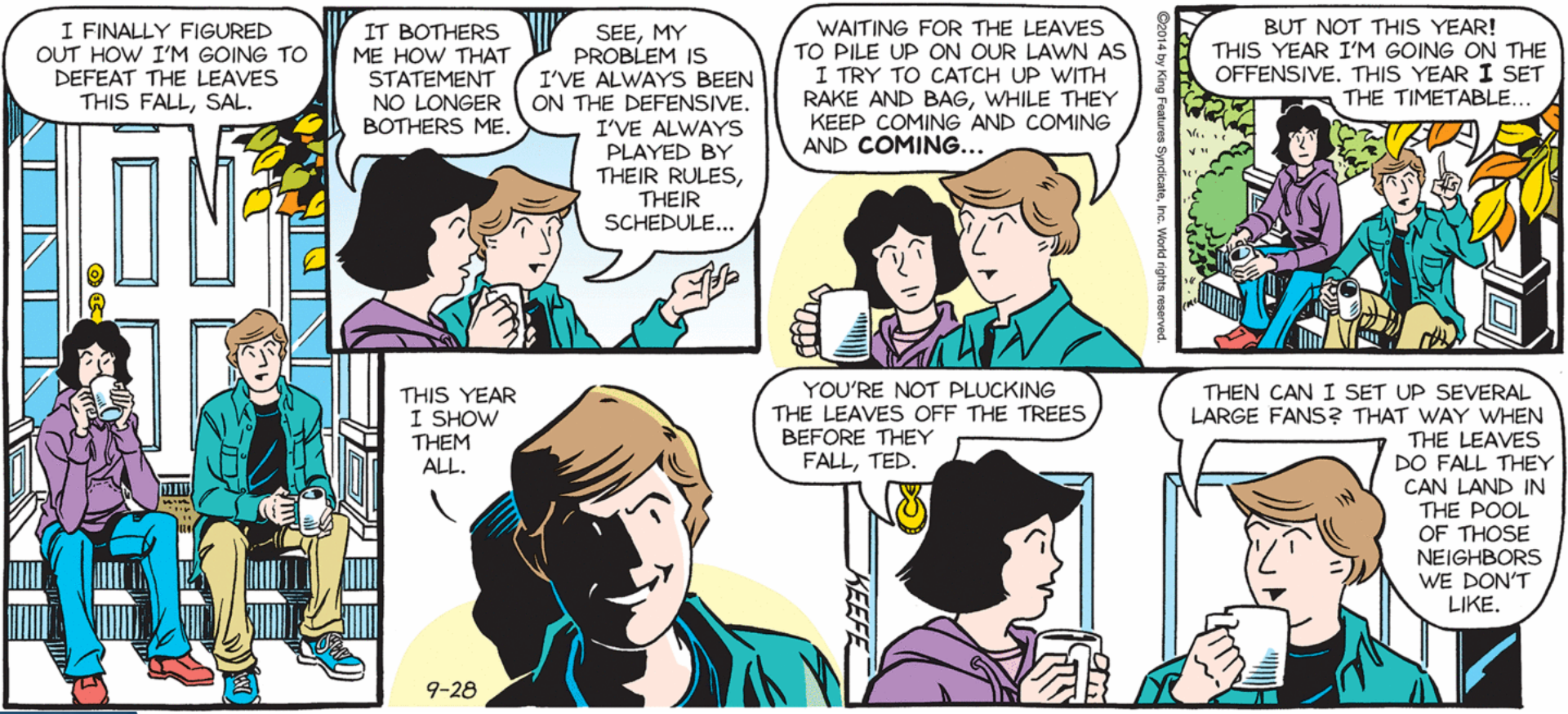
Kai Monast

NCSU-ITRE

kcmonast@ncsu.edu

919.515.8768

ITRE


I FINALLY FIGURED OUT HOW I'M GOING TO DEFEAT THE LEAVES THIS FALL, SAL.
IT BOTHERS ME HOW THAT STATEMENT NO LONGER BOTHERS ME.
SEE, MY PROBLEM IS I'VE ALWAYS BEEN ON THE DEFENSIVE. I'VE ALWAYS PLAYED BY THEIR RULES, THEIR SCHEDULE...
WAITING FOR THE LEAVES TO PILE UP ON OUR LAWN AS I TRY TO CATCH UP WITH RAKE AND BAG, WHILE THEY KEEP COMING AND COMING AND COMING...
©2014 by King Features Syndicate, Inc. World rights reserved.
BUT NOT THIS YEAR! THIS YEAR I'M GOING ON THE OFFENSIVE. THIS YEAR I SET THE TIMETABLE...
THIS YEAR I SHOW THEM ALL.
9-28
YOU'RE NOT PLUCKING THE LEAVES OFF THE TREES BEFORE THEY FALL, TED.
KEEFE
THEN CAN I SET UP SEVERAL LARGE FANS? THAT WAY WHEN THE LEAVES DO FALL THEY CAN LAND IN THE POOL OF THOSE NEIGHBORS WE DON'T LIKE.

ITRE

Service Delivery Methods

- Fixed Route, Fixed Schedule
- On-Demand
- Route Deviation
- Point Deviation
- Demand Responsive Connector
- Request Stops
- Flexible Route Segments
- Zone Routes
- Blended

ITRE

CUE Score

- Customer Convenience (C)
- Understandability (U)
- Efficiency (E)
- 5 is best, 1 is worst

C	U	E
1	3	5

ITRE

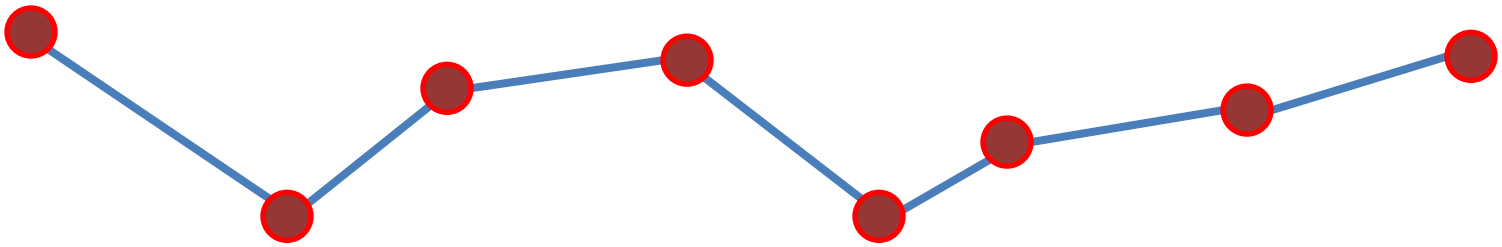
Fixed Route, Fixed Schedule

- Vehicles operate on a repetitive, fixed schedule along a specific route, stopping to pickup and deliver passengers to specific locations
  - Each fixed route trip serves the same origins and destinations

C	U	E
1	5	5

National Transit Database, http://www.ntdprogram.gov/ntdprogram/Glossary.htm

Fixed Route, Fixed Schedule



Stop

Route

Stop	Time
1	9:00
2	9:07
3	9:12
4	9:19
5	9:23
6	9:27
7	9:31
8	9:35

GTFS= General Transit Feed Specification

ITRE

Ideal When…

- Origins/Destinations are close to the route
- Passengers can travel a reasonable distance to reach the stop locations along the fixed route and travel from the stop to the destination

ITRE

Interesting Facts:

- Typically, there is a ¼ mile buffer for expected walking distance
- Even if the origin/destination is within a walkable distance, is there a pedestrian network that allows walking?

ITRE

Demand Response

- Passengers make requests to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. A demand response (DR) operation is characterized by:
  - The vehicles do not operate over a fixed route or on a fixed schedule except, perhaps, on a temporary basis to satisfy a special need

National Transit Database, http://www.ntdprogram.gov/ntdprogram/Glossary.htm

ITRE

Demand Response

- Typically, the vehicle may be dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations
- May even be interrupted en route to these destinations to pick up other passengers

C	U	E
5	1	1

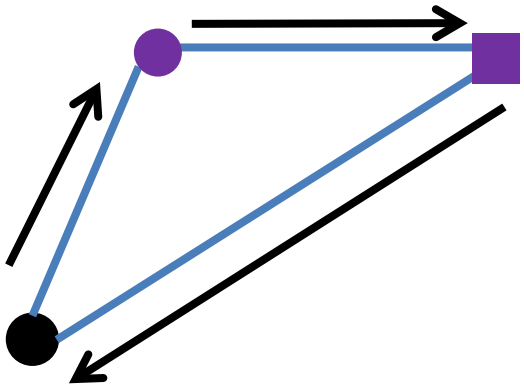
ITRE

Most Useful When…

- It is not cost-effective to provide any other kind of service (LAST RESORT!)
  - **Or, customer convenience is most important**
- Origins/destinations are far apart from one another (i.e. no “clusters”)
- Passenger pickup/drop off times are spread apart

ITRE

Demand Response

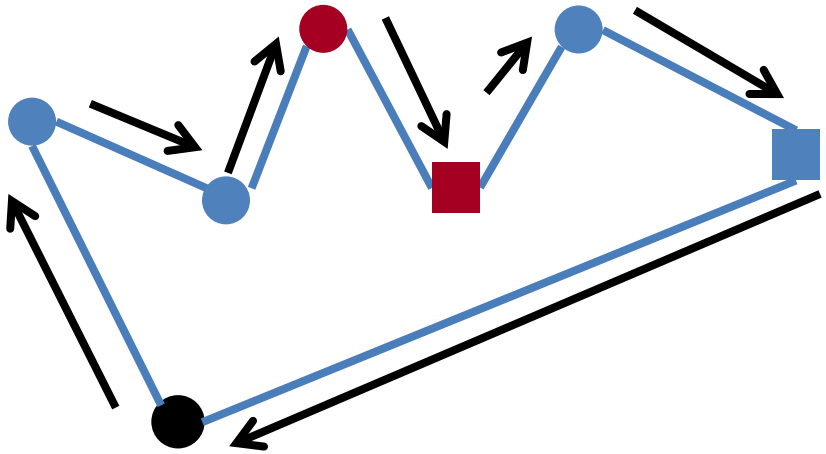


Typical Subscription Route

- Transit System Location
- A single passenger's home
- Destination

ITRE

Demand Response



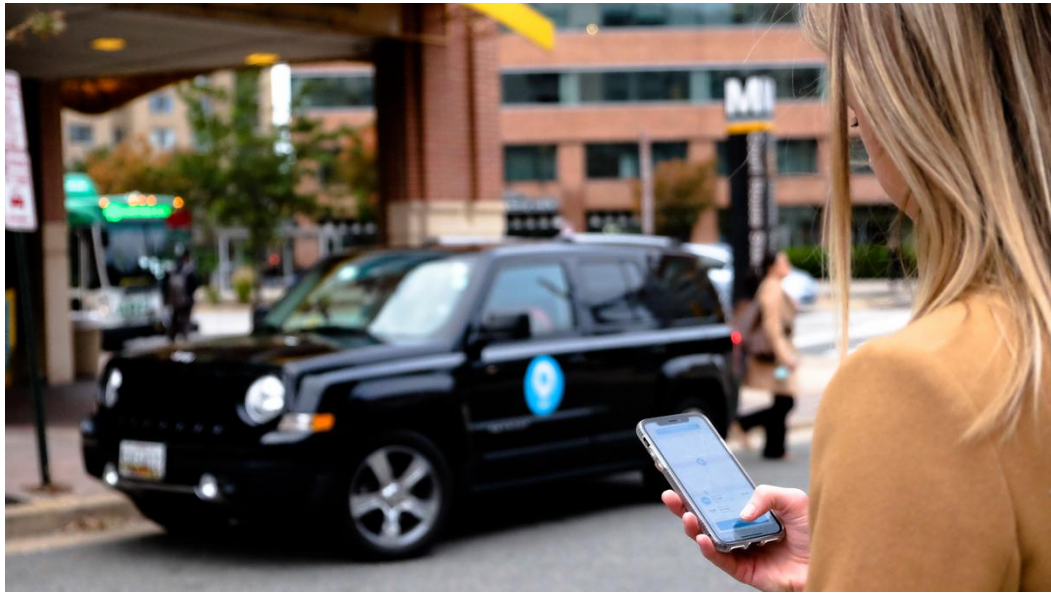
Typical Subscription Route with insertions of demand response requests

- Transit System Location
- A single passenger's home
- Destination

ITRE

On Demand

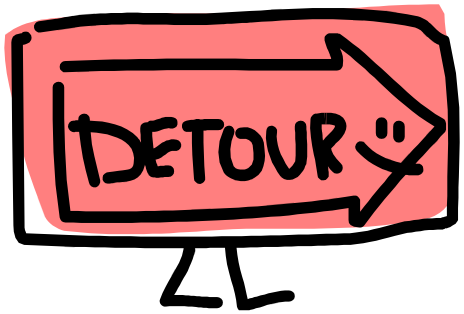
- Real-time demand response service that requires no prior reservation
- Numerous operational setups, but most:
  - Customers request rides using smart devices
  - Pay without cash



Bizjournals.com

Route Deviation

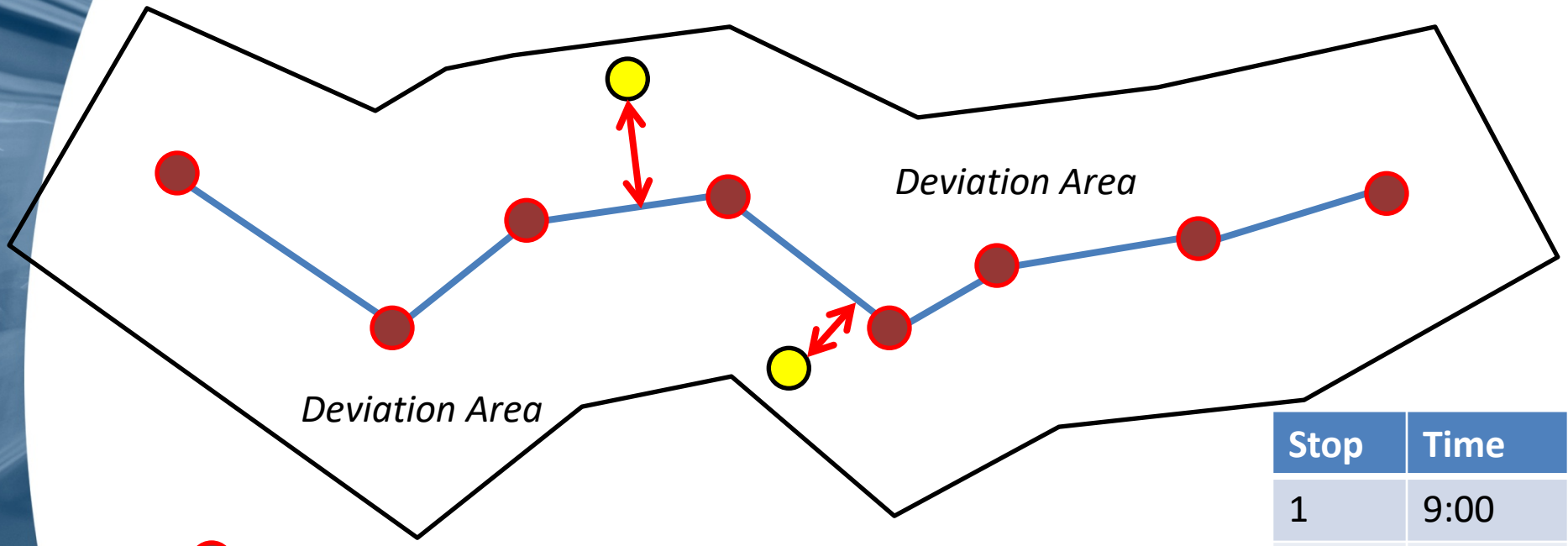
- Vehicles operate on a regular schedule along a well-defined path, with or without marked bus stops, and deviate to serve demand-responsive requests within a zone around the path. The width of extent of the zone may be precisely established or flexible.



C	U	E
3	3	4

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Route Deviation



Stop

Fixed Route

Deviation Area

Requested Deviation

Deviation Path at Right Angles to Route

Stop	Time
1	9:00
2	9:07
3	9:12
4	9:19
5	9:23
6	9:27
7	9:31
8	9:35

ITRE

Route Deviation is Ideal When…

- Origins/Destinations are close to the route (as in Fixed Route, Fixed Schedule)

… **EXCEPT** a few lie outside the "cluster" and these passengers can **NOT** travel a reasonable distance to reach the stop locations along the fixed route and travel from the stop to the destination

Here's An Idea:
Build in time for deviation in the schedule!

ITRE

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Route Deviation is the Most Common Flexible Service

According to a study about Flexible Transit Services:

Type of Flexible Service	Number of Transit Systems
Route deviation	**12**
Point deviation	3
Demand Response	6
Request Stops	4
Flexible route segments	2
Zone route	1
Total transit systems reporting	24
Total service types reported	28

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

ITRE

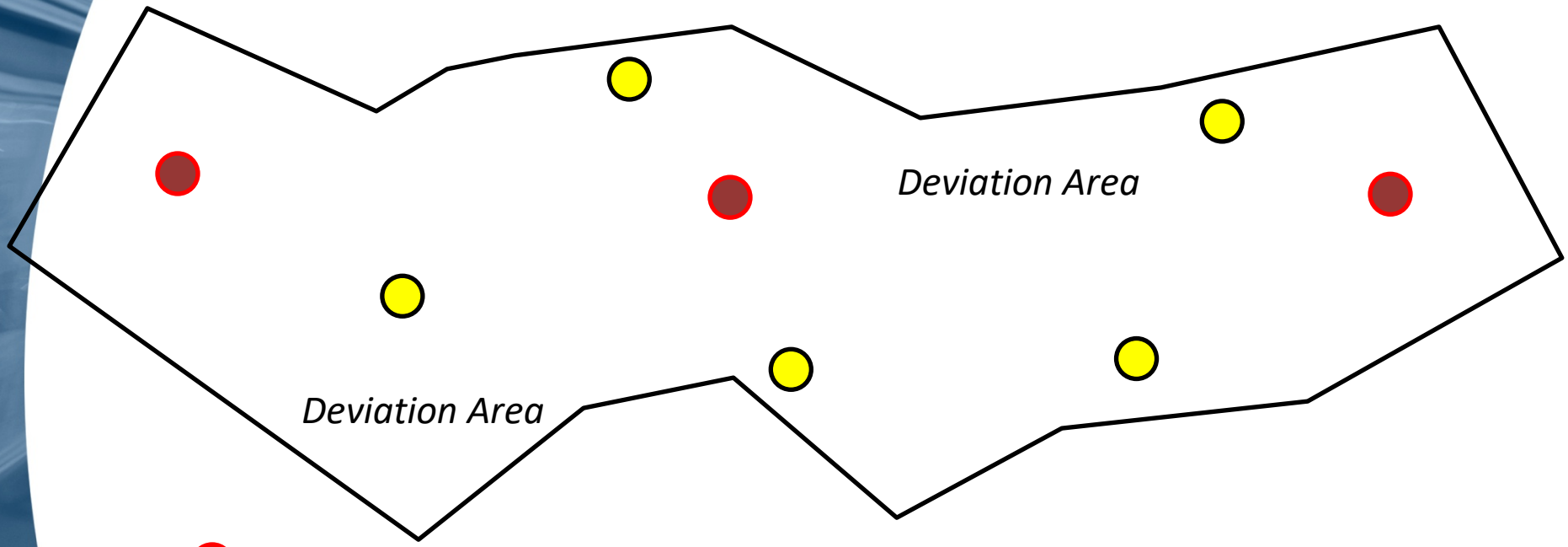
Point Deviation

- Vehicles serve demand-responsive requests within a zone and also serve a limited number of stops within the zone, without any regular path between the stops.

C	U	E
4	2	3

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Point Deviation



Stop

Deviation Area

Requested Stop

Stop	Time
1	9:00
2	9:25
3	9:45

ITRE

Point Deviation is Ideal When…

- Origins/destinations do not reside in "clusters", and transportation to stops is required
- Key hubs exist (i.e. Grocery Stores, Malls, Hospitals)

Here's An Idea:
You could use your subscriptions as the foundation of your stop schedule!

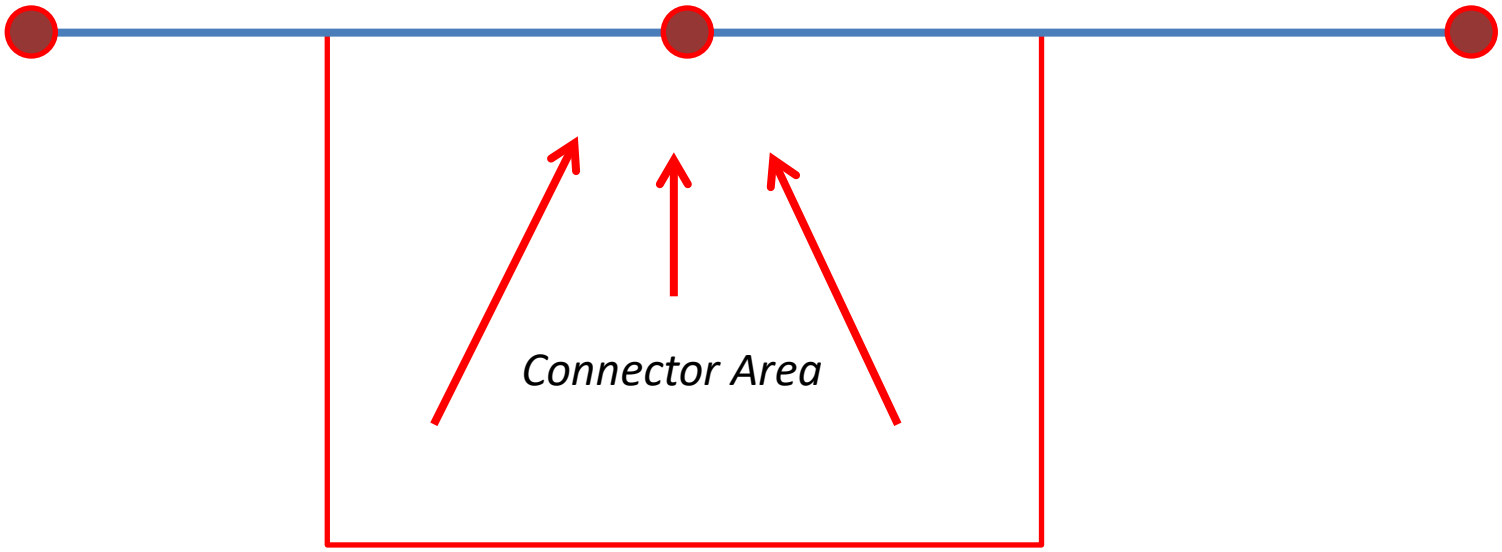
ITRE

Demand Responsive Connector

- Vehicles operate in demand-responsive mode within a zone, with one or more scheduled transfer points that connect with a fixed-route network. A high percentage of ridership consists of trips to or from the transfer points.

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Demand Responsive Connector



Fixed Route

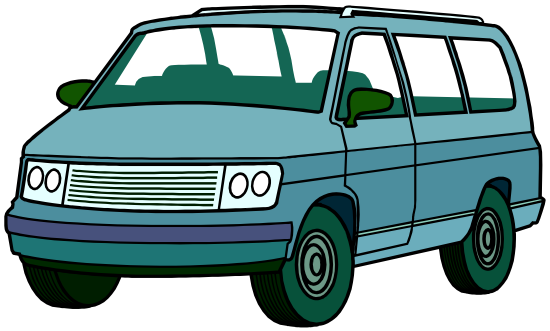
Stop

Connector Area

ITRE

Demand Responsive Connector is Ideal When…

- There is a fixed route service that is easy to integrate with
- Destinations are accessible from the fixed route



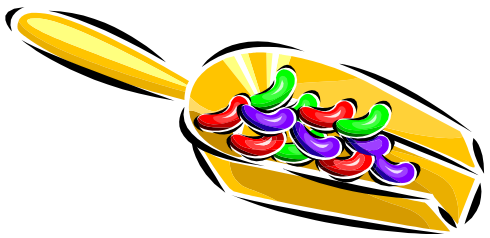
C	U	E
3	3	3

ITRE

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

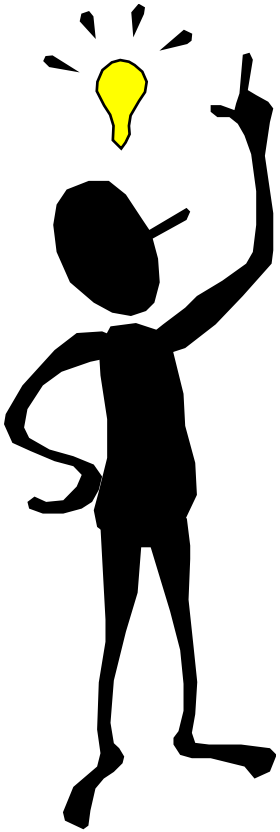
Demand Responsive Connector

- Eliminates the necessity for the demand response vehicle to deliver the trip
- The demand response vehicle scoops them up and puts them at the bus stop



ITRE

Demand Responsive Connector



Here's An Idea:

Fixed route must have capacity for the connecting trips, including wheelchair capacity!

ITRE

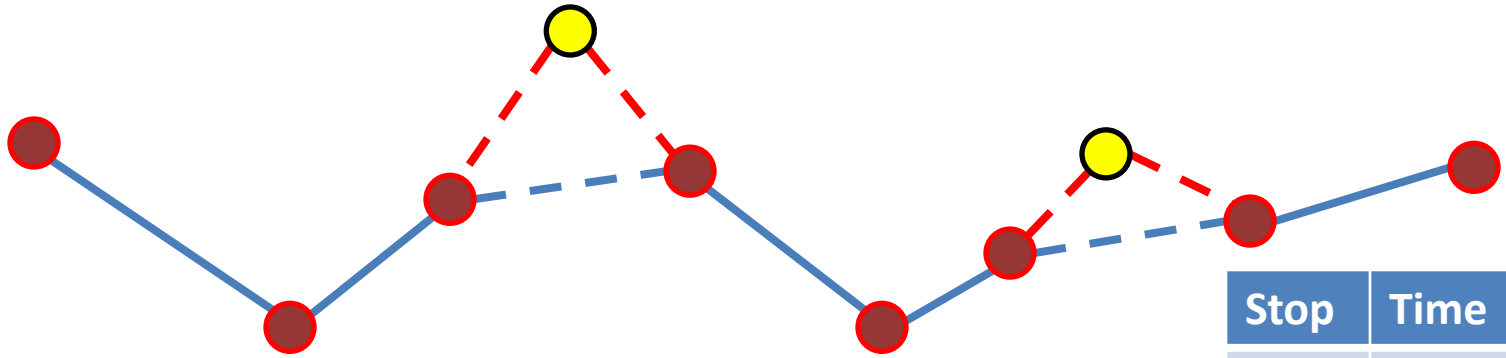
Request Stops

- Vehicles operate in conventional fixed-route, fixed-schedule mode and also serve a limited number of defined stops near the route in response to passenger requests. (Request stops differ from flag stops in not being directly on the route).

ITRE

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Request Stops



Stop

Fixed Route

Fixed Route if No Request Stops

Route to Access Request Stop

Deviation Area

Potential Requested Stop

Stop	Time
1	9:00
2	9:07
3	9:12
3a	As Requested
4	9:19
5	9:23
6	9:27
6a	As Requested
7	9:38
8	9:44

ITRE

Request Stops Are Ideal When…

- Infrequent service is required
  - Amtrak station/Inter-city bus hubs/factory shift changes
- Serving the bus stop all day long is unproductive

C	U	E
2	4	5

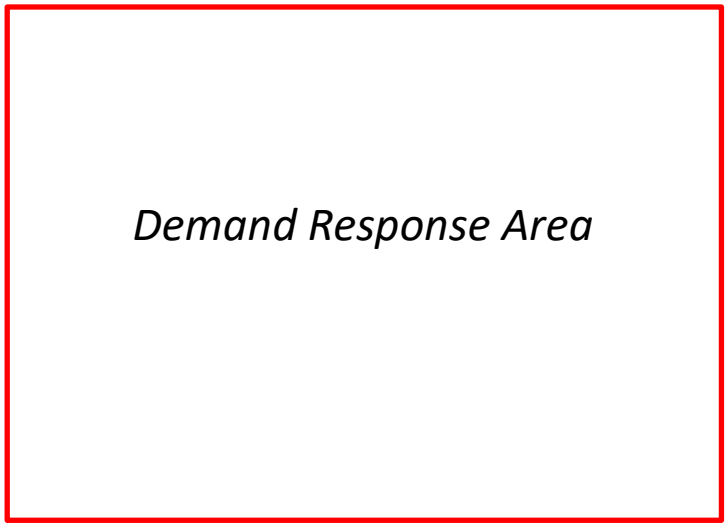
ITRE

Flexible-Route Segments

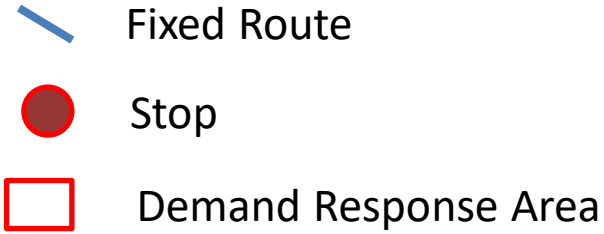
- Vehicles operate in conventional fixed-route, fixed-schedule mode, but switch to demand-responsive operation for a limited portion of the route.

TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Flexible Route Segments



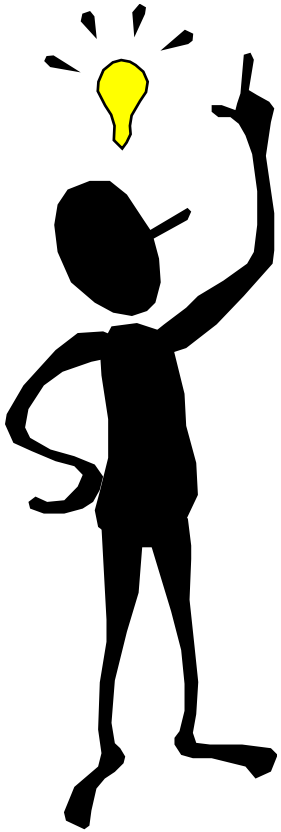
C	U	E
4	3	4



ITRE

Flexible-Route Segments Are Ideal When…

- Feeding rural customers into urbanized areas

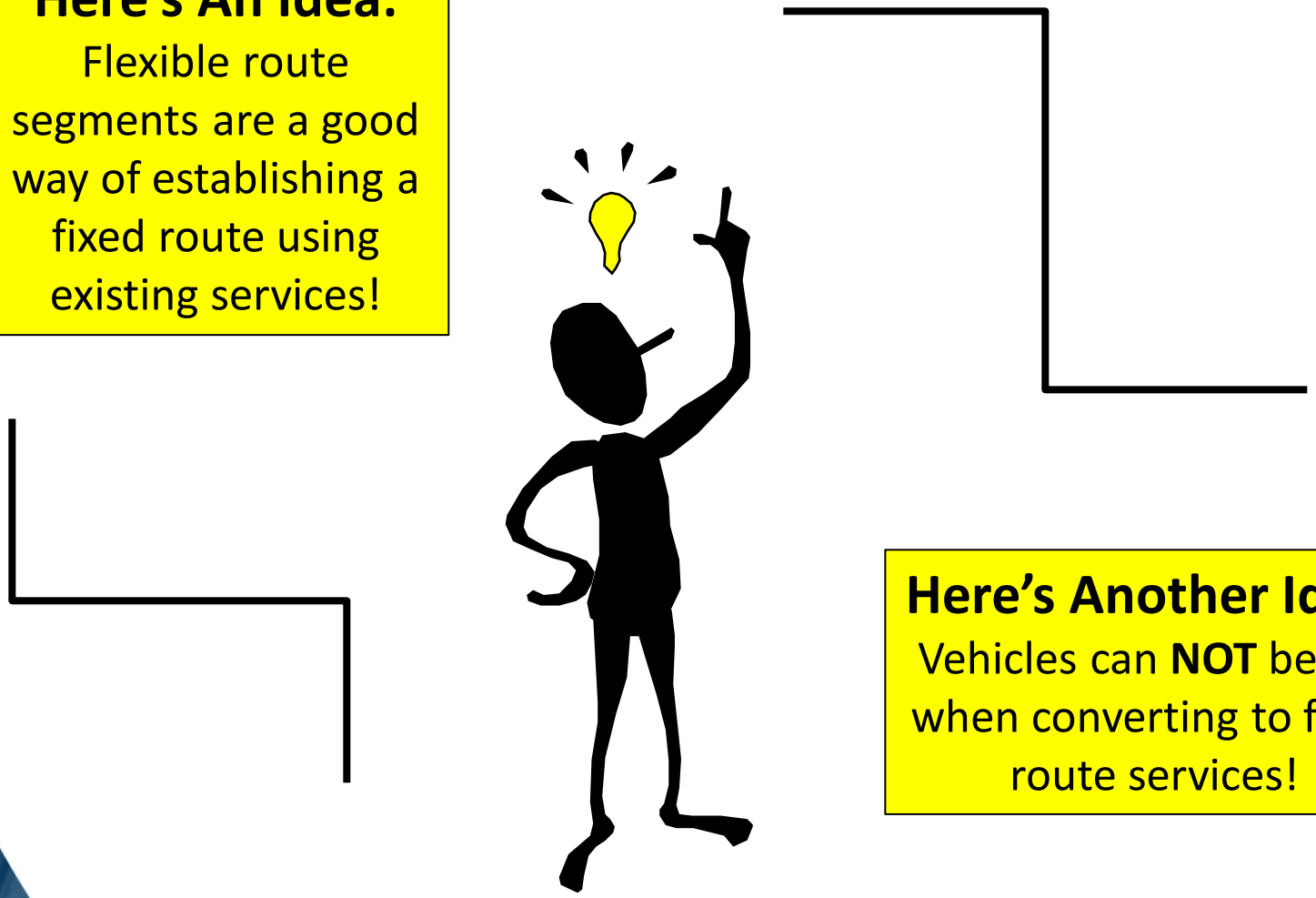


Here's An Idea:
Rural part is demand response, urban area is fixed route!

ITRE

Flexible-Route Segments

Here's An Idea:
Flexible route segments are a good way of establishing a fixed route using existing services!

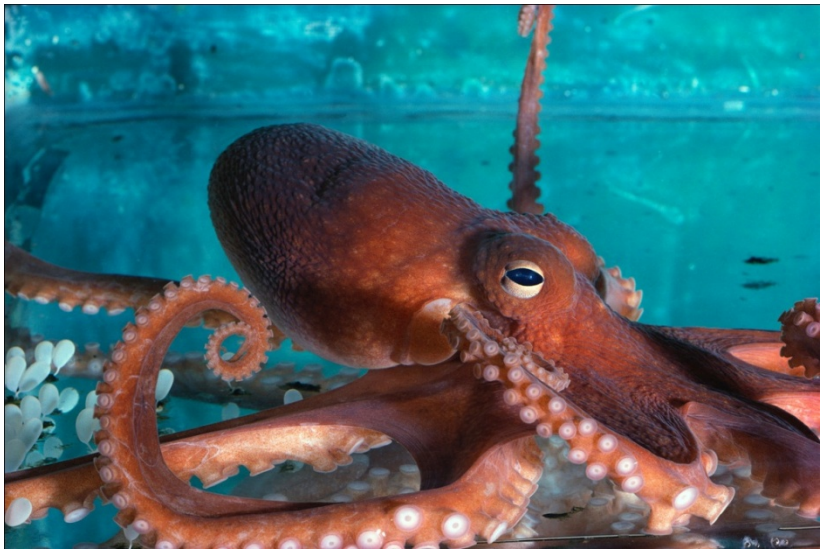


Here's Another Idea:
Vehicles can **NOT** be full when converting to fixed route services!

ITRE

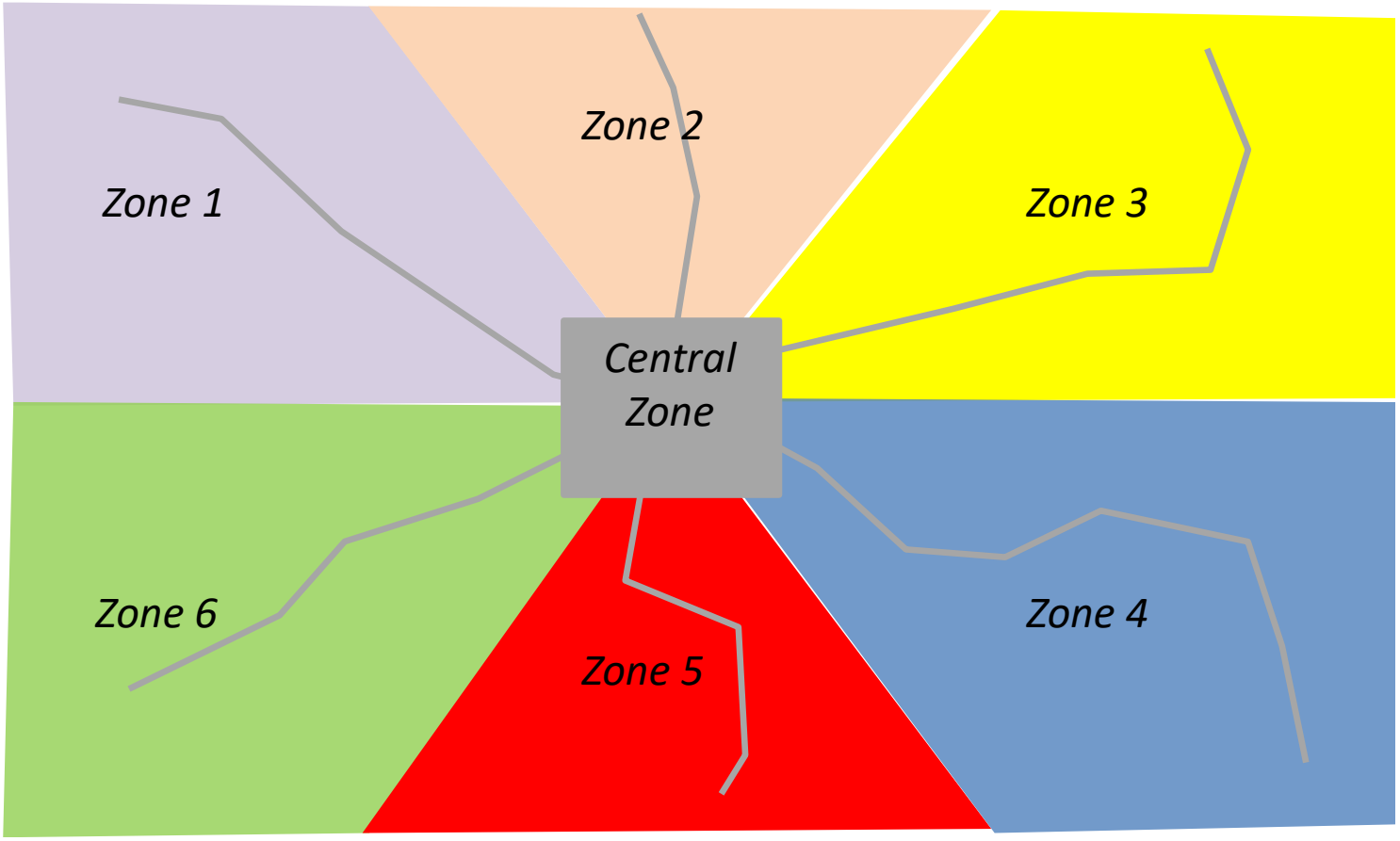
Zone Route

- Vehicles operate in demand-responsive mode along a corridor with established departure and arrival times at one or more end points.



TCRP Synthesis 53, Operational Experiences with Flexible Transit Services, 2004

Zone Route



C	U	E
4	4	4

Zone Routes are Ideal When…

- It is desired to operate more efficient demand response systems, because it provides a scheduling foundation within which to insert trips

Here's an Idea:

Add set times to the zones, publish the schedule, and customers will adapt appointments to your service!

ITRE

Blended

- Any combination of transit services

C	U	E
?	?	?

ITRE

Service Delivery Methods: Which are the best?

	Individual Customer Needs	Understandable	Efficient	Total
Fixed Route	1	5	5	**11**
Demand Response	5	1	1	**7**
Route Deviation	3	3	4	**10**
Point Deviation	4	2	3	**9**
D-R Connector	3	3	3	**9**
Request Stops	2	4	5	**11**
Flexible Route	4	3	4	**11**
Zone Route	4	4	4	**12**
Blended	?	?	?	**?**

Note: this analysis is based on the assumption that methods are implemented *where appropriate*

ITRE

What Good is Demand Response?

1. Premium value services - These high value services are defined by the need to reduce travel times, receive a higher degree of customer care and are often door-to-door. These have grown significantly for niche markets such as airport transfer services.

2. High value to agency services - These are needed where services are tailored to particular needs of public agencies. These include some patient transport, school transport, joblink services.

3. High care needs - This market is quite diverse to cater for the different care needs of travellers. It includes services for people with disabilities such as dial-a-ride and some non emergency patient transport, social services transport, and community transport.

4. Best value - Where demand is low, greater flexibility in the locations for picking up and dropping off passengers can ensure better value and wider network coverage.

ITRE

Adapted From: http://www.scotland.gov.uk/Publications/2006/05/18112606/3

How to Change Methods

You cannot simply change service delivery methods.

You need…

Planning

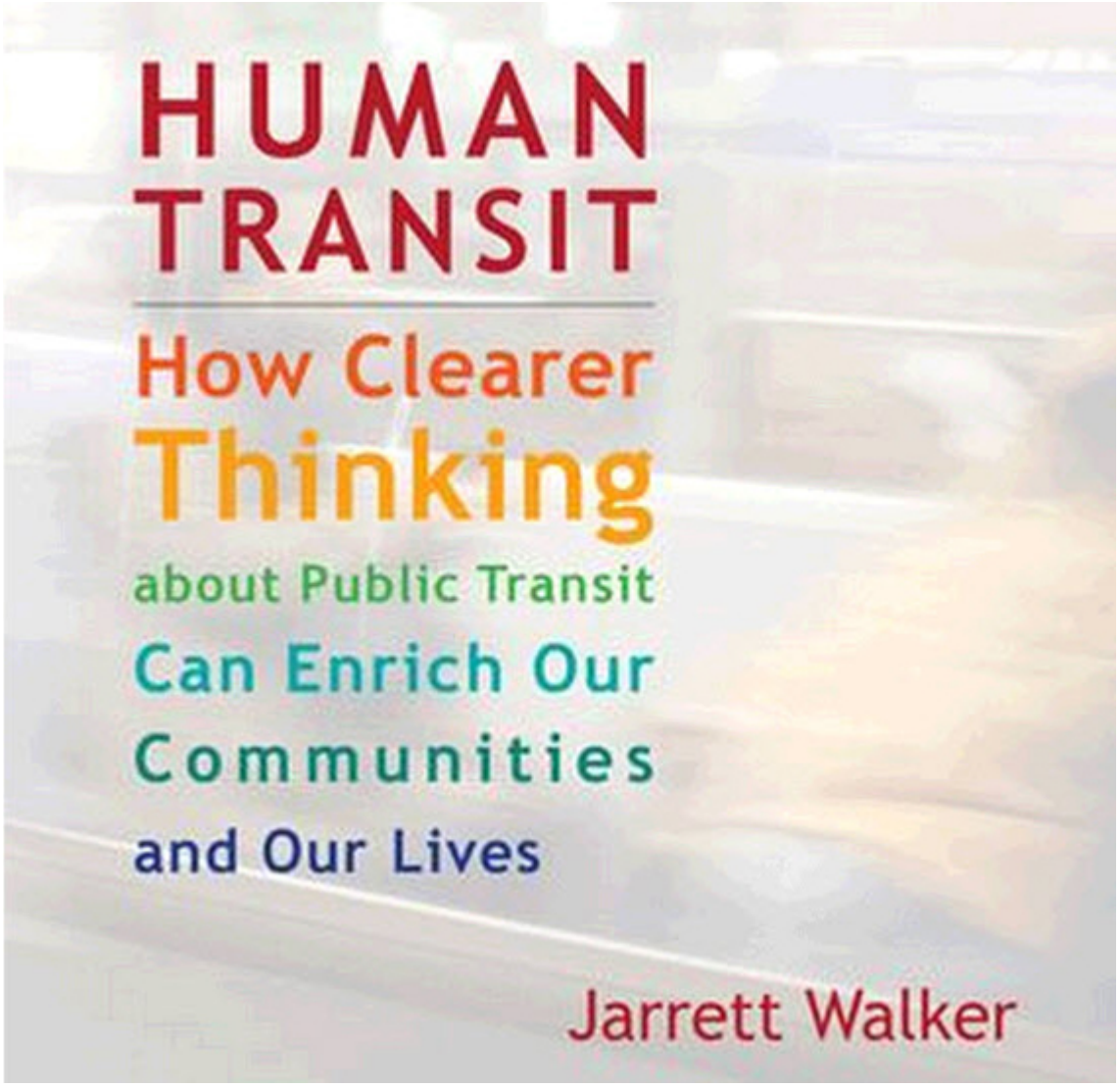
RESEARCH

Public Input

Stakeholder Buy-in

ITRE

Planning

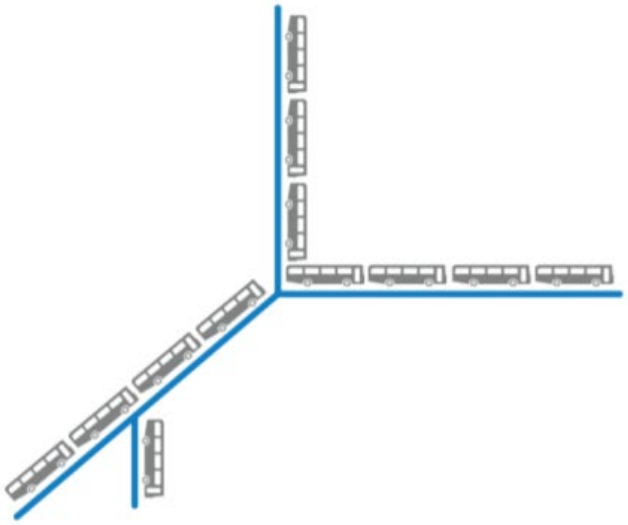


ITRE

Wake Transit Bus Plan Service Guidelines

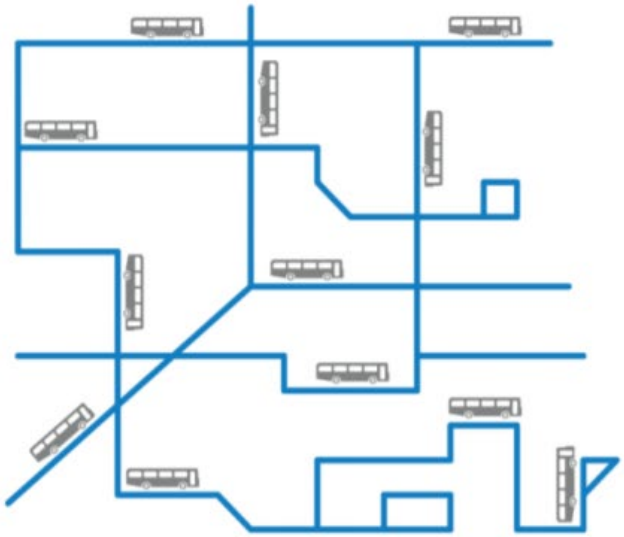
PRODUCTIVITY MODEL

The **productivity model** concentrates service on collector streets that feature the highest density of development. As a result, service is more direct, faster, and more productive. Because the bus operates on a handful of main streets, most people will have to walk to and from their bus route. Ridership-oriented services tend to feature higher frequencies, operate longer service spans, and carry more riders than coverage-oriented services. Examples include light rail and bus rapid transit, but also high frequency bus corridors.



COVERAGE MODEL

The **coverage model** operates service on many streets, even if service is infrequent. This model ensures that the maximum number of people have nearby access to bus service, and is more likely to provide door-to-door service (even if the overall trip time is longer). Coverage services tend to have lower frequencies and operate on residential streets. As a result, coverage-oriented routes tend to carry fewer riders, as compared with ridership-oriented services. The main advantage of coverage services is the increased geographic accessibility of the network, particularly for people unable to walk longer distances.



Identify Unmet Needs (Who, Where, When)

- Track Denied Trips With Enough Detail
- Complaints / Forums
- Community Organization Outreach
- Surveys
- Census / Other Data

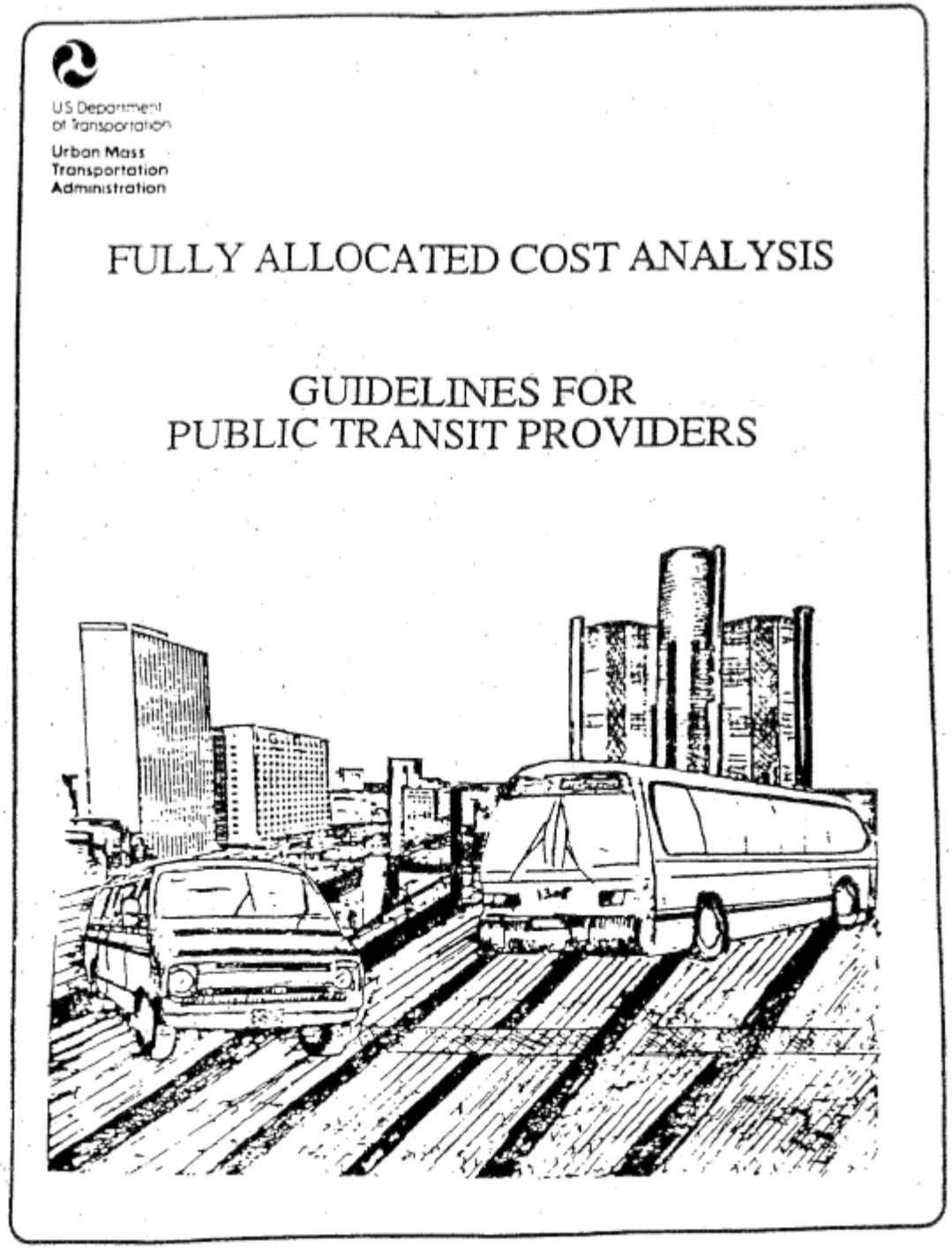
Service Design and Policies (What, How)

- Community meetings
- Match service design to the need
- Determine technologies (including vehicles)
- Establish policies
  - Billing methods and rates

ITRE

Rate Setting

Price Waterhouse
1987



ITRE

Worksheets

- Expenses
  - Fixed, Variable Miles, Variable Hours
- In-Kind Services
- OpStats
- Grant and Reserve Info
- Costs and Rates
- Vehicles

ITRE

Numerator

- Expenses – General revenues
  - Expenses all expected admin/operating plus 5311 admin local match, capital reserve, and program reserve
  - General Revenues = 5311 admin, advertising, local government contributions, or other blanket subsidies you do not need to generate
  - ROAP, 5310, contract revenue and fares are NOT general revenues because you are identifying what these rates should be

Denominators

Operating Statistics

Enter the miles, hours and passengers that the transit system provided or will provide in the yellow boxes below. Only enter operating statistics for the mode for which you entered expenses. Brokered services and services provided in-house must be budgeted for separately.

Hours:	18,000
Miles:	485,000
Passengers:	42,000
Type of Miles/Hours	Service

ITRE

Cost and Rate Outputs

Information in the grey boxes below is auto-filled from previous data entry and calculations sheets. Do not re-enter data.

Budget Information	
Total Fixed Costs	**$158,447**
Total Variable Hour Costs	**$439,157**
Total Variable Mile Costs	**$147,871**
Total Cost of Service	**$745,475**
Total With Program Reserve	$774,431
Total With Capital Reserve	$761,276
Total with Program and Capital Reserves	$790,233
Total Cost of Service Less Grants	**$579,127**
Total Cost Less Grants With Program Reserve	$608,083
Total Cost Less Grants With Capital Reserve	$594,928
Total Cost Less Grants with Program and Capital Reserves	$623,884

OpStats Information	
Total Hours	18,000
Total Miles	485,000
Total Passengers	42,000

Grant, Reserve and Vehicle Information	
Grants to be Deducted	$166,348
Total Program Reserve	$28,956
Total Capital Reserve Additon	$15,801

Output WITH Grants Discounted- Typically You Will Use This Section

	Per Service Hour	Per Service Mile	Per Passenger Trip	Per Service Mile and Hour		Per Service Mile/Hour/Passenger		
				Hour	Mile	Hour	Mile	Passenger
Base Rate	$32.174	$1.194	$13.789	$24.069 &	$0.301	$24.398 &	$0.305 &	-$0.188
Rate with Program Reserve	$33.782	$1.254	$14.478	$25.273 &	$0.316	$24.398 &	$0.305 &	$0.501
Rate with Capital Reserve	$33.052	$1.227	$14.165	$24.726 &	$0.309	$24.398 &	$0.305 &	$0.188
Rate with Program and Capital Reserve	$34.660	$1.286	$14.854	$25.929 &	$0.324	$24.398 &	$0.305 &	$0.878

Output WITHOUT Grants Discounted- True Cost of Service

	Per Service Hour	Per Service Mile	Per Passenger Trip	Per Service Mile and Hour		Per Service Mile/Hour/Passenger		
				Hour	Mile	Hour	Mile	Passenger
Base Rate	$41.415	$1.537	$17.749	$30.983 &	$0.387	$24.398 &	$0.305 &	$3.773
Rate with Program Reserve	$43.486	$1.614	$18.637	$32.186 &	$0.402	$24.398 &	$0.305 &	$4.462
Rate with Capital Reserve	$42.293	$1.570	$18.126	$31.640 &	$0.395	$24.398 &	$0.305 &	$4.149
Rate with Program and Capital Reserve	$44.364	$1.646	$19.013	$32.843 &	$0.410	$24.398 &	$0.305 &	$4.838

Understanding Billing

Kai Monast

Public Transportation Group
NCSU-ITRE

kcmonast@ncsu.edu
(919) 515-8768

Course Content

1. Introduction
2. Definitions
3. Does Billing Type Matter?
4. Billing Scenarios
5. Medicaid Transformation

Definitions

- **Service Miles/Hours –** The total number of miles / hours traveled by transit vehicles while providing service. Starts when the vehicle leaves the depot and stops when the vehicle returns to the depot. Includes deadhead miles / hours. Service Miles / Hours does not include breaks, lunch, fueling or maintenance, etc.
- **Revenue Miles/Hours –** The miles/hours a vehicle travels while in revenue service. Vehicle revenue miles/hours exclude travel to and from storage facilities, training operators prior to revenue service, road tests, breaks and deadhead travel. (FTA)
- **Passenger Miles –** The total number of miles / hours that each passenger travels on the transit vehicle *(Simple Definition)*.
- **Direct Miles –** Estimated network miles from the origin to the destination, regardless of how the vehicle travelled.

Are billing methods policy decisions with consequences?

- If you set the correct rates, you end up getting the same amount of money either way…
- So, why should it matter which type you select?


Metropolitan Transportation Authority
MTA New York City Subway
THE BRONX
MANHATTAN
QUEENS
BROOKLYN
Long Island Sound
Hudson River
Harlem River
East River
Key
Part-time line extension
Local service only
All trains stop (local and express service)
Free subway transfer
Free out-of-system subway transfer (excluding single ride ticket)
Normal service
Additional express service
Station Name
Terminal
Accessible station
© 2007 Metropolitan Transportation Authority
Design: Michael Hertz Associates, NYC
8/07

New York City

- $2.75 Trip Cost
- Affluent riders take shorter trips (within Manhattan)
- Longer trips taken from less affluent areas (outer Boroughs)
- Affluent subsidize less affluent


System Map
Legend
Red Line • Glenmont to Shady Grove
Orange Line • New Carrollton to Vienna/Fairfax-GMU
Blue Line • Franconia-Springfield to Largo Town Center
Green Line • Branch Avenue to Greenbelt
Yellow Line • Huntington to Mt Vernon Sq/7th St-Convention Center
Station in Service
Transfer Station
Commuter Rail
Parking
RED LINE
Shady Grove
Rockville
Twinbrook
White Flint
Grosvenor-Strathmore
Medical Center
Bethesda
Friendship Heights
Tenleytown-AU
Van Ness-UDC
Cleveland Park
Woodley Park-Zoo/ Adams Morgan
Dupont Circle
Farragut North
McPherson Sq
Metro Center
Federal Triangle
Smithsonian
Gallery Pl-Chinatown
Mt Vernon Sq/7th St-Convention Center*
Union Station
Rosslyn
ORANGE LINE
Vienna/Fairfax-GMU
Dunn Loring-Merrifield
West Falls Church-VT/UVA
East Falls Church
Ballston-MU
Virginia Sq-GMU
Clarendon
Court House
Foggy Bottom-GWU
Farragut West
Archives-Navy Memorial
L'Enfant Plaza
Arlington Cemetery
Pentagon
YELLOW LINE
Pentagon City
Crystal City
Ronald Reagan Washington National Airport
Braddock Road
King Street
Eisenhower Ave
Huntington
Van Dorn Street
BLUE LINE
Franconia-Springfield
Glenmont
Wheaton
Forest Glen
Silver Spring
Takoma
GREEN LINE
Greenbelt
College Park-U of Md
Prince George's Plaza
West Hyattsville
Fort Totten
Georgia Ave-Petworth
Columbia Heights
U St/African-Amer Civil War Memorial/Cardozo
Shaw-Howard U
Brookland-CUA
Rhode Island Ave
New York Ave (Under Construction)
New Carrollton
Landover
Cheverly
Deanwood
Minnesota Ave
Benning Road
Capitol Heights
Addison Road-Seat Pleasant
Morgan Boulevard (Under Construction)
Largo Town Center (Under Construction)
Stadium-Armory
Potomac Ave
Eastern Market
Capitol South
Federal Center SW
Judiciary Sq
Waterfront-SEU
Navy Yard
Anacostia
Congress Heights
Southern Ave
Naylor Road
Suitland
Branch Ave
N
*7th St. Convention Center scheduled to open March 2003. Existing Convention Center at 9th & H Sts. served by Metro Center and Gallery Pl-Chinatown stations

Washington DC

- Direct Mile cost (longer trip = more $)
- Less affluent riders live in city and take shorter trips
- More affluent riders live outside city and take longer trips
- Affluent subsidize less affluent

NYC – DC Comparison

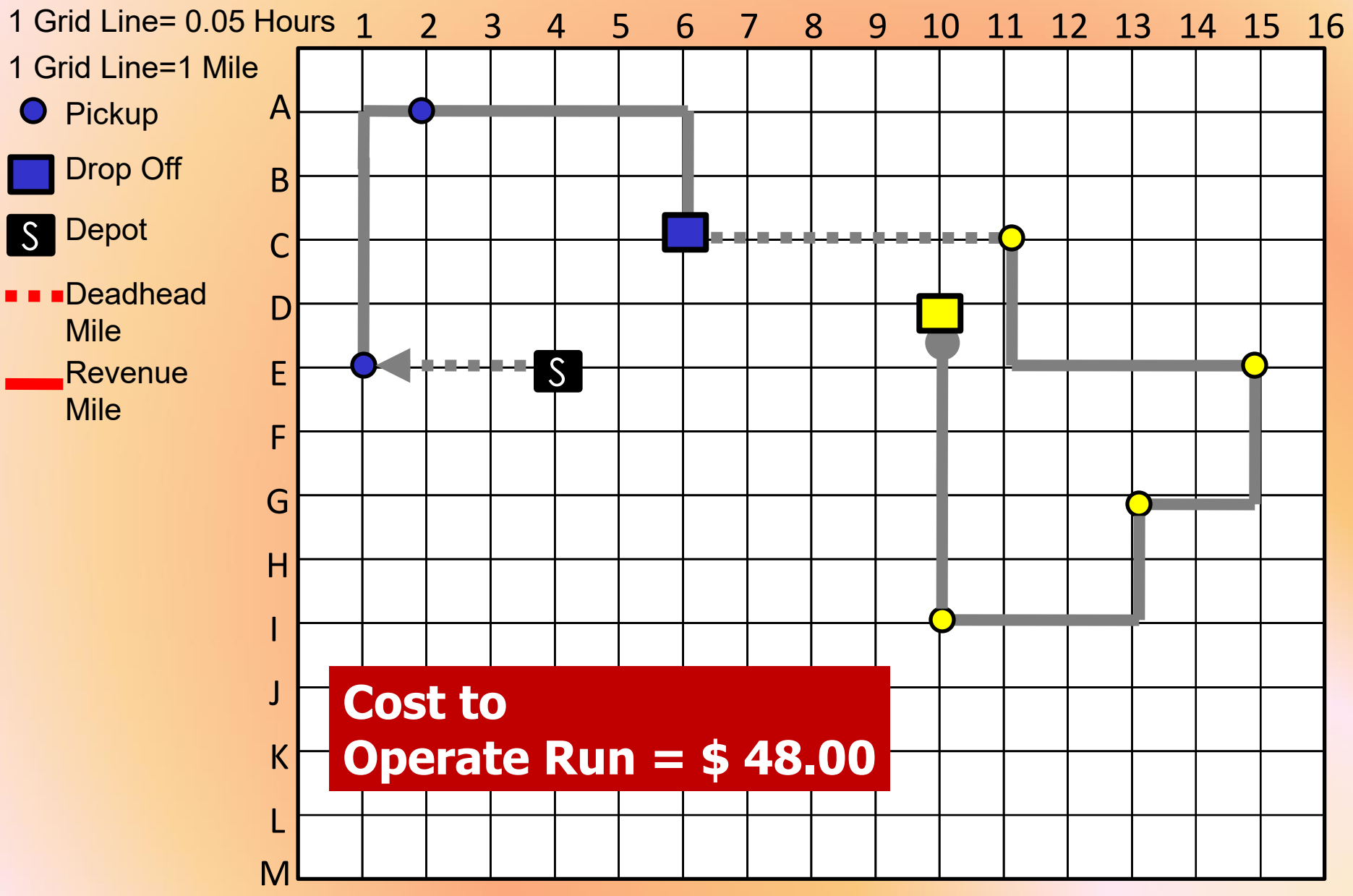
- **Does it Matter? A different billing type would have serious impacts on the customer base**
- **Do you lose contracts because of your billing type/rate?**
- **Are some contracts being subsidized by other contracts?**
- **How will Medicaid Transformation impact other contracts?**

Billing Scenarios

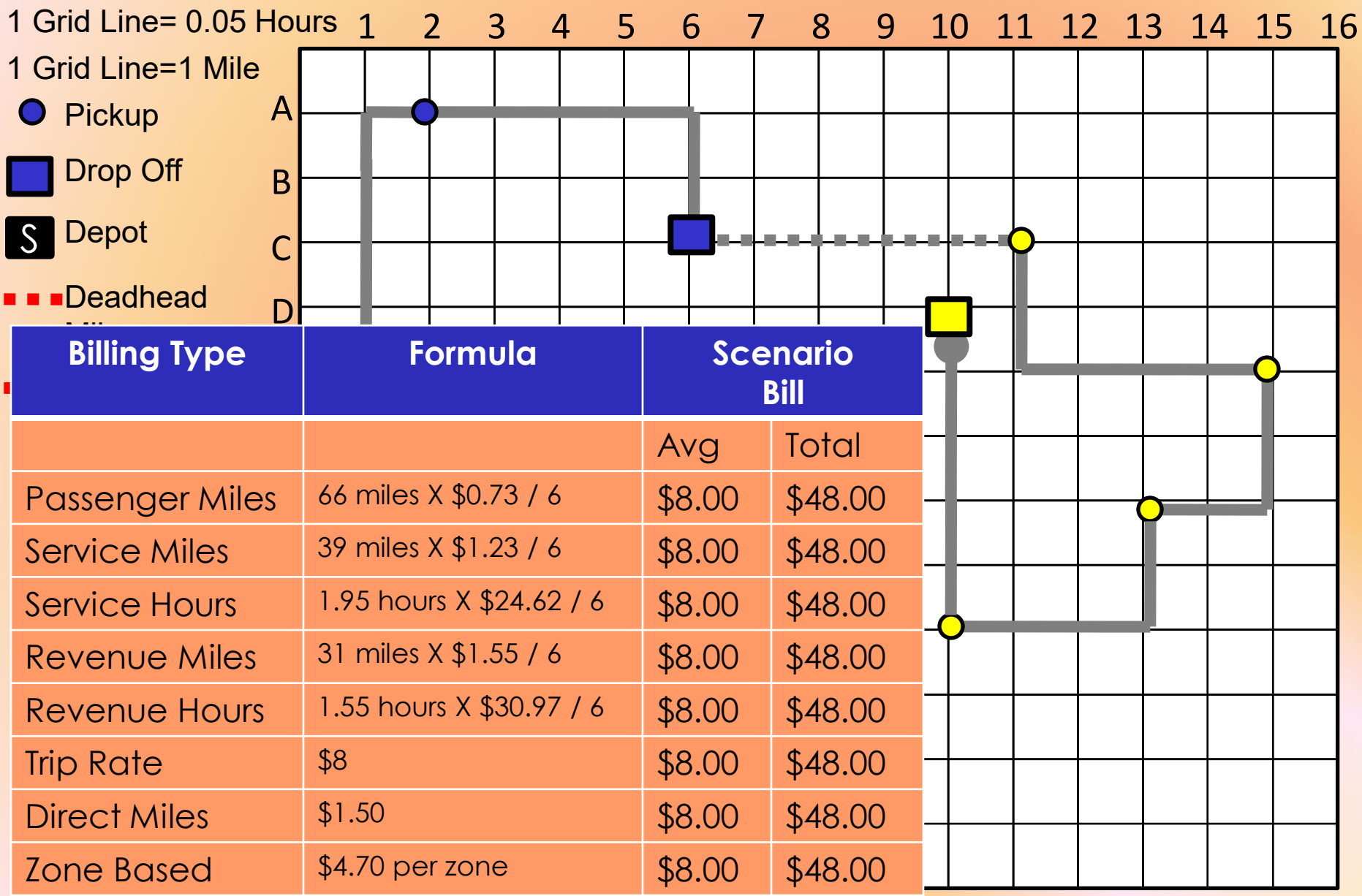
	Scenario Rate
• Passenger Mile	$ 0.73
• Service Mile	$ 1.23
• Service Hour	$ 24.62
• Revenue Mile	$ 1.55
• Revenue Hour	$ 30.97
• Trip Rate	$ 8.00
• Direct Miles	$1.50
• Zone Based Fares	$4.70 per zone

- Combinations
  - ➲ Direct Miles and Service Miles

Billing Rates - Base Scenario



Billing Rates - Base Scenario



Billing Type	Formula	Scenario Bill	
		Avg	Total
Passenger Miles	66 miles X $0.73 / 6	$8.00	$48.00
Service Miles	39 miles X $1.23 / 6	$8.00	$48.00
Service Hours	1.95 hours X $24.62 / 6	$8.00	$48.00
Revenue Miles	31 miles X $1.55 / 6	$8.00	$48.00
Revenue Hours	1.55 hours X $30.97 / 6	$8.00	$48.00
Trip Rate	$8	$8.00	$48.00
Direct Miles	$1.50	$8.00	$48.00
Zone Based	$4.70 per zone	$8.00	$48.00

Passenger Miles ($0.73)

The total number of miles that each passenger travels on the transit vehicle *(paratransit definition)*.

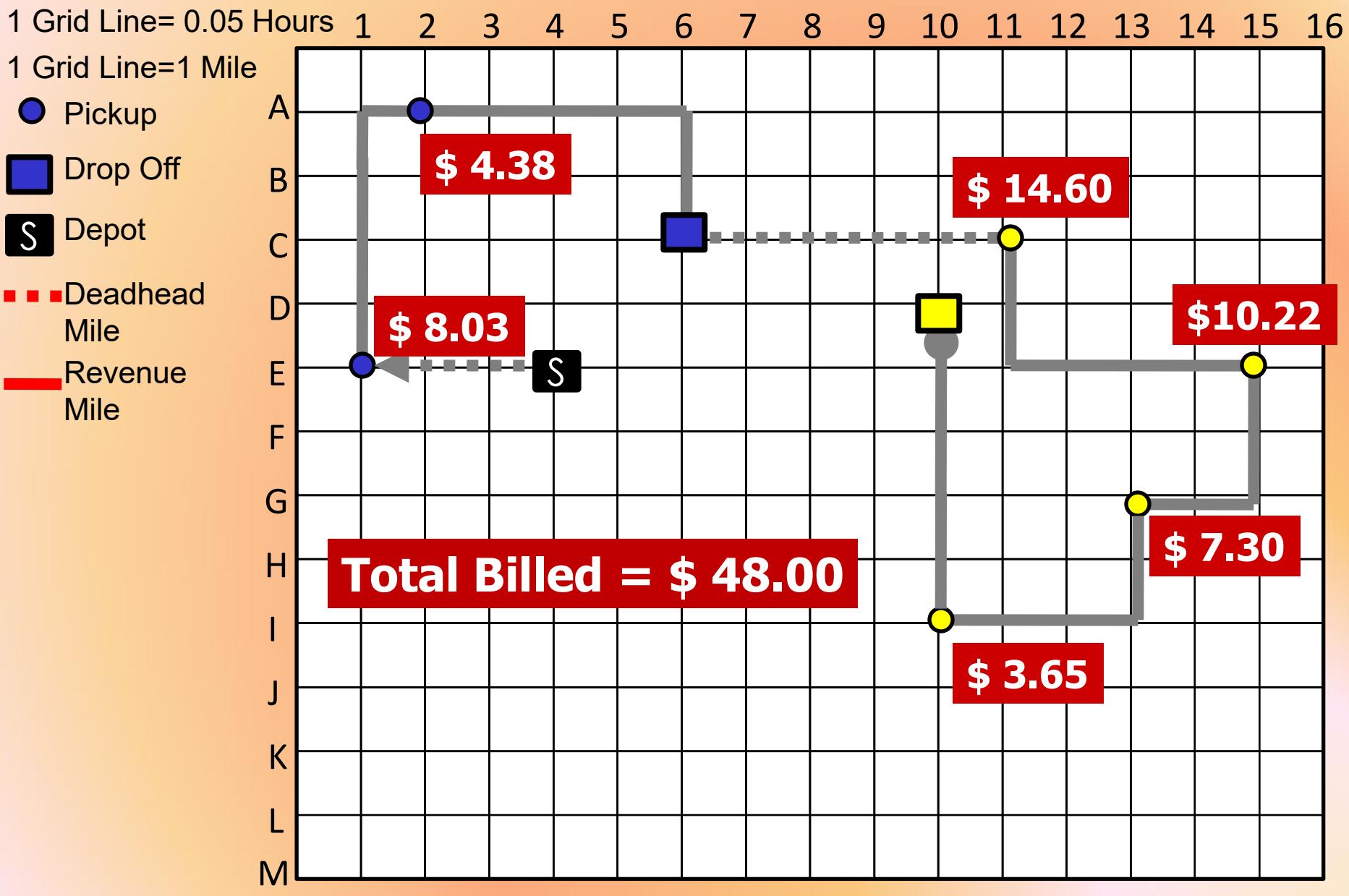
Data Requirements:

- Individual passenger pickup and dropoff odometer readings
- Passenger counts
- Cancels, No Shows

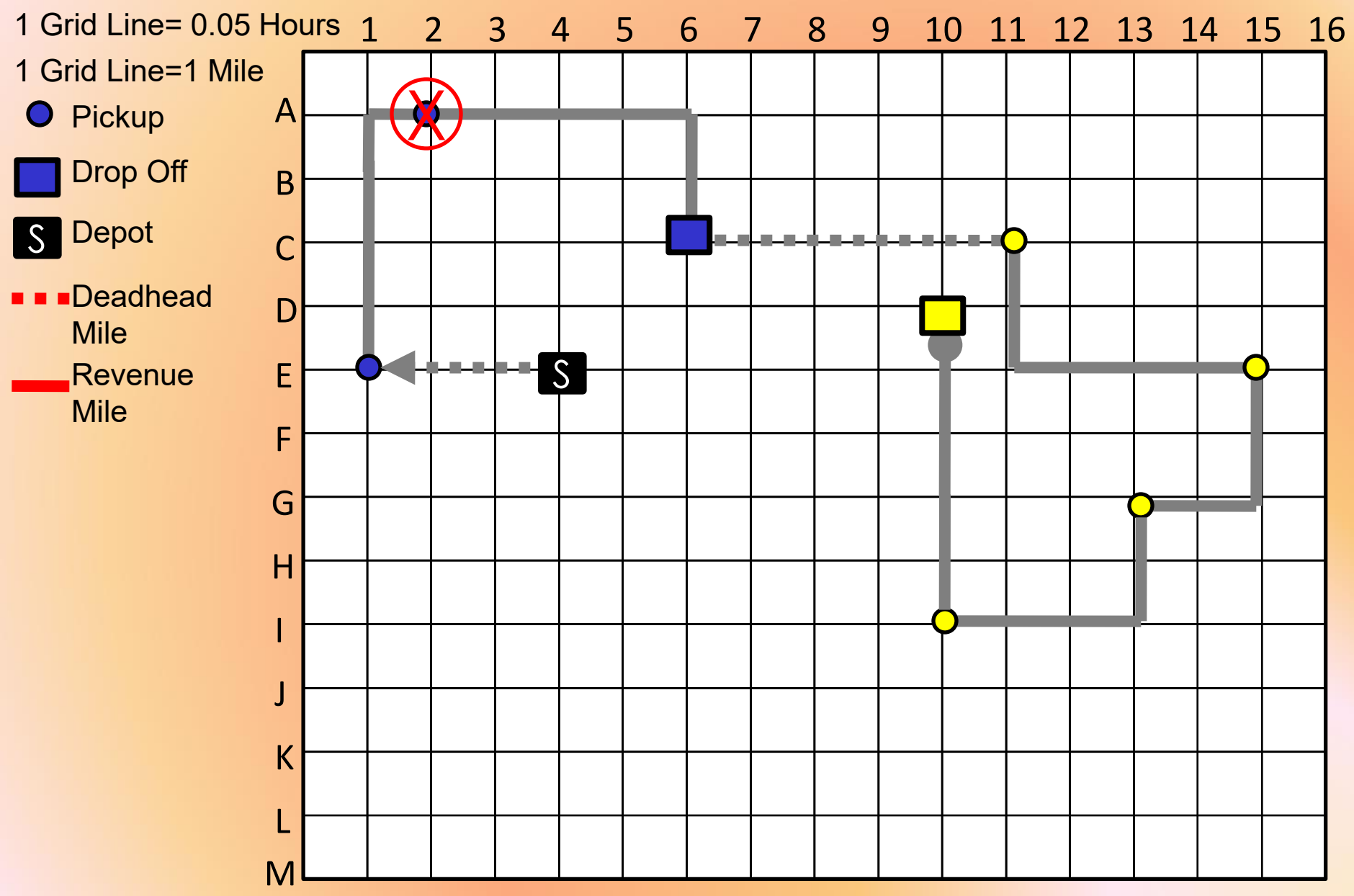
Passenger Miles - Required Data

Route					Driver Manifest											
Date		Driver		Actual Start Time		Start Odom		1st Stop Time			1st Stop Odom					
				Actual End Time		End Odom		Last Stop Time			Last Stop Odom					
In/Out	Appt. Time	Client			Origin/ Destination			Mob. Aid	Agency	Miles		Units		No Show	Can-celled	

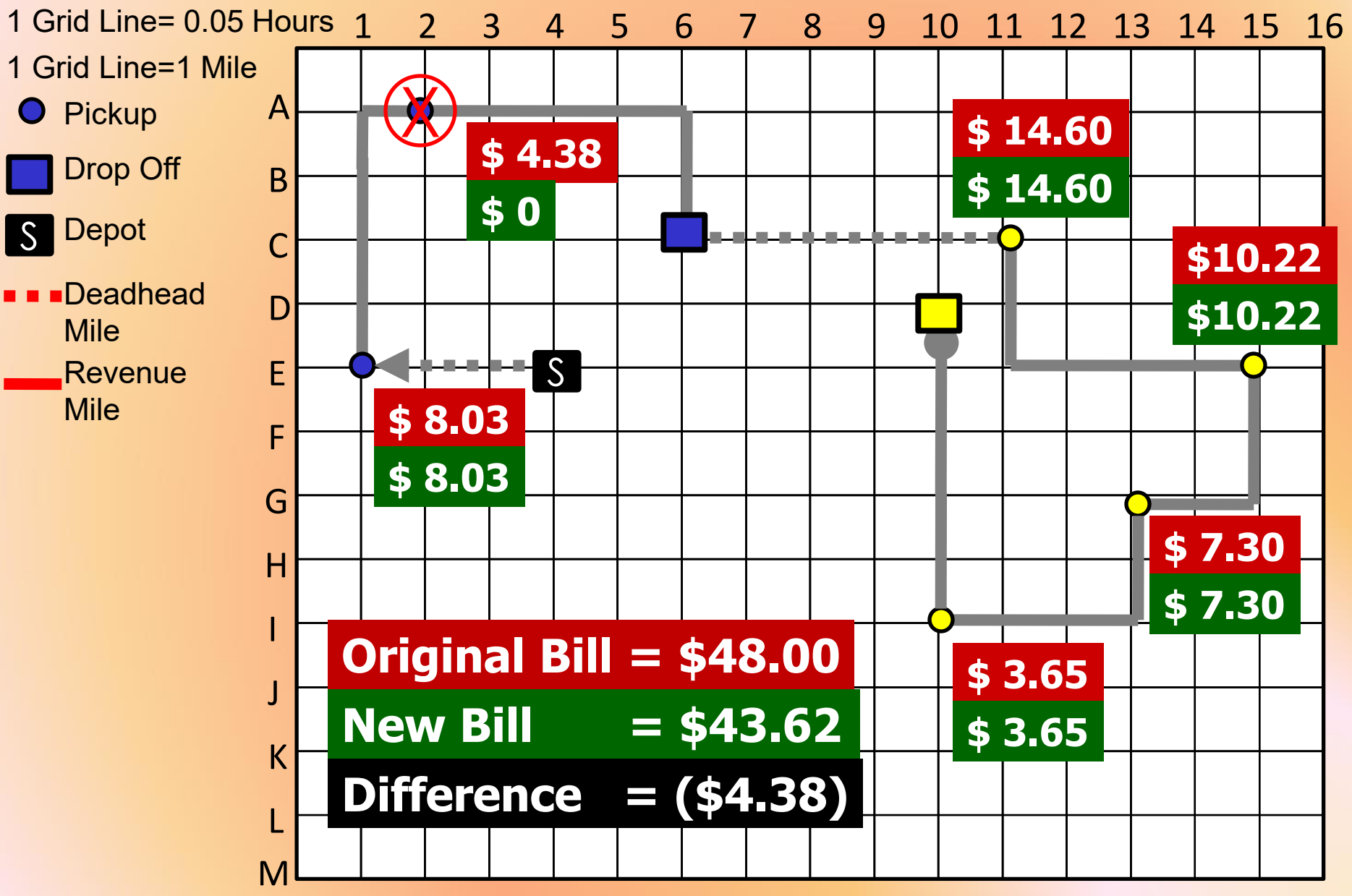
Passenger Miles ($0.73)



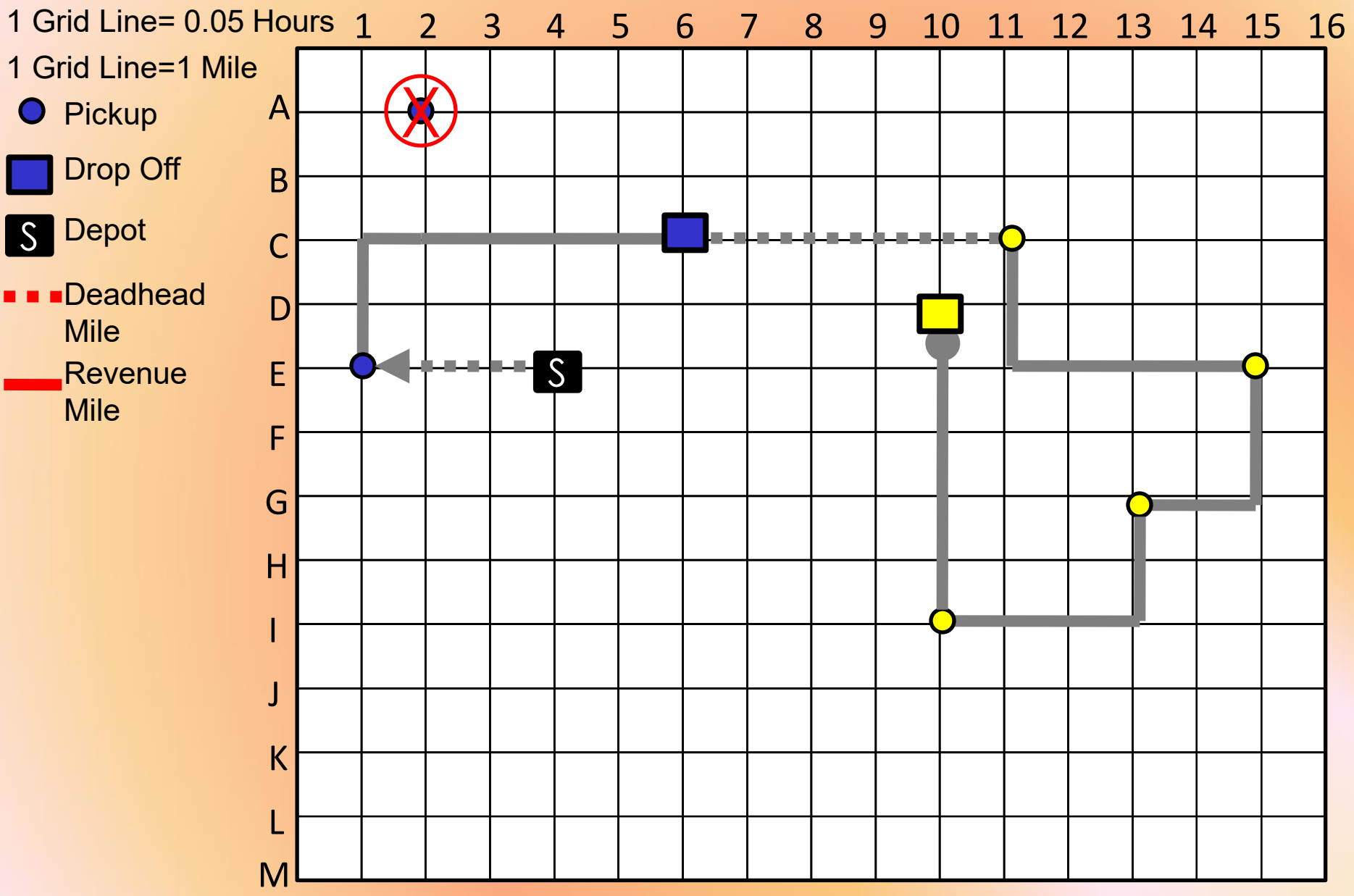
Passenger Mile Scenario 1 - No Show



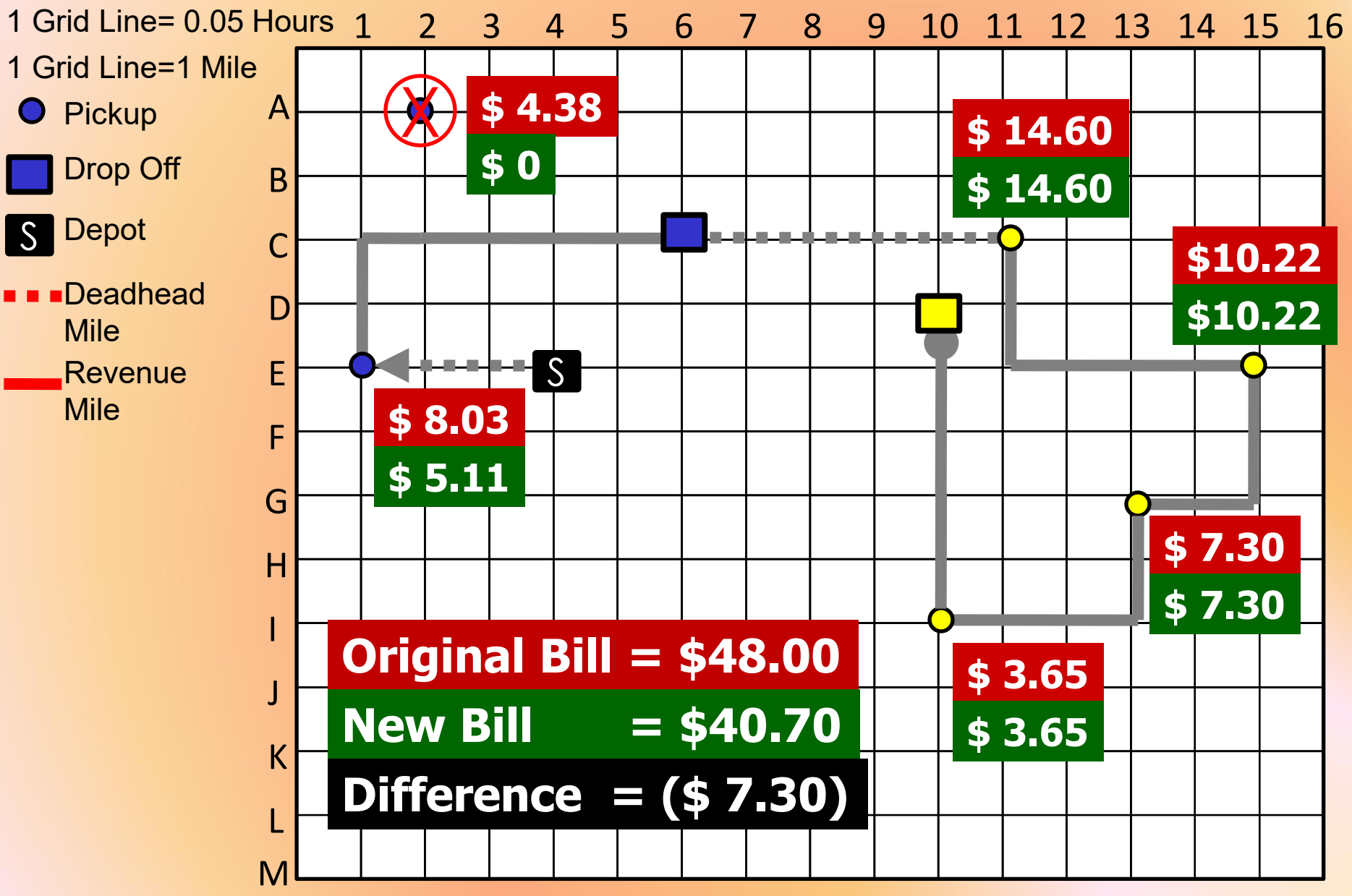
Passenger Mile Scenario 1 - No Show



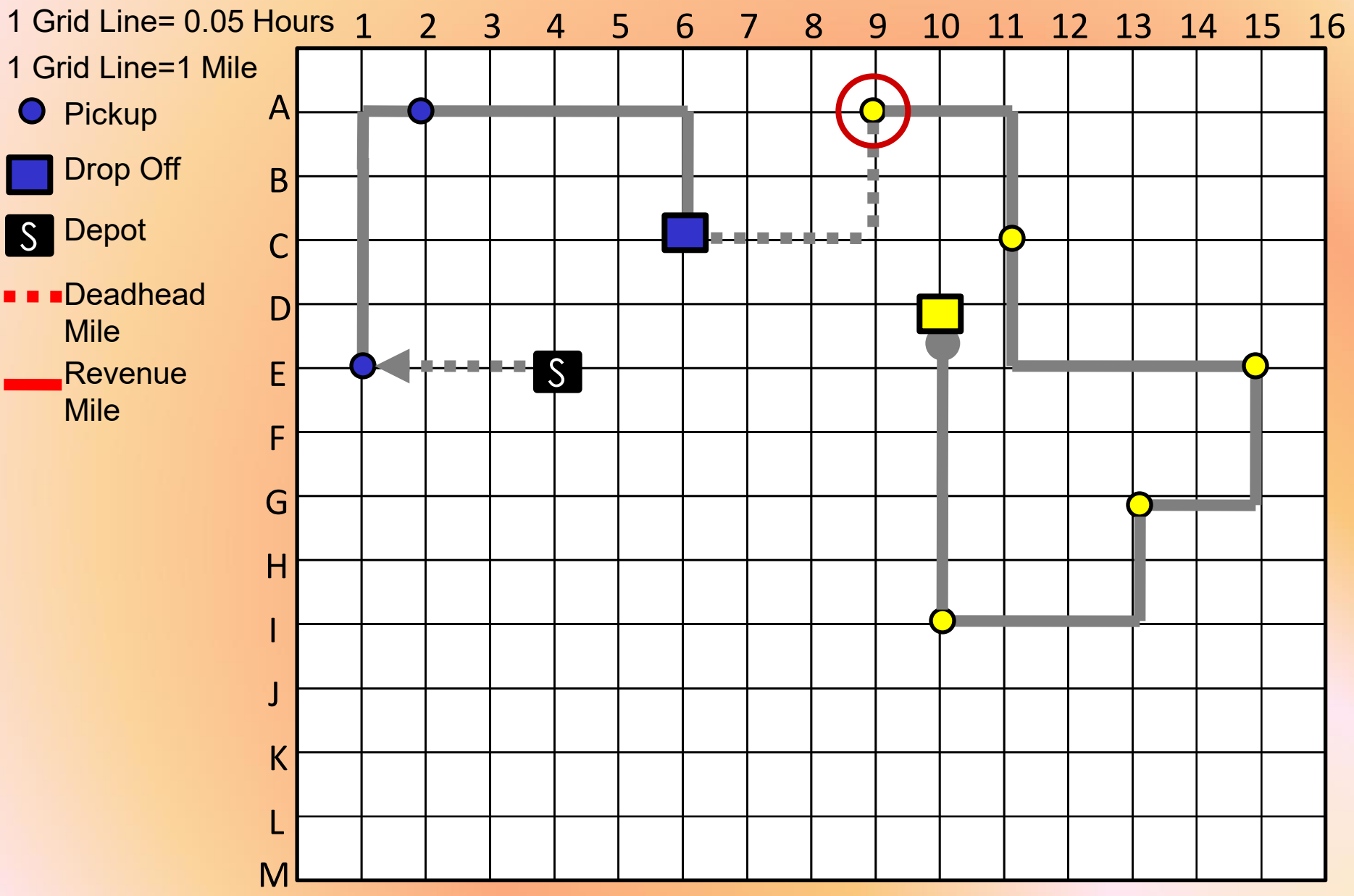
Passenger Mile Scenario 2 - Cancellation



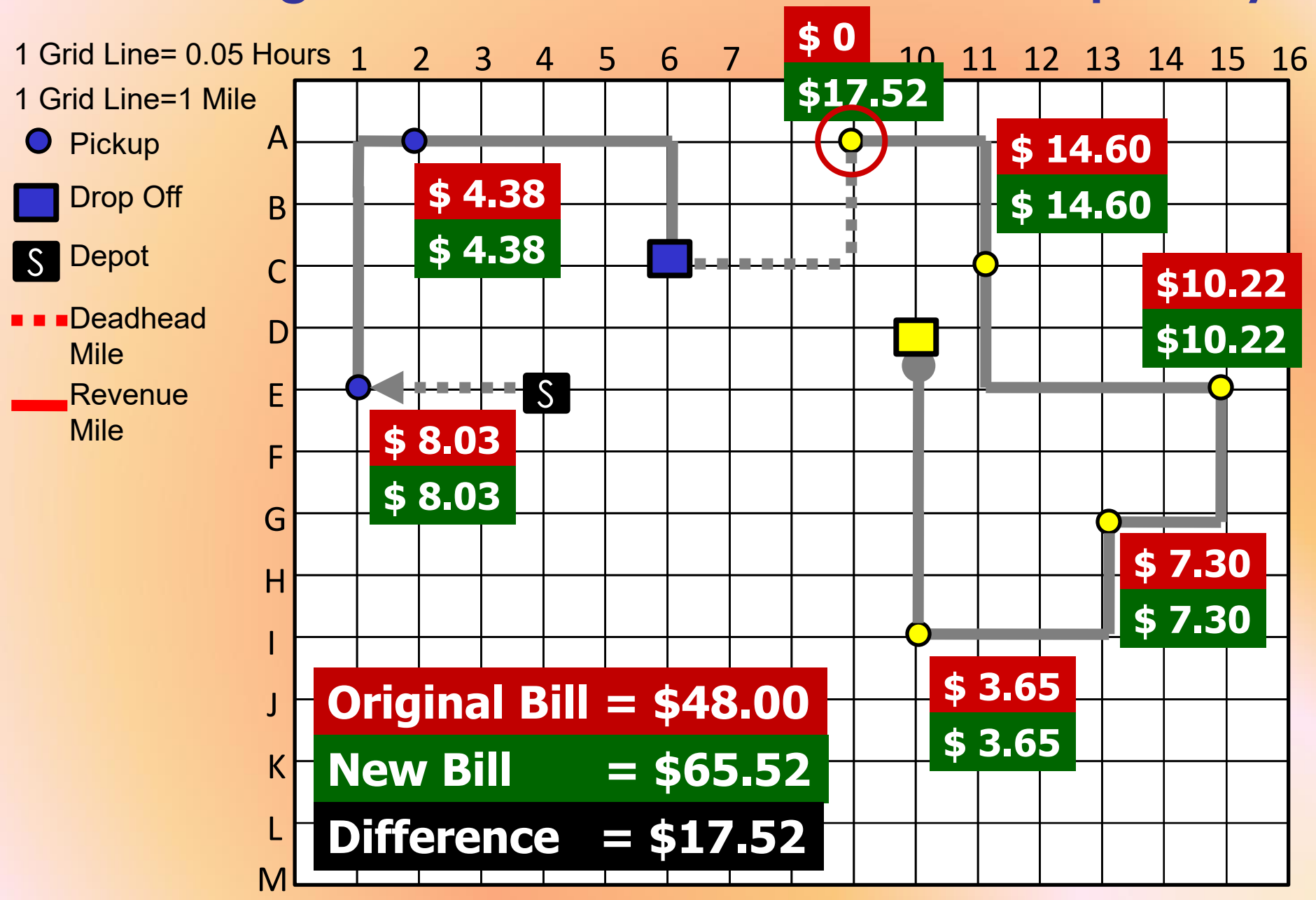
Passenger Mile Scenario 2 - Cancellation



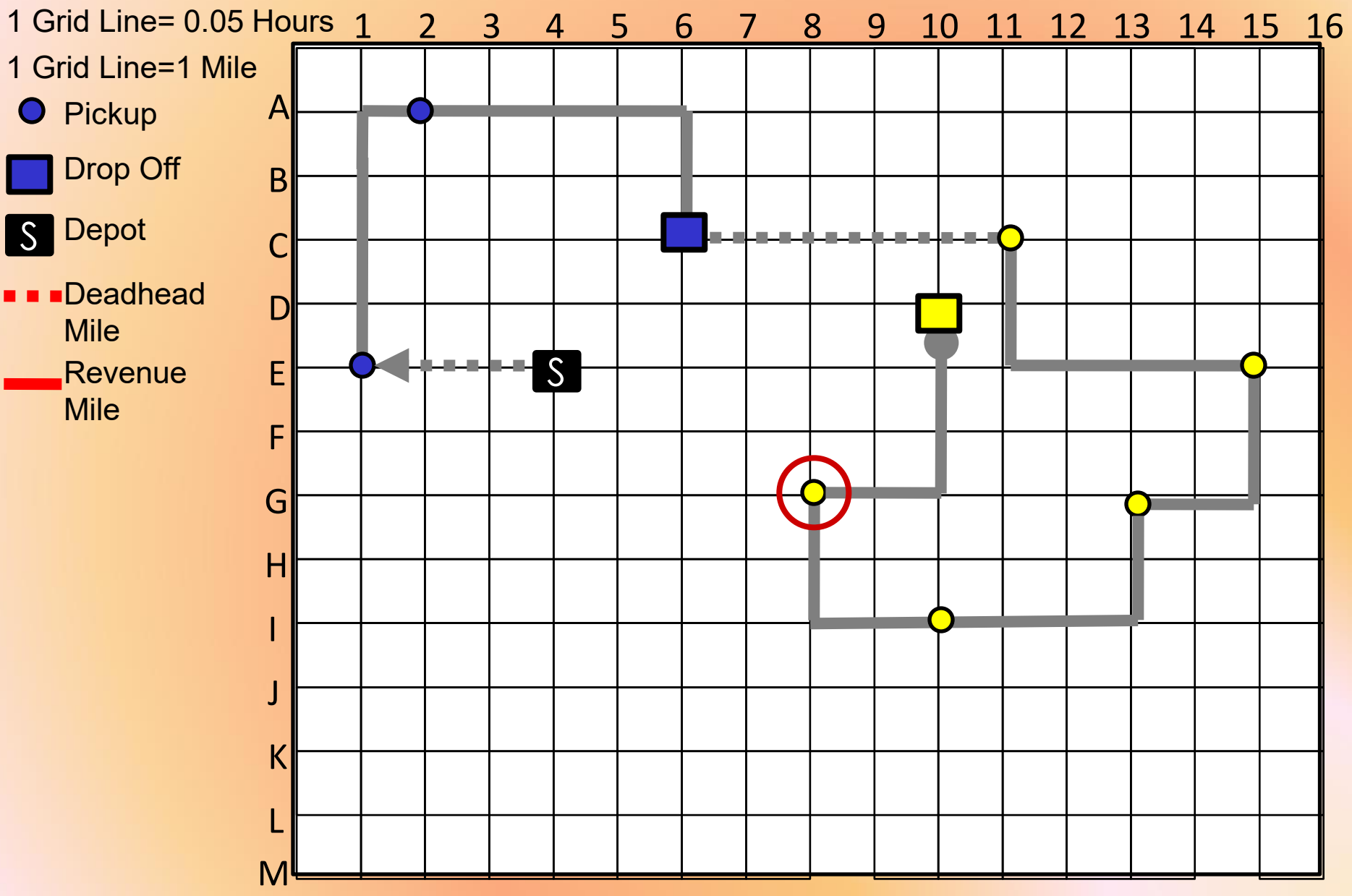
Passenger Mile Scenario 3 - Extra Pickup, Early



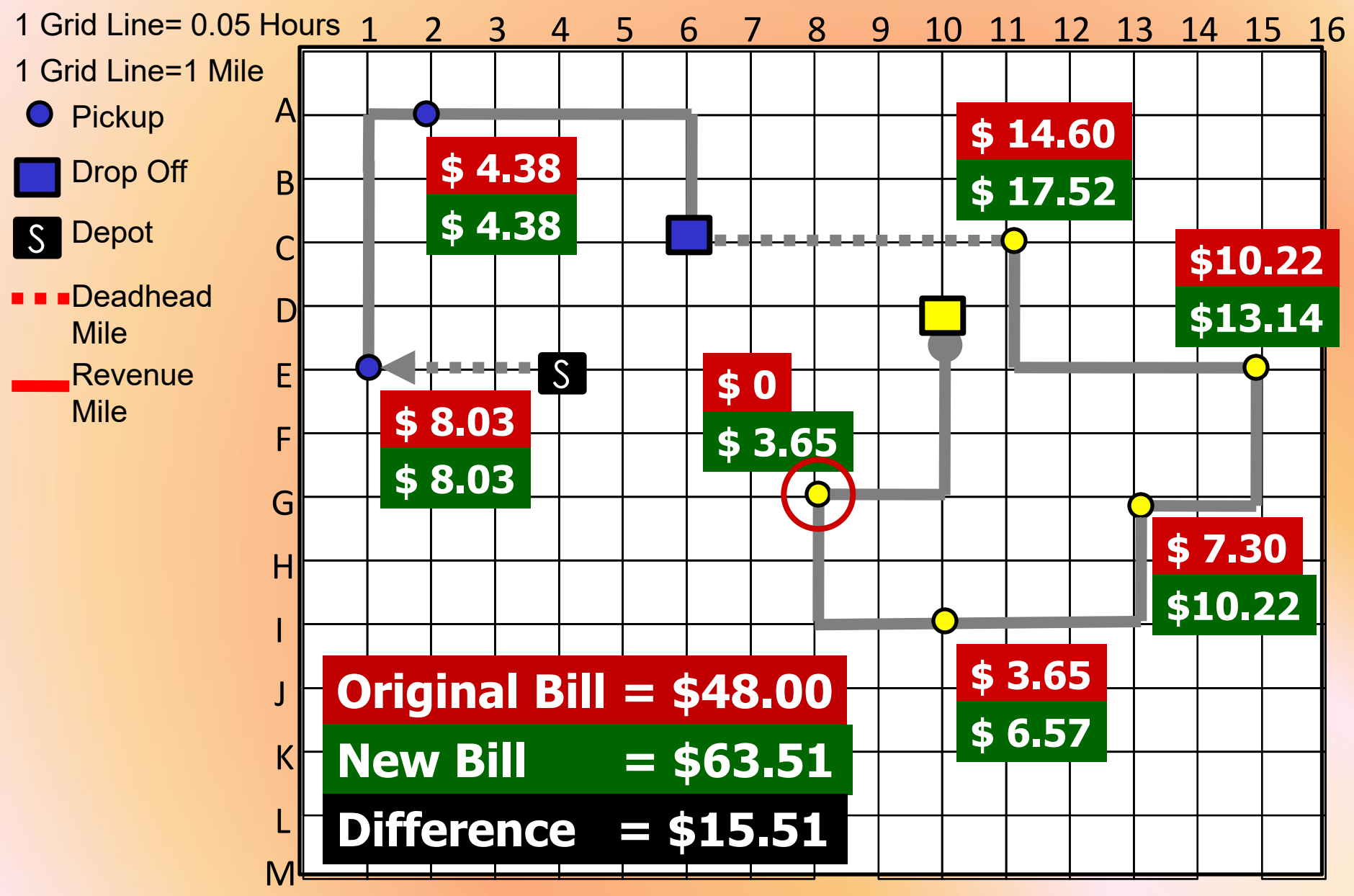
Passenger Mile Scenario 3 - Extra Pickup, Early



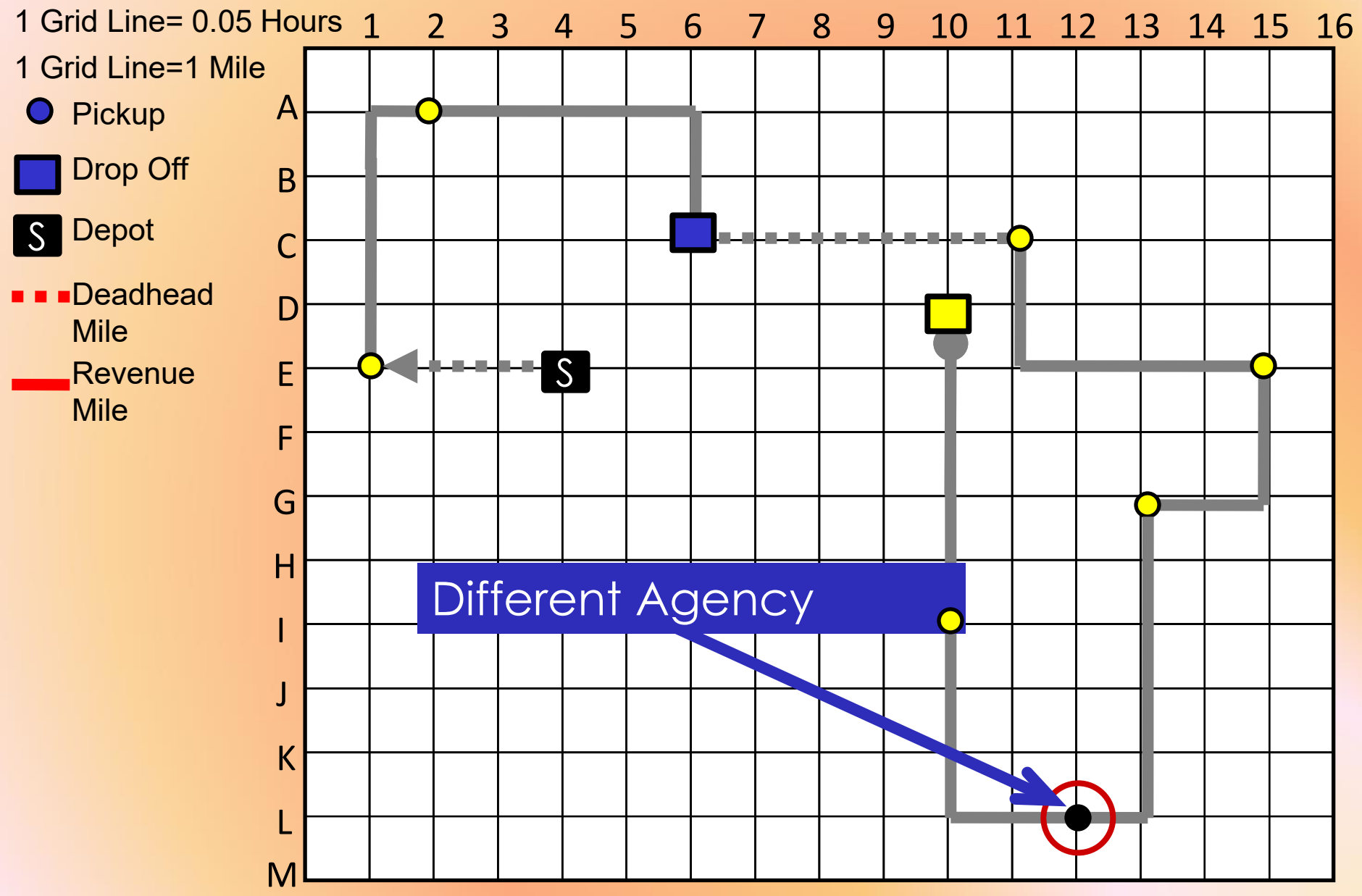
Passenger Mile Scenario 4 - Extra Pickup, Late



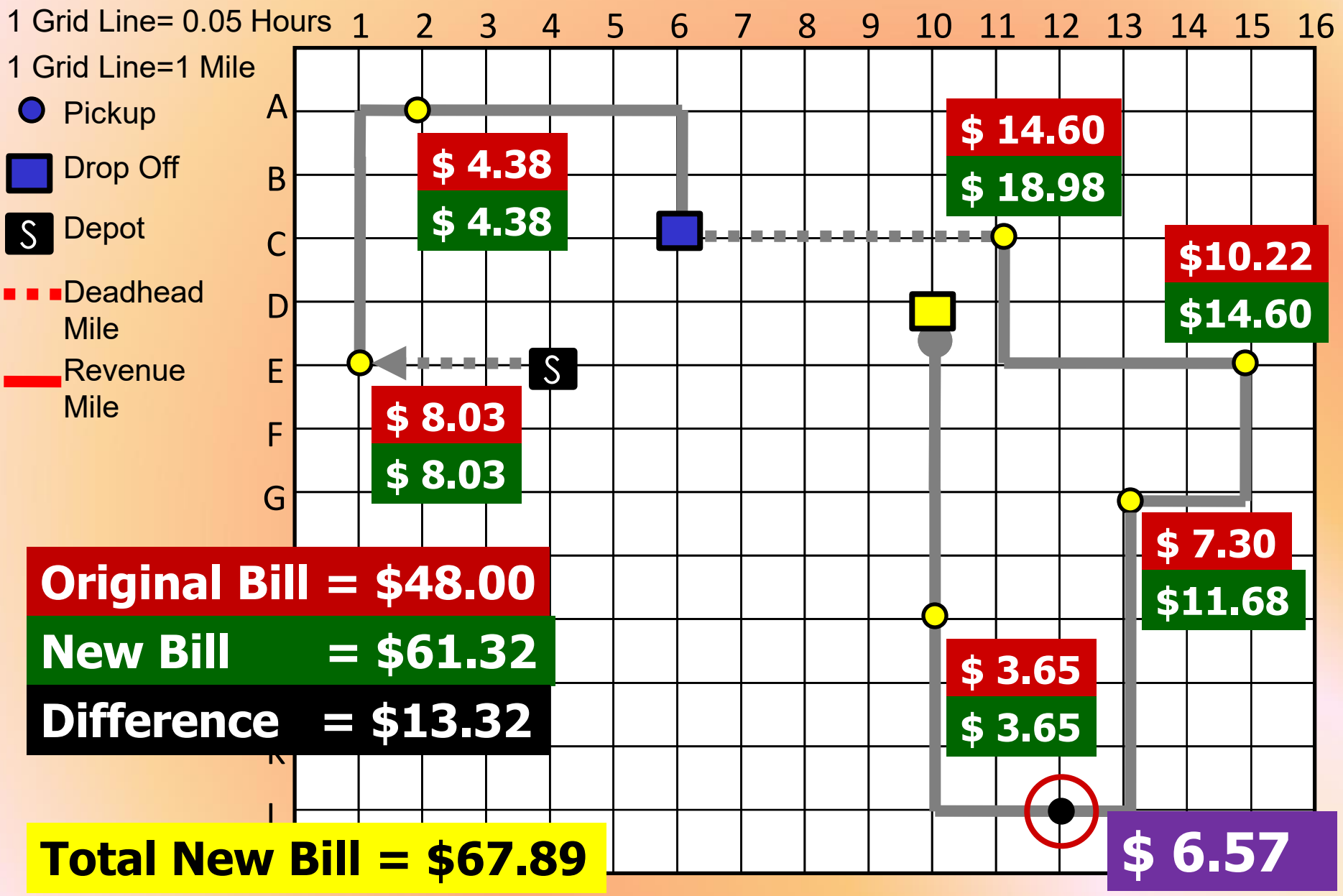
Passenger Mile Scenario 4 - Extra Pickup, Late



Passenger Mile Scenario 5 - Equity



Passenger Mile Scenario 5 - Equity



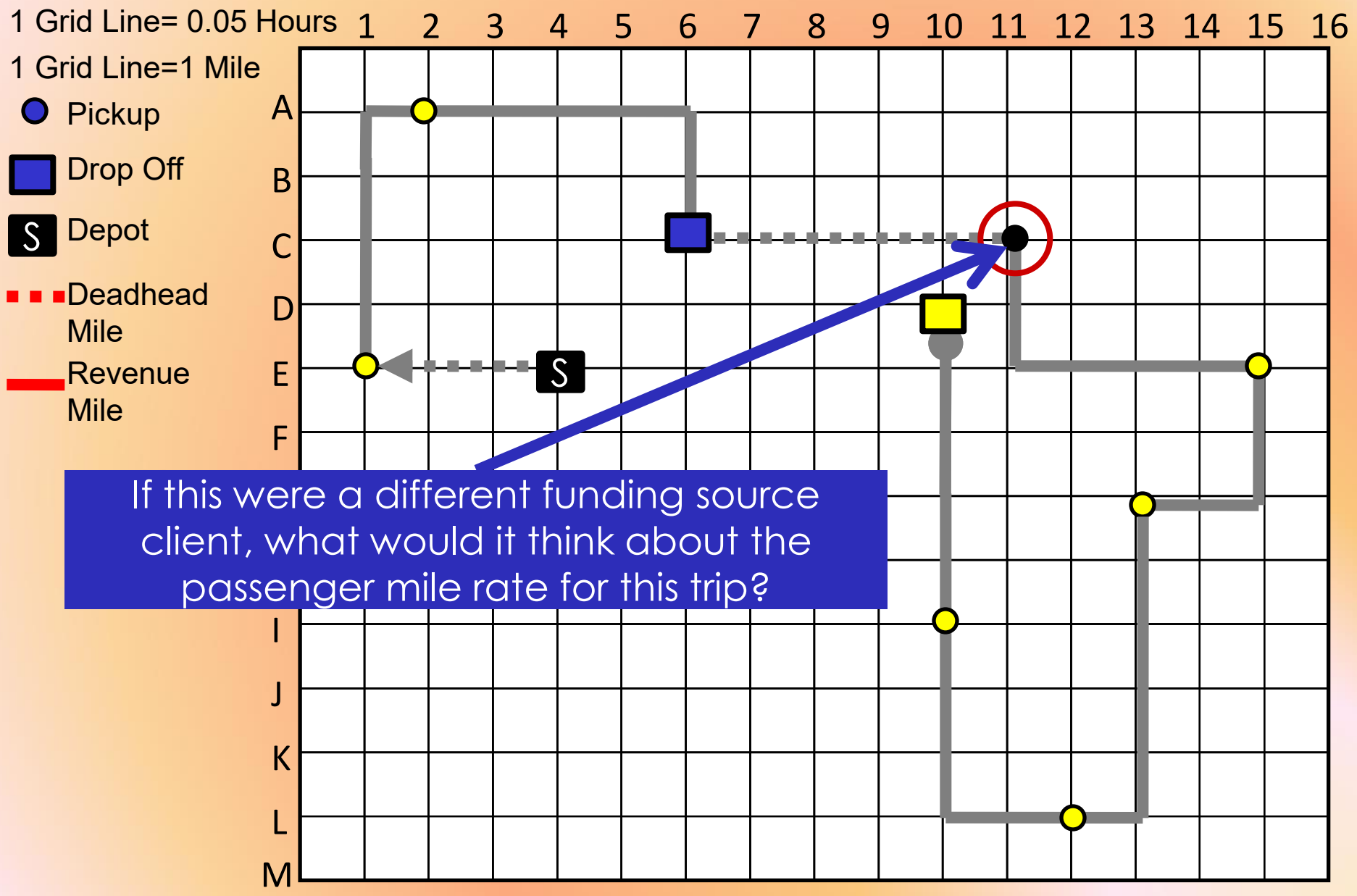
Original Bill = $48.00

New Bill = $61.32

Difference = $13.32

Total New Bill = $67.89

Passenger Mile Scenario 6 - Equity



Passenger Miles Summary

- Equity- Potential for inequitable billing situations is high
- Rate Development- Difficult to establish rates *(Divide total costs by the number of passenger miles with assumptions for growth)*
  - collect data during VUD weeks
- Data Requirement- Intense
- No Shows- No impact on bills for riders on the vehicle
- Cancellations- Decreased bills for riders on the vehicle
- Additional Passengers- Increased passenger bills if added at the end of the route, no impact if added at the beginning
- Efficiency-
  - Encourages full vehicles (more passengers = more $)
  - Encourages deadhead minimization (no $ added)
  - No incentive for revenue mile efficiency
- Other- Can be difficult for agencies to understand price differences for the same trip

Shared Service Miles ($1.23) / Hours ($24.62)

Shared Service Mile/Hour Bills are calculated by dividing the service miles/hours by the number of passengers on the run.

Data Requirements:

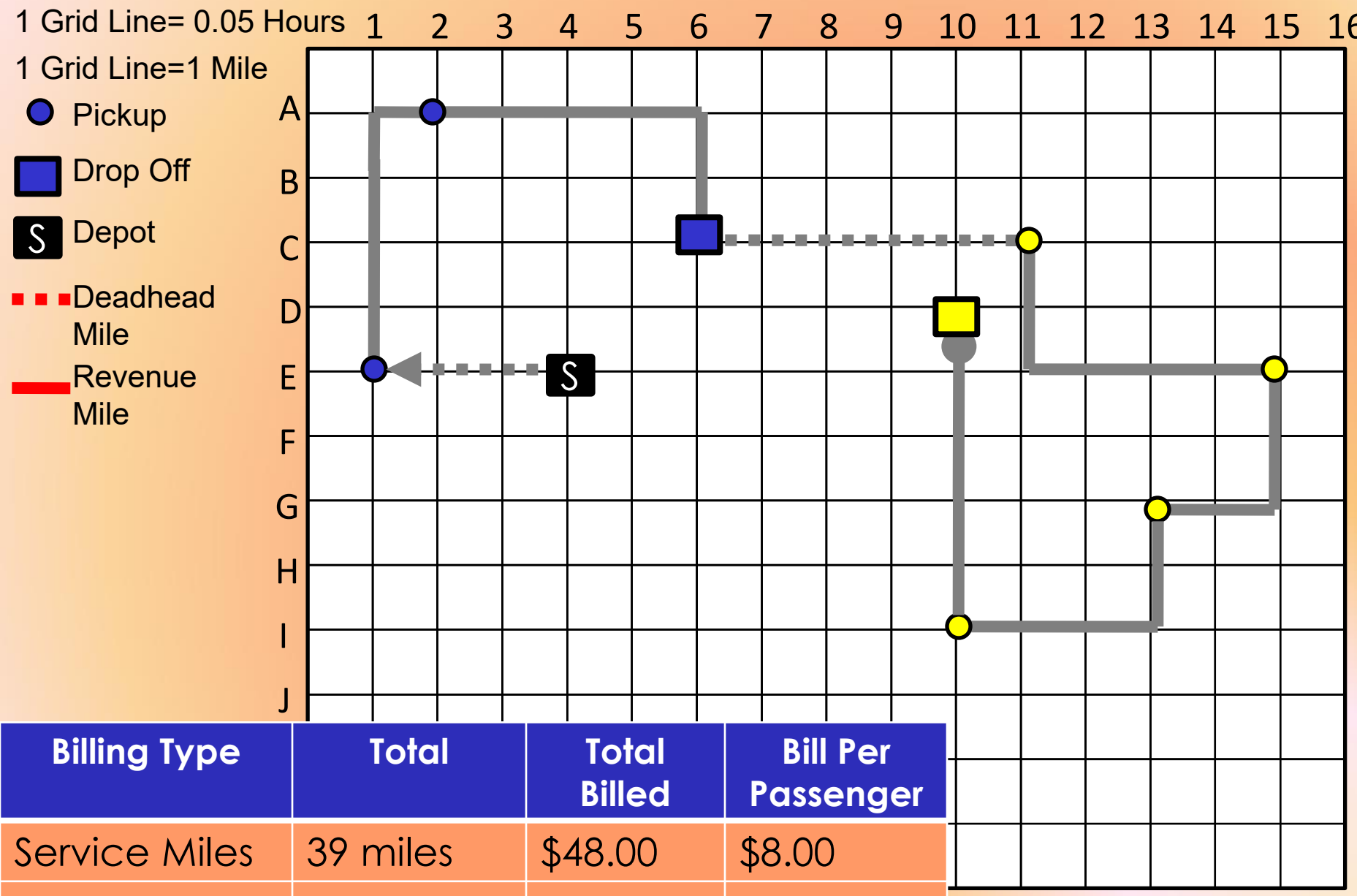
- Run start and end odometer / time
- Passenger counts
- Cancels, No Shows

medium

Shared Service Mile/Hour - Required Data

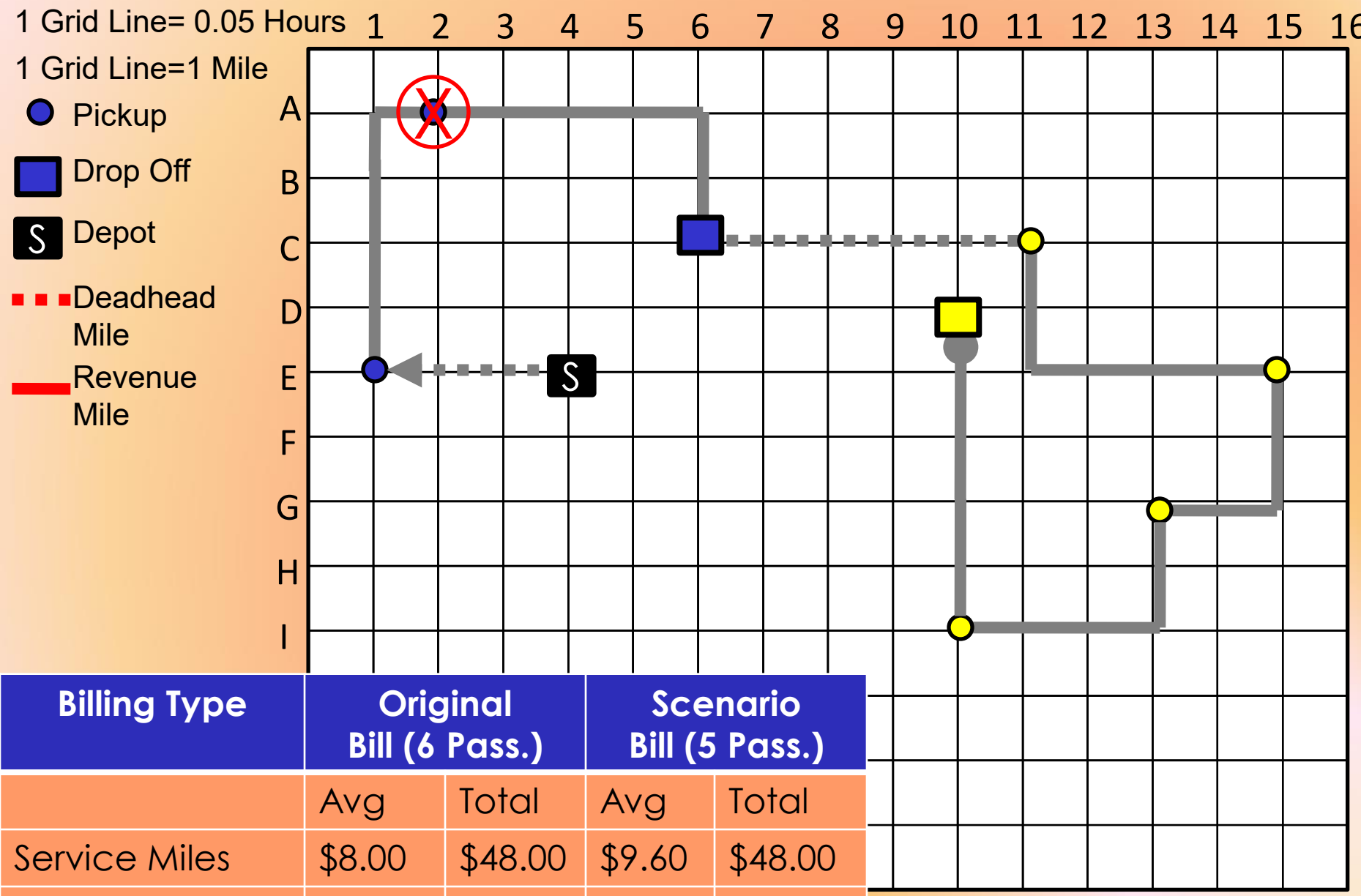
Route					Driver Manifest										
Date		Driver		Actual Start Time		Start Odom		1st Stop Time			1st Stop Odom				
				Actual End Time		End Odom		Last Stop Time			Last Stop Odom				
In/Out	Appt. Time	Client		Origin/ Destination				Mob. Aid	Agency	Miles	Units	No Show	Can-celled		

Shared Service Miles ($1.23) / Hours ($24.62)



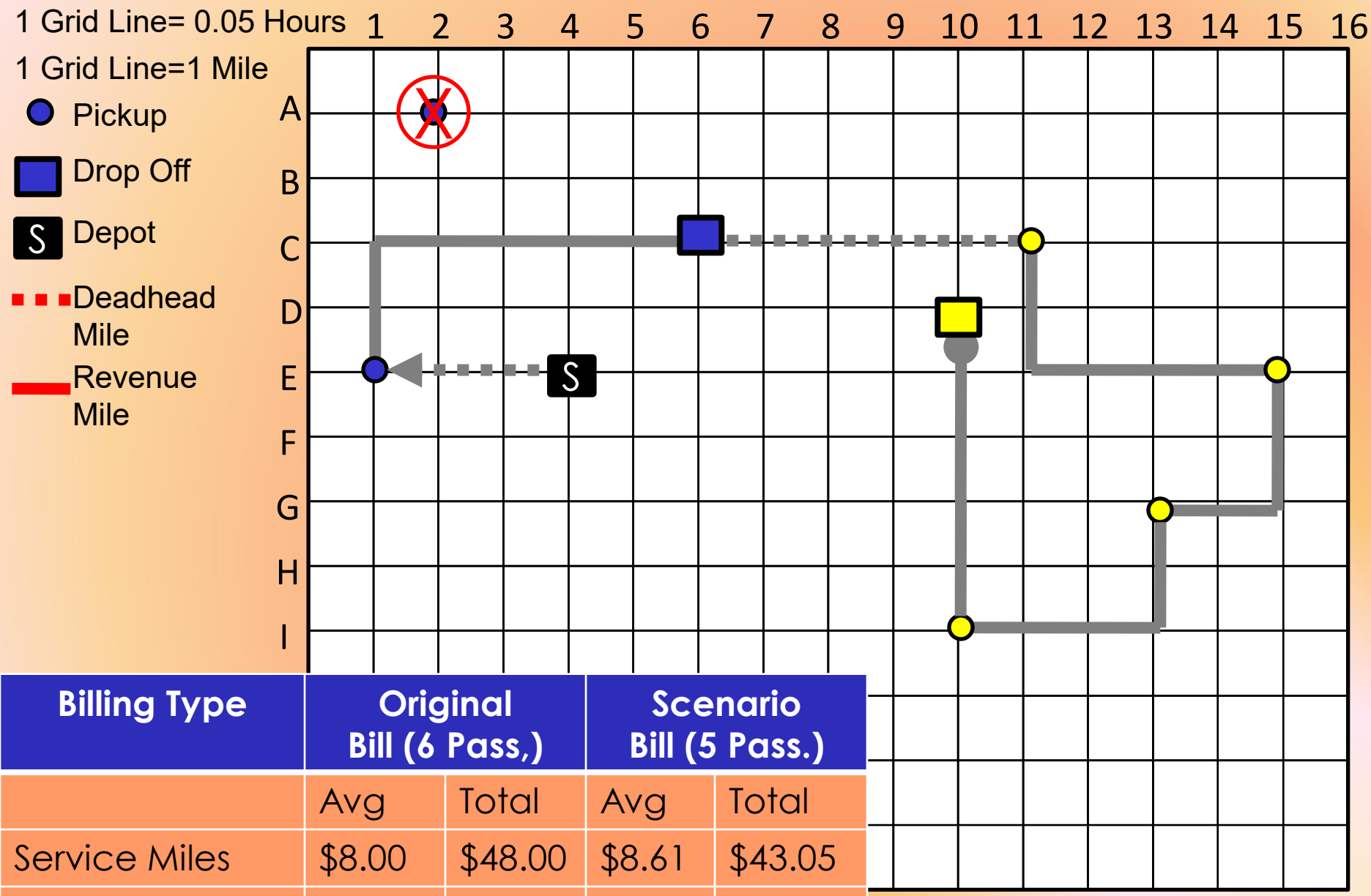
Billing Type	Total	Total Billed	Bill Per Passenger
Service Miles	39 miles	$48.00	$8.00
Service Hours	1.95 hours	$48.00	$8.00

Service Miles/Hours Scenario 1 - No Show



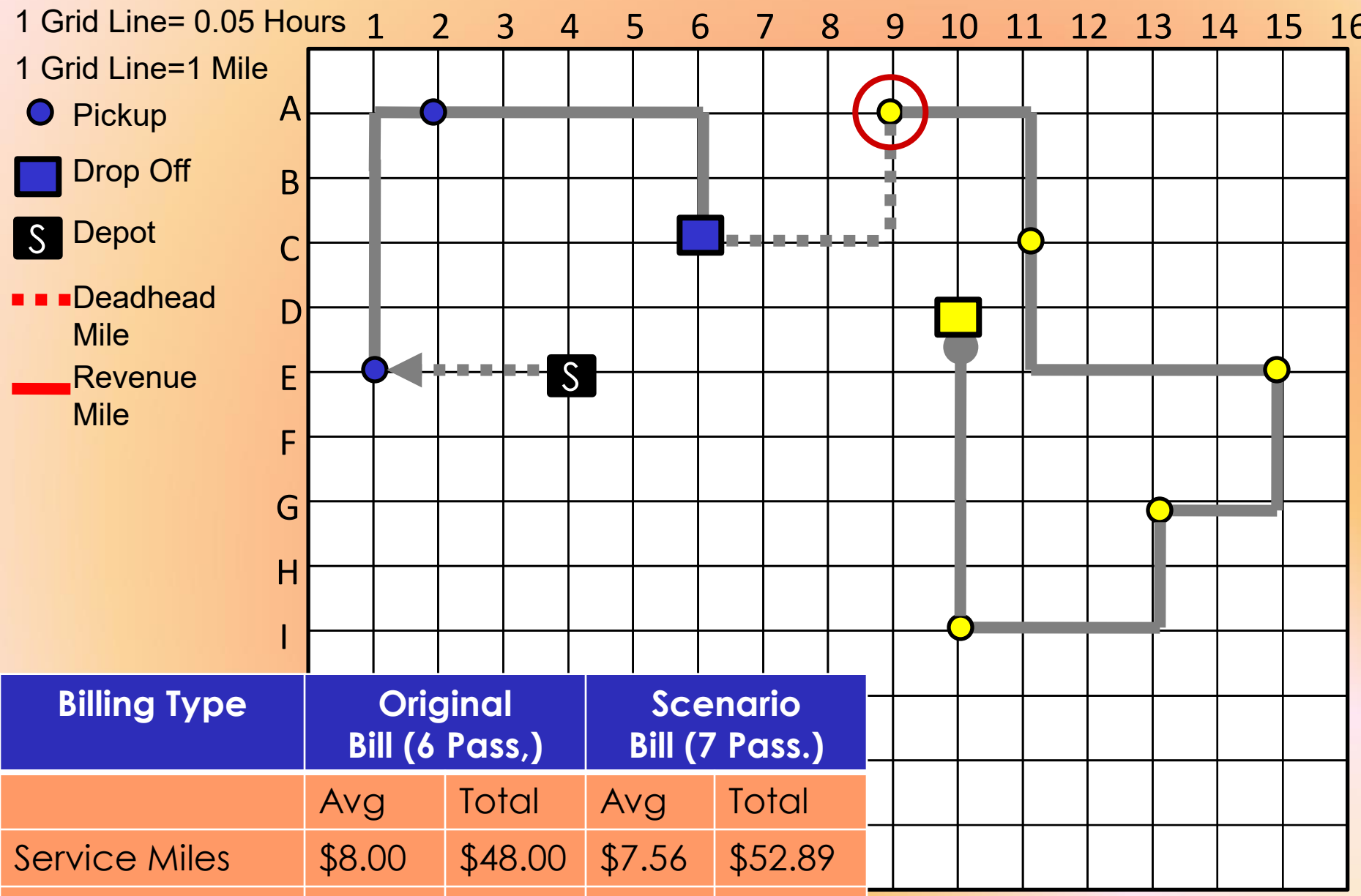
Billing Type	Original Bill (6 Pass.)		Scenario Bill (5 Pass.)	
	Avg	Total	Avg	Total
Service Miles	$8.00	$48.00	$9.60	$48.00
Service Hours	$8.00	$48.00	$9.60	$48.00

Service Mile/Hour Scenario 2 - Cancellation



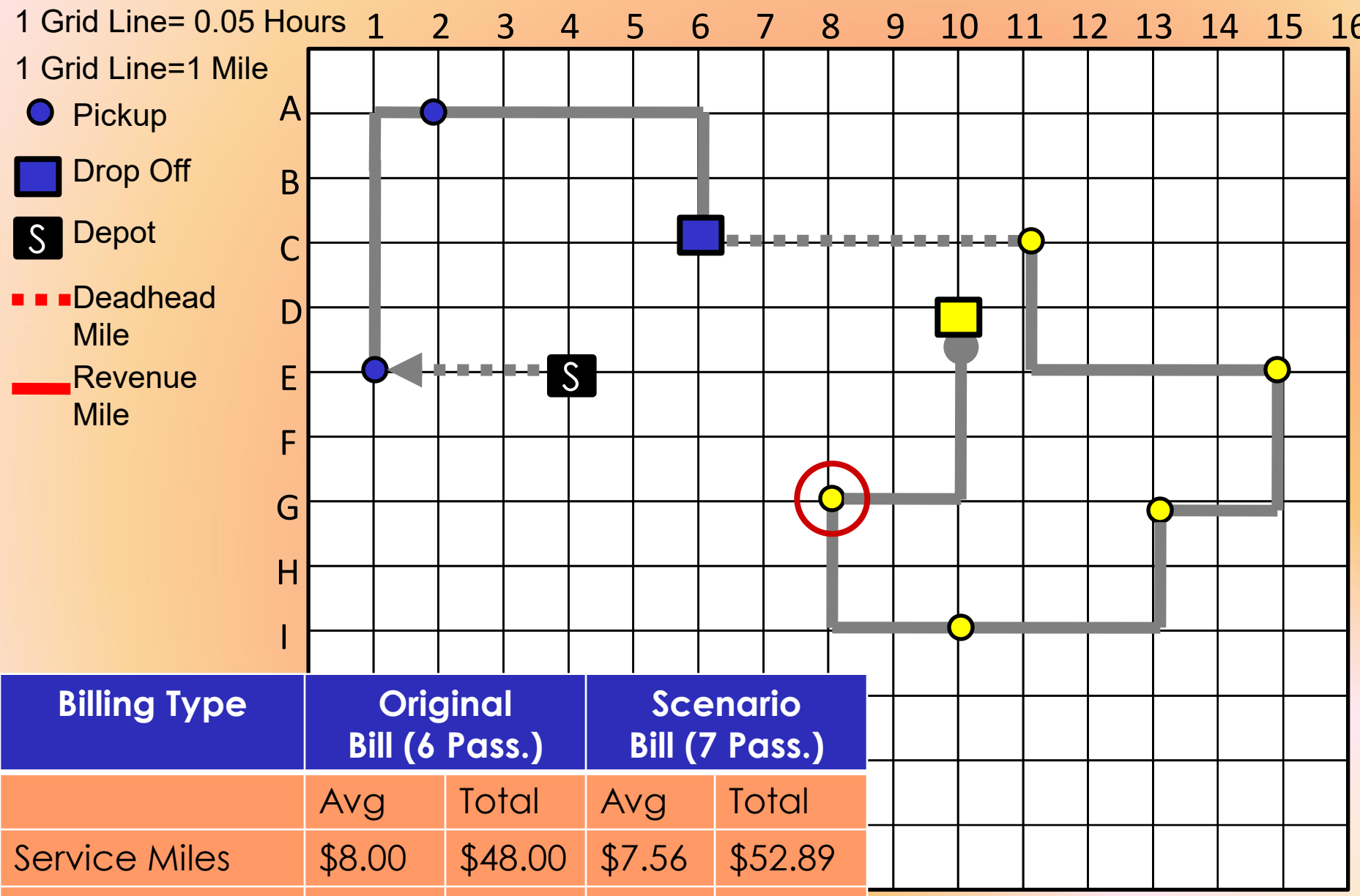
Billing Type	Original Bill (6 Pass,)		Scenario Bill (5 Pass.)	
	Avg	Total	Avg	Total
Service Miles	$8.00	$48.00	$8.61	$43.05
Service Hours	$8.00	$48.00	$8.61	$43.05

Service Mile/Hour Scenario 3 - Extra Pickup, Early



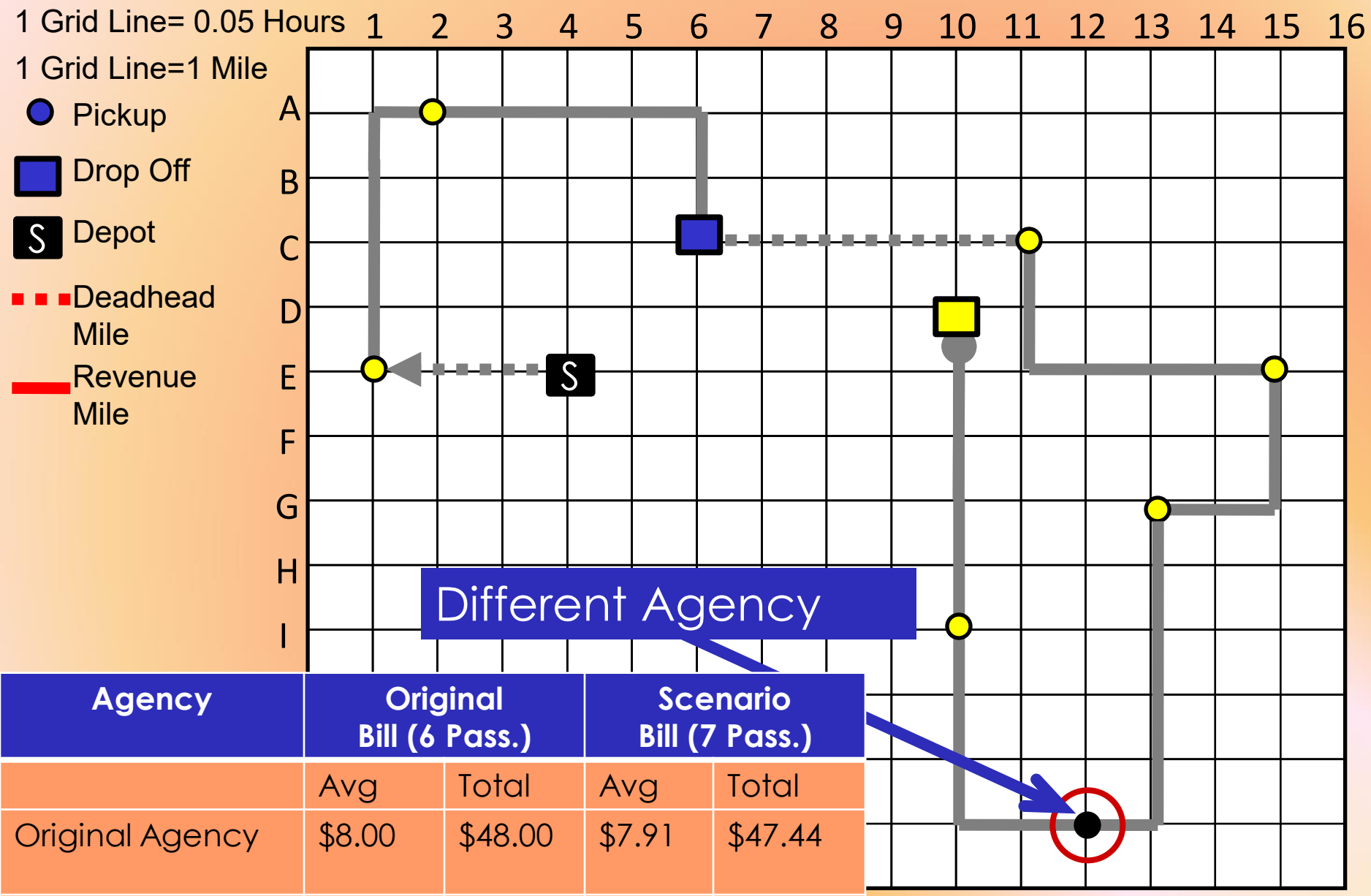
Billing Type	Original Bill (6 Pass,)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Service Miles	$8.00	$48.00	$7.56	$52.89
Service Hours	$8.00	$48.00	$7.56	$52.89

Service Mile/Hour Scenario 4 - Extra Pickup, Late



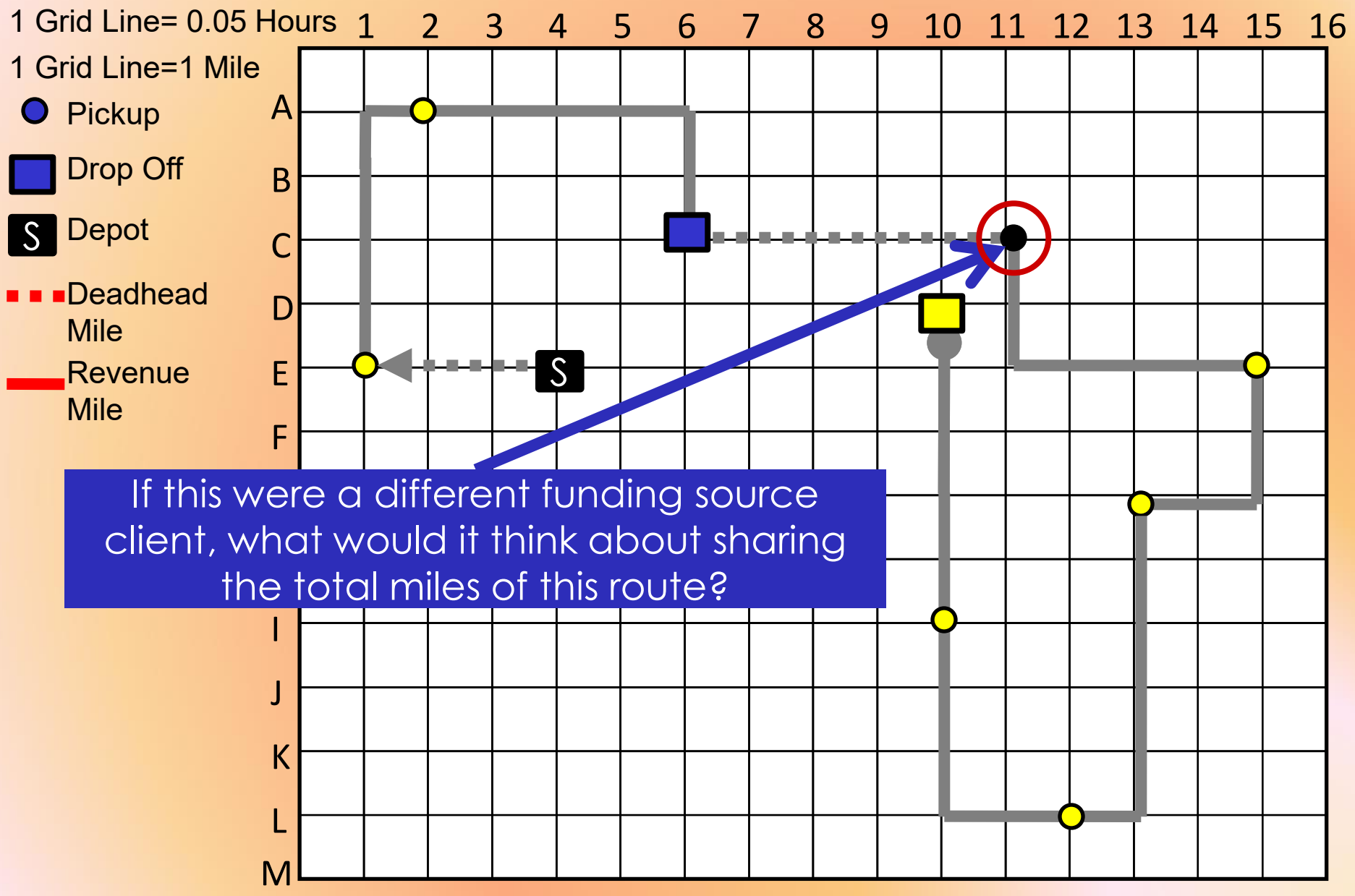
Billing Type	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Service Miles	$8.00	$48.00	$7.56	$52.89
Service Hours	$8.00	$48.00	$7.56	$52.89

Service Mile/Hour Scenario 5 - Equity



Agency	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Original Agency	$8.00	$48.00	$7.91	$47.44
New Agency			$7.91	$ 7.91

Service Mile/Hour Scenario 6 - Equity



Service Mile/Hour Summary

- Equity- The potential for inequity is there, must be monitored
- Rate Creation- Easy *(Divide total costs by the number of miles/hours with assumptions for growth)*
- Data Requirements- Medium
- No Shows- Increased bills for riders on the vehicle
- Cancellations- May increase bills for riders on the vehicle
- Additional Passengers- Decreased passenger bills
- Efficiency-
  - No incentive for full vehicles (more passengers = same $)
  - No incentive for deadhead minimization (same $)
  - No incentive for revenue mile/hour efficiency
- Other- Can be difficult for agencies to understand price differences for the same trip

Shared Revenue Miles ($1.55) / Hours ($30.97)

Divide the revenue miles/hours by the number of passengers on the run.

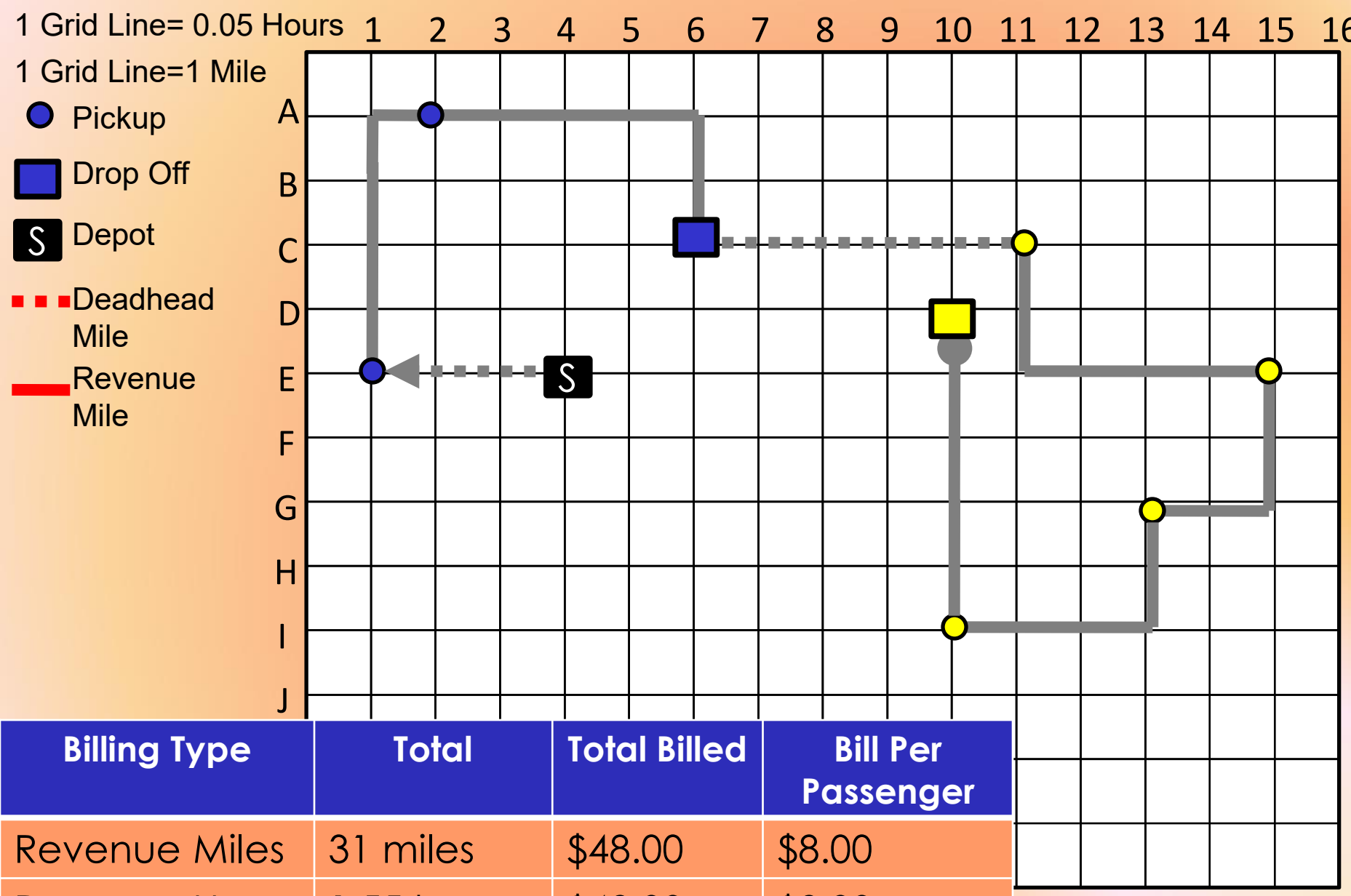
Data Requirements:

- First passenger pickup and last passenger drop-off odometer / time
- Passenger counts
- Cancels, No Shows

Shared Revenue Mile/Hour - Required Data

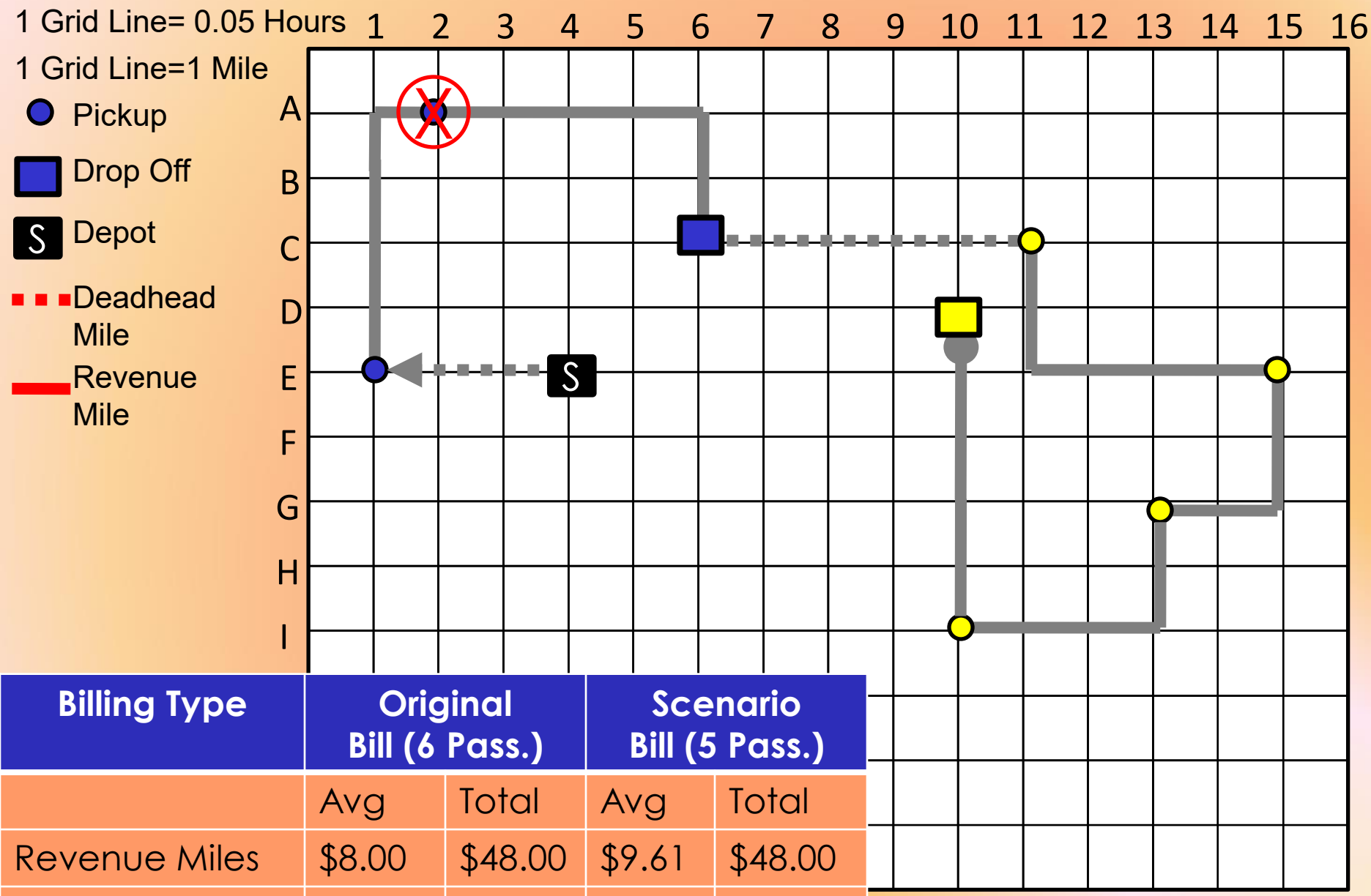
Route					Driver Manifest								
Date		Driver		Actual Start Time		Start Odom		1st Stop Time		1st Stop Odom			
				Actual End Time		End Odom		Last Stop Time		Last Stop Odom			
In/Out	Appt. Time	Client		Origin/ Destination			Mob. Aid	Agency	Miles	Units	No Show	Can-celled	

Shared Revenue Miles ($1.55) / Hours ($30.97)



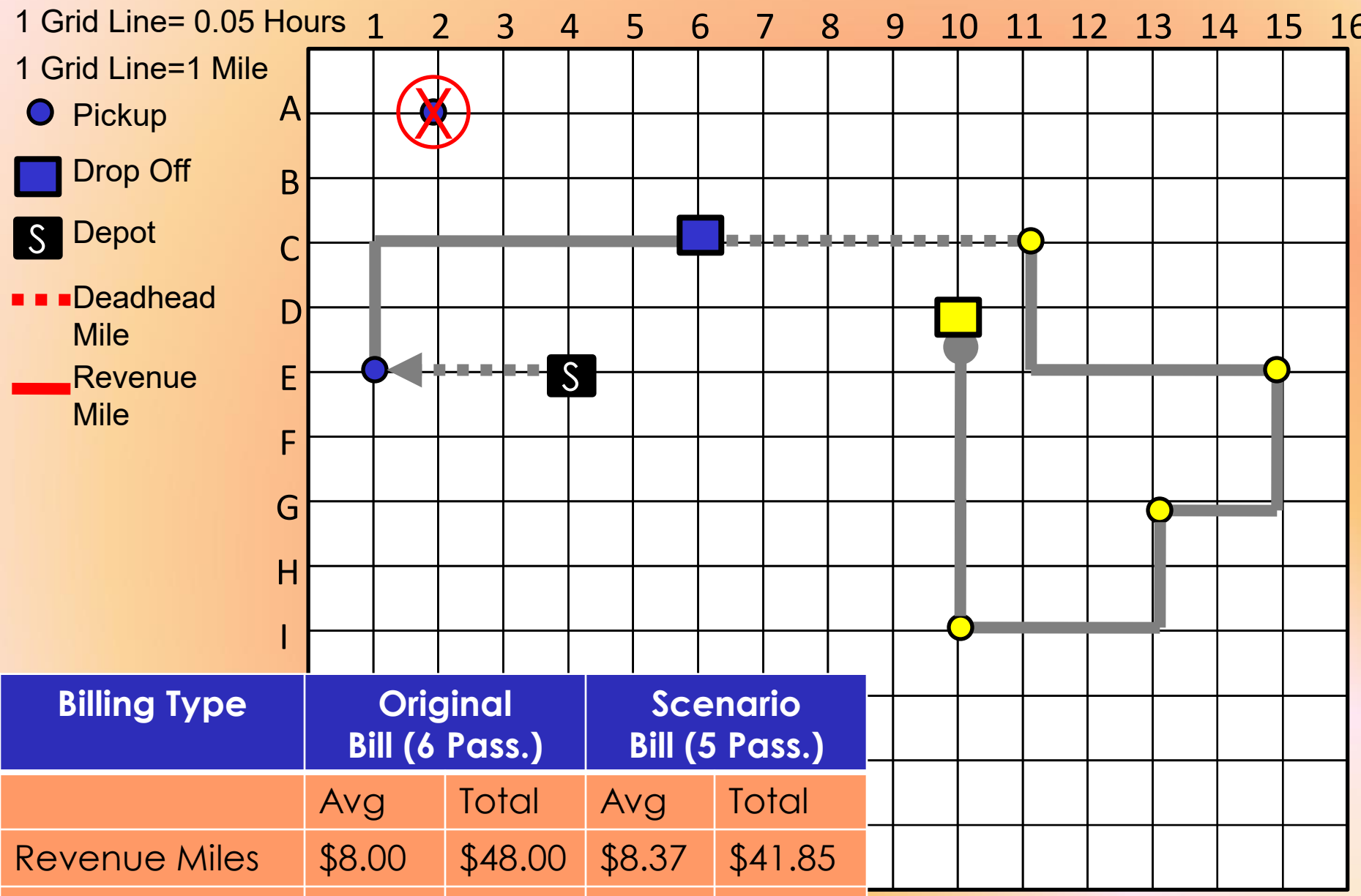
Billing Type	Total	Total Billed	Bill Per Passenger
Revenue Miles	31 miles	$48.00	$8.00
Revenue Hours	1.55 hours	$48.00	$8.00

Revenue Miles/Hours Scenario 1 - No Show



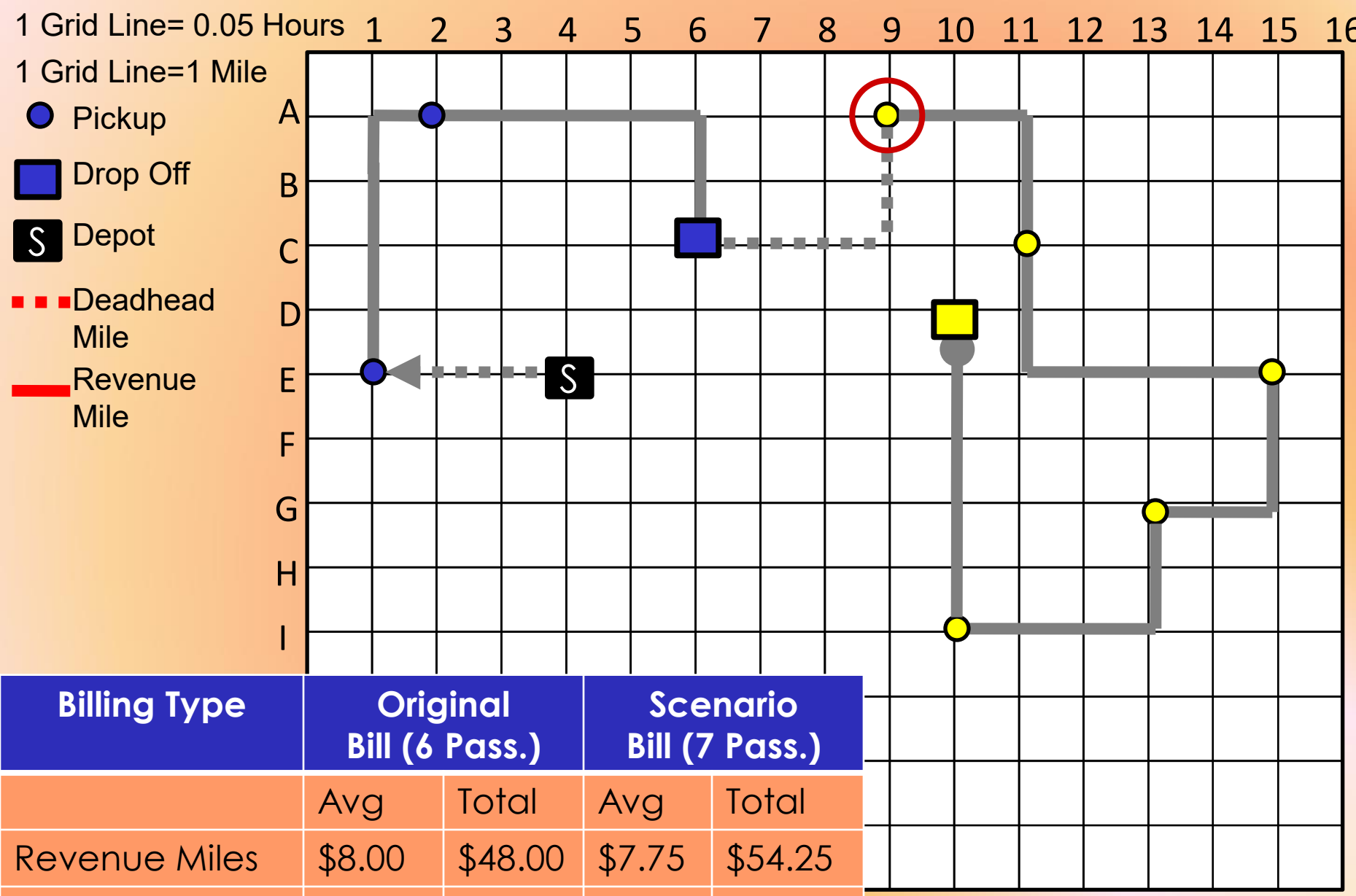
Billing Type	Original Bill (6 Pass.)		Scenario Bill (5 Pass.)	
	Avg	Total	Avg	Total
Revenue Miles	$8.00	$48.00	$9.61	$48.00
Revenue Hours	$8.00	$48.00	$9.61	$48.00

Revenue Mile/Hour Scenario 2 - Cancellation



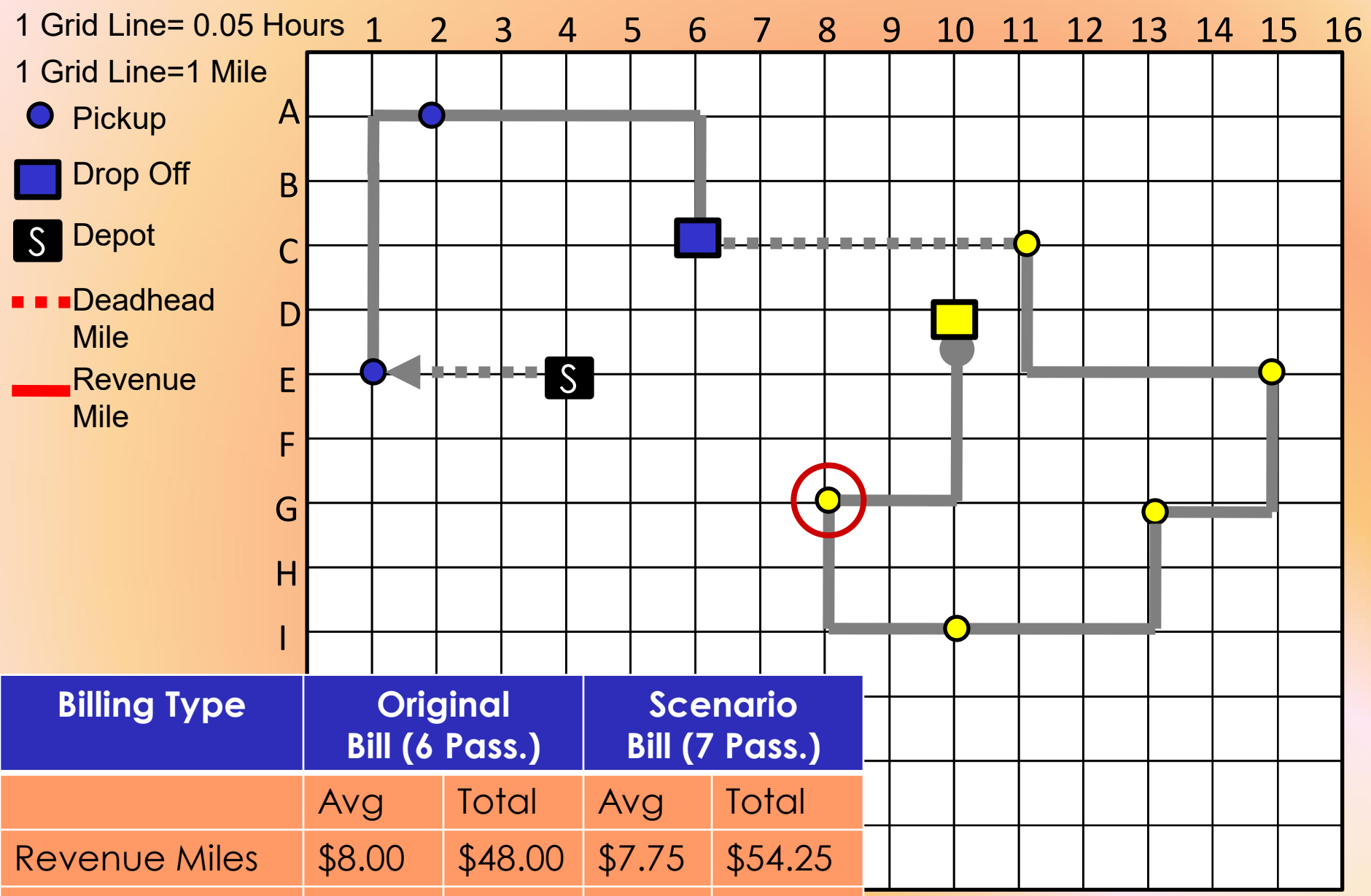
Billing Type	Original Bill (6 Pass.)		Scenario Bill (5 Pass.)	
	Avg	Total	Avg	Total
Revenue Miles	$8.00	$48.00	$8.37	$41.85
Revenue Hours	$8.00	$48.00	$8.37	$41.85

Revenue Mile/Hour Scenario 3 - Extra Pickup, Early



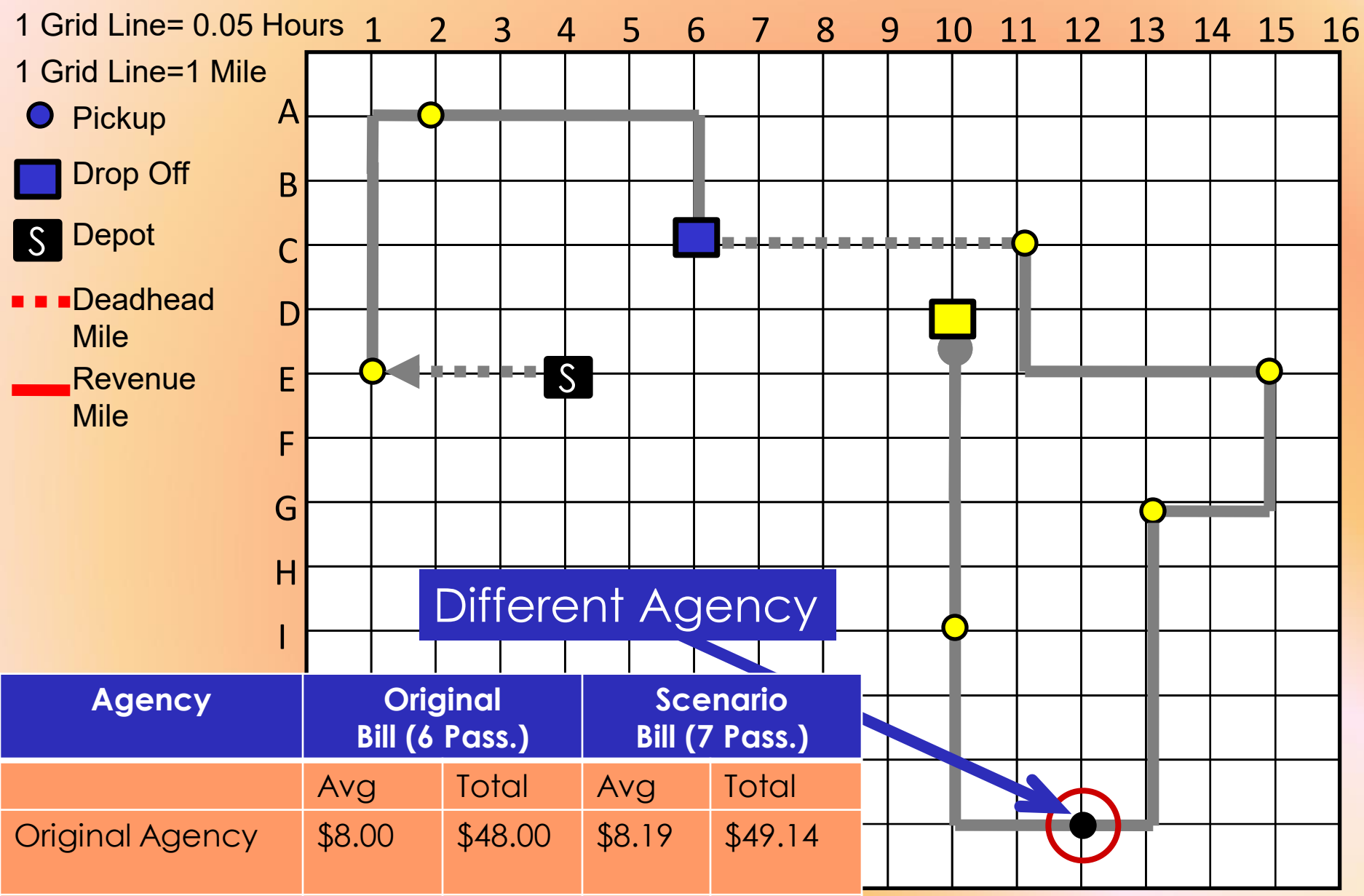
Billing Type	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Revenue Miles	$8.00	$48.00	$7.75	$54.25
Revenue Hours	$8.00	$48.00	$7.75	$54.25

Revenue Mile/Hour Scenario 4 - Extra Pickup, Late



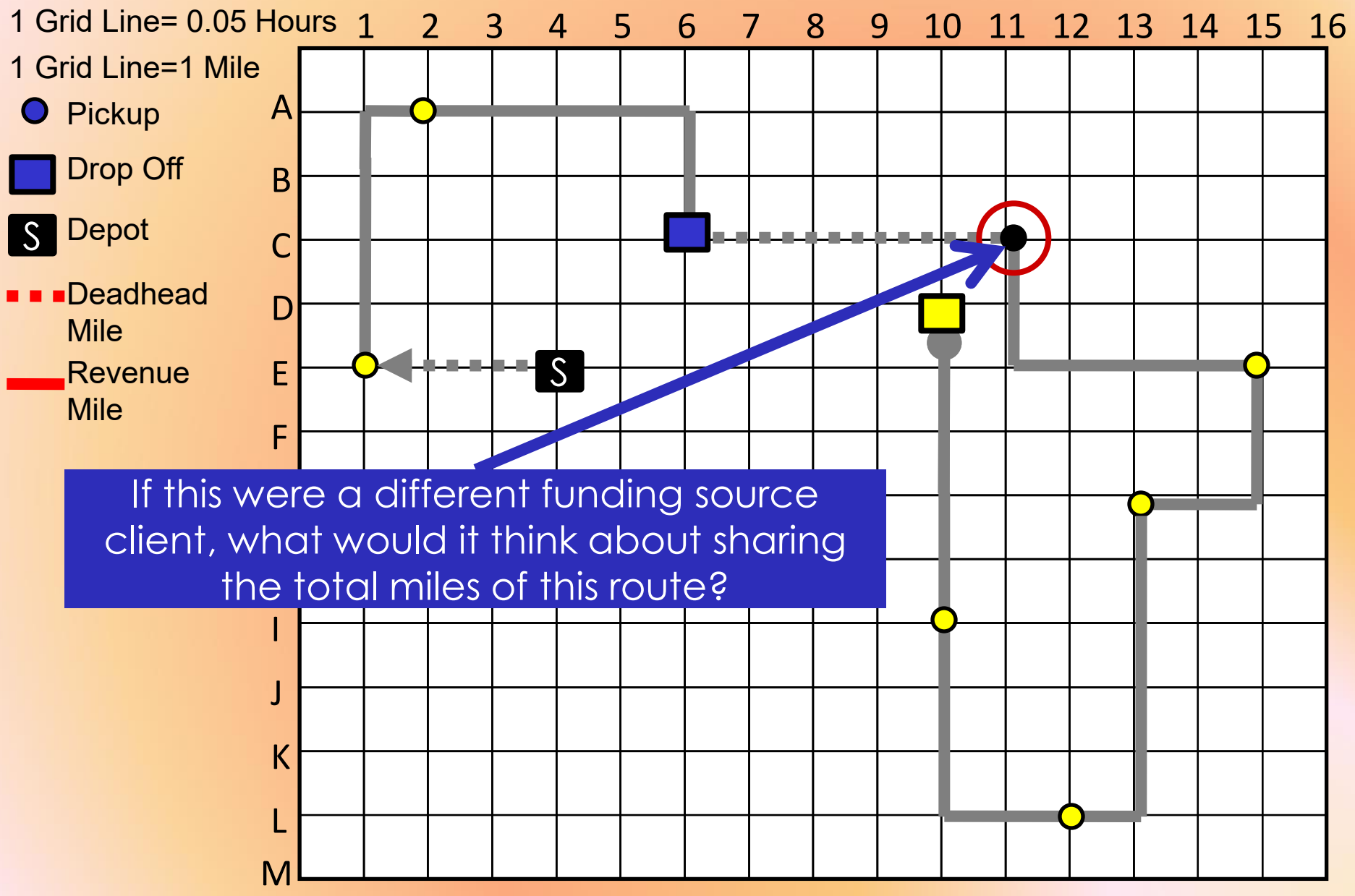
Billing Type	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Revenue Miles	$8.00	$48.00	$7.75	$54.25
Revenue Hours	$8.00	$48.00	$7.75	$54.25

Revenue Mile/Hour Scenario 5 - Equity



Agency	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Original Agency	$8.00	$48.00	$8.19	$49.14
New Agency			$8.19	$ 8.19

Revenue Mile/Hour Scenario 6 - Equity



Revenue Mile/Hour Summary

- Equity- The potential for inequity is there, must be monitored
- Rate Creation- Easy *(Divide total costs by the number of miles/hours with assumptions for growth)*
- Data Requirements- Medium
- No Shows- Increases bills for riders on the vehicle
- Cancellations- May increase bill for riders on the vehicle
- Additional Passengers- Decreases passenger bills
- Efficiency-
  - No incentive for full vehicles (more passengers = same $)
  - Encourages deadhead minimization (no $ for deadhead)
  - No incentive for revenue mile/hour efficiency
- Other- Can be difficult for agencies to understand price differences for the same trip on different days

Trip Rate / Unit Cost ($8.00)

A set fee is charged per trip regardless of miles / hours traveled.

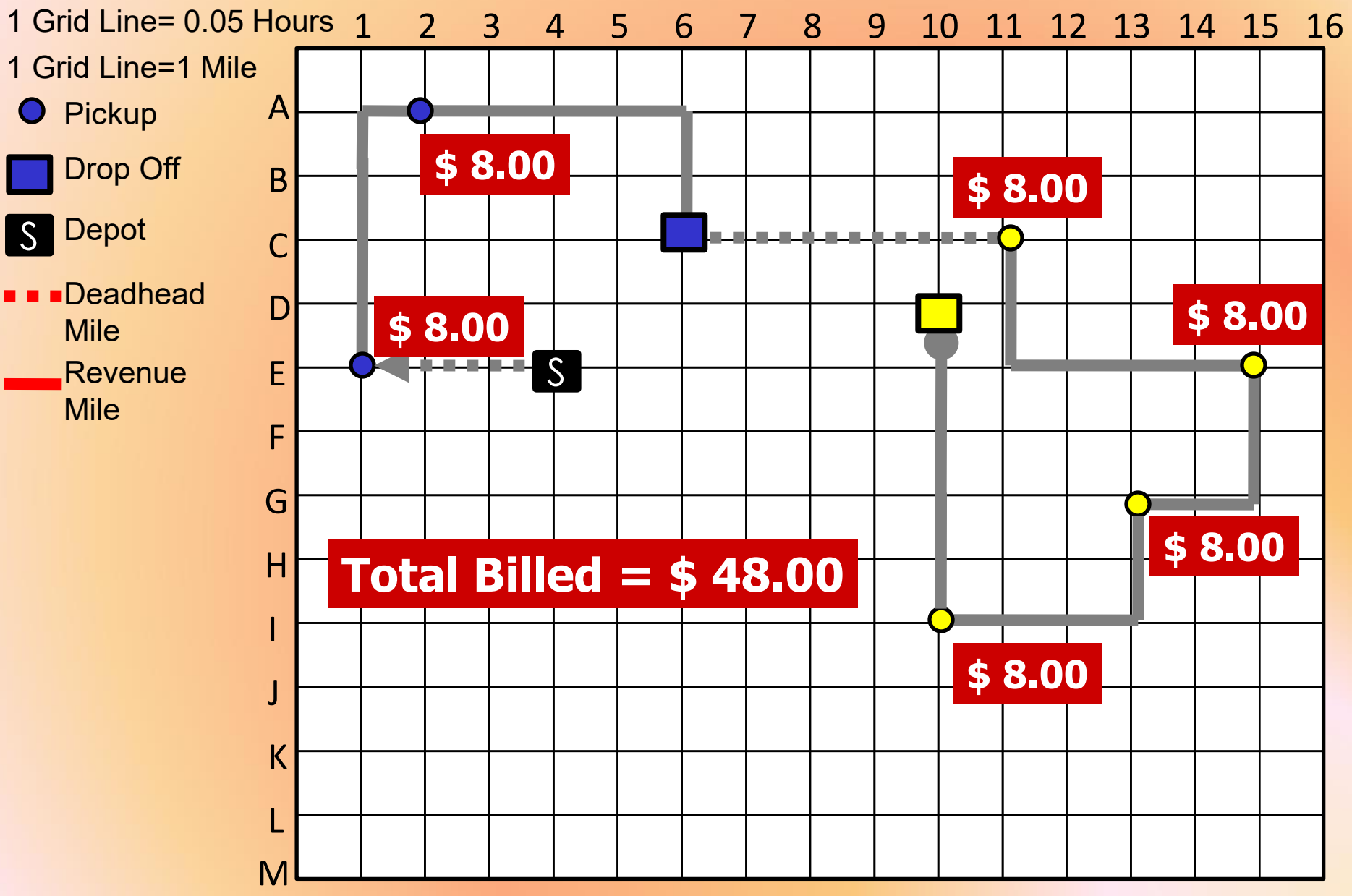
Data Requirements:

- Passenger counts
- Cancels, No Shows

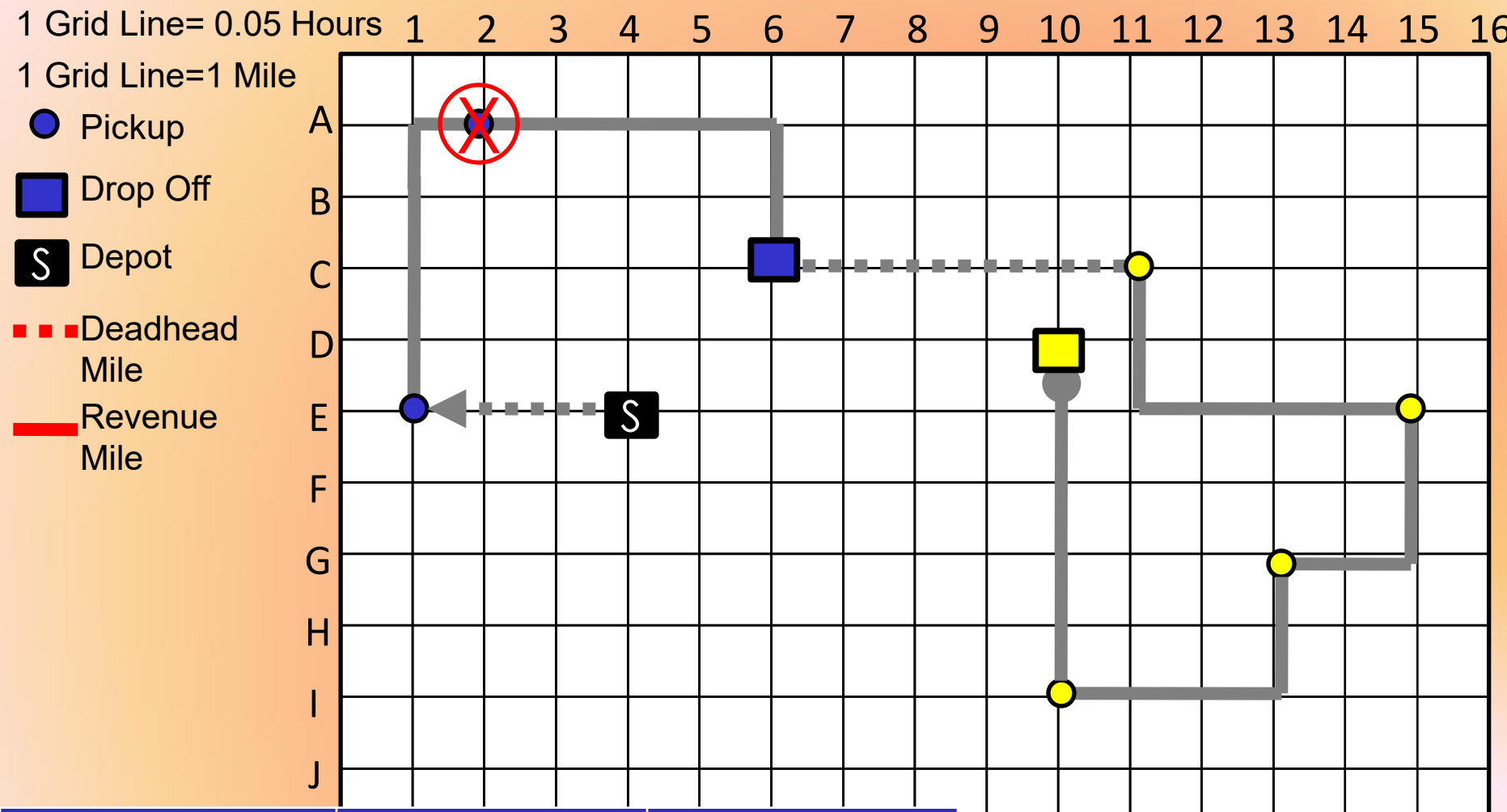
Trip Rate Required Data

Route					Driver Manifest								
Date		Driver		Actual Start Time		Start Odom		1st Stop Time			1st Stop Odom		
				Actual End Time		End Odom		Last Stop Time			Last Stop Odom		
In/Out	Appt. Time	Client		Origin/ Destination			Mob. Aid	Agency	Miles	Units	No Show	Can-celled	

Trip Rate ($8.00)

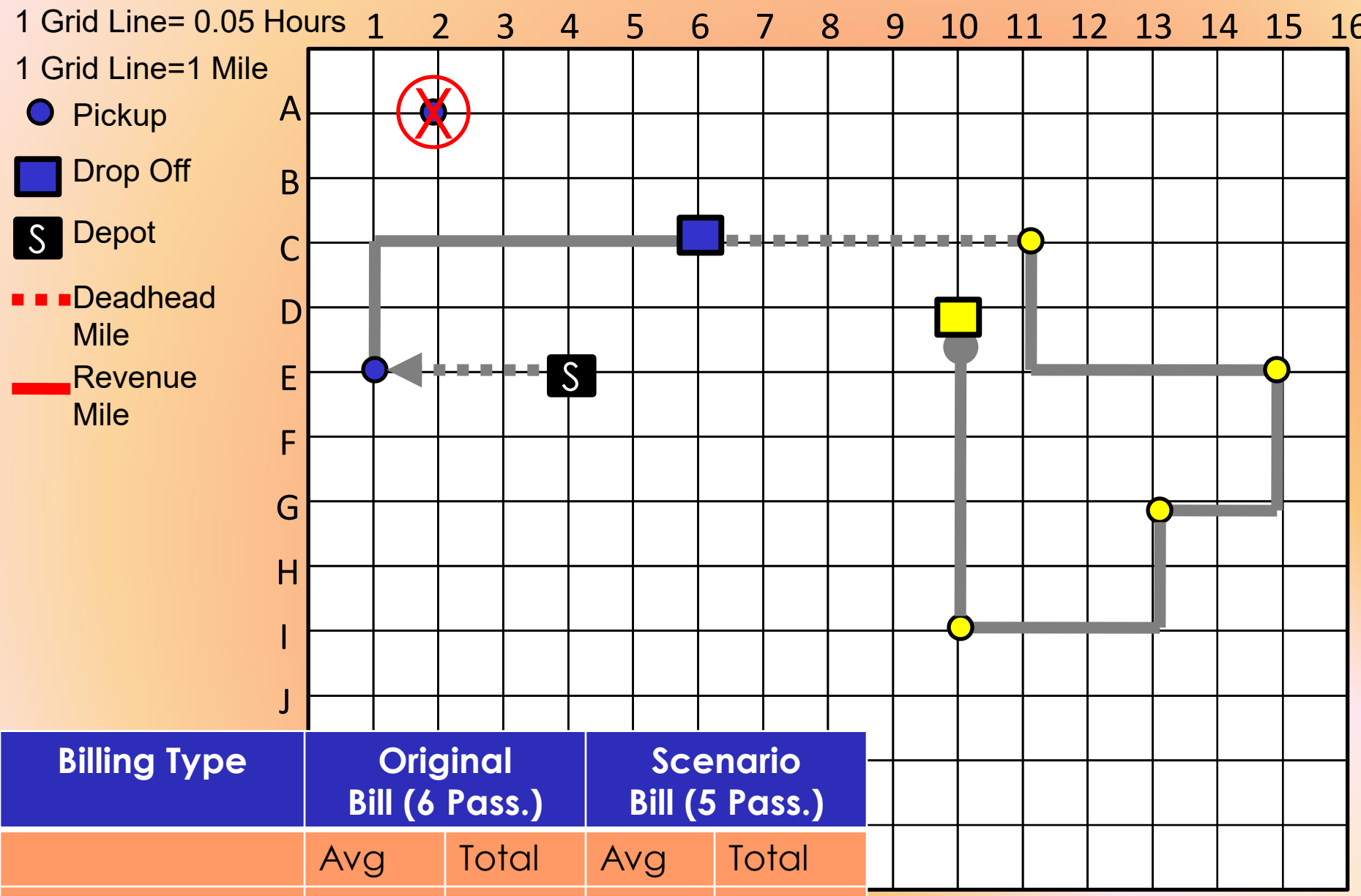


Trip Rate Scenario 1 - No Show



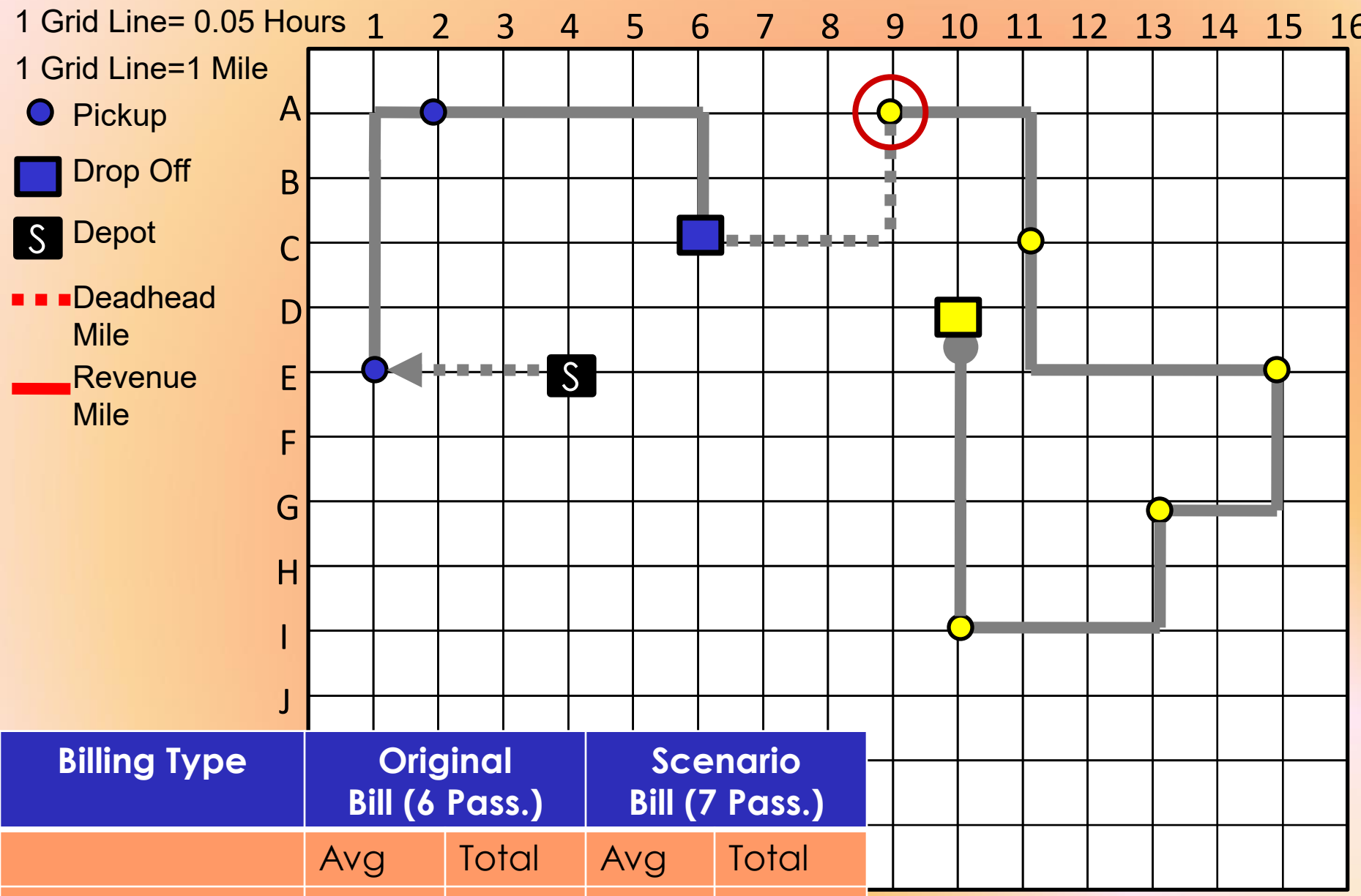
Billing Type	Original Bill (6 Pass.)		Scenario Bill (5 Pass.)	
	Avg	Total	Avg	Total
Trip Rate	$8.00	$48.00	$8.00	$40.00

Trip Rate Scenario 2 - Cancellation



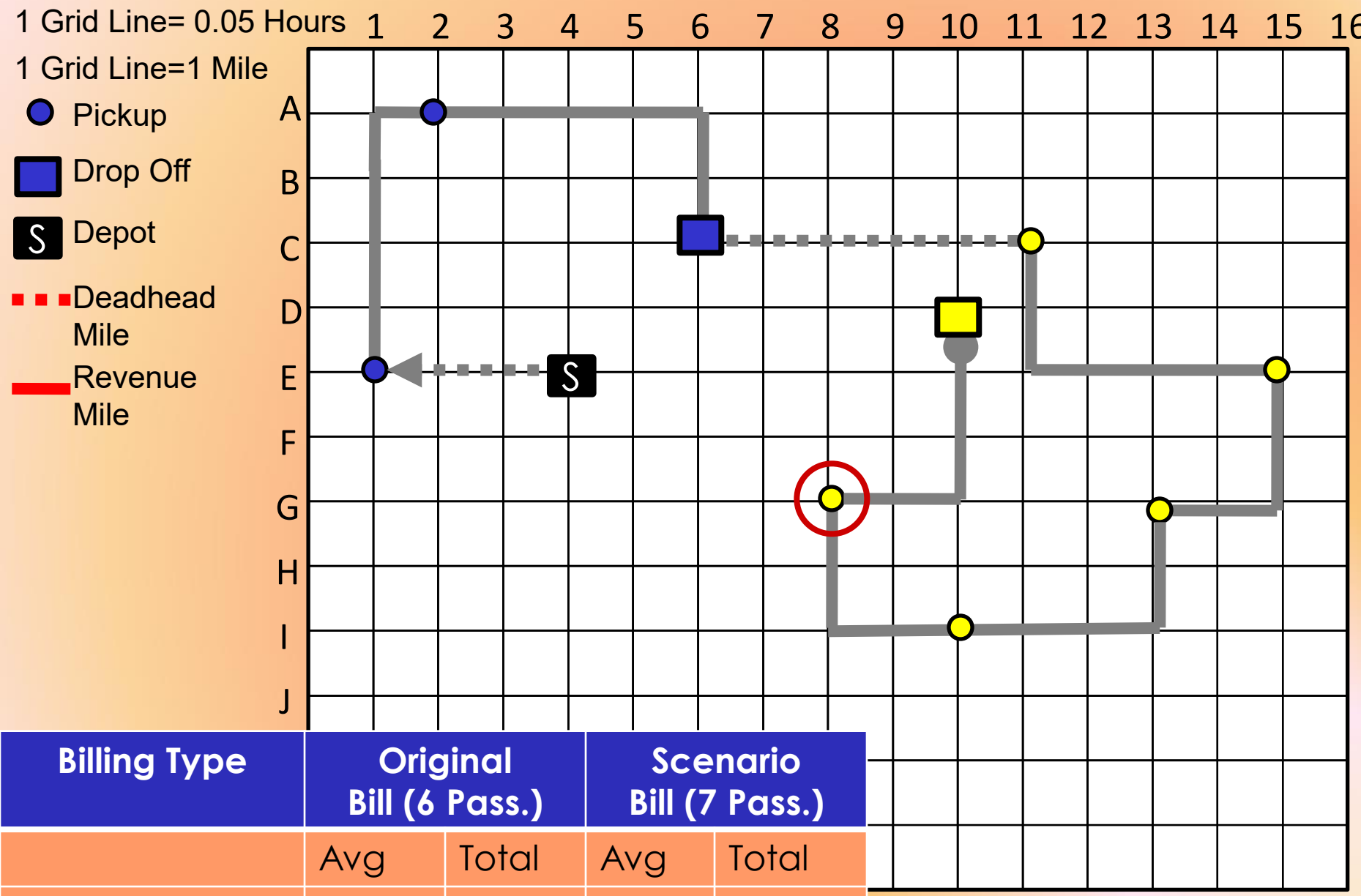
Billing Type	Original Bill (6 Pass.)		Scenario Bill (5 Pass.)	
	Avg	Total	Avg	Total
Trip Rate	$8.00	$48.00	$8.00	$40.00

Trip Rate Scenario 3 - Extra Pickup, Early



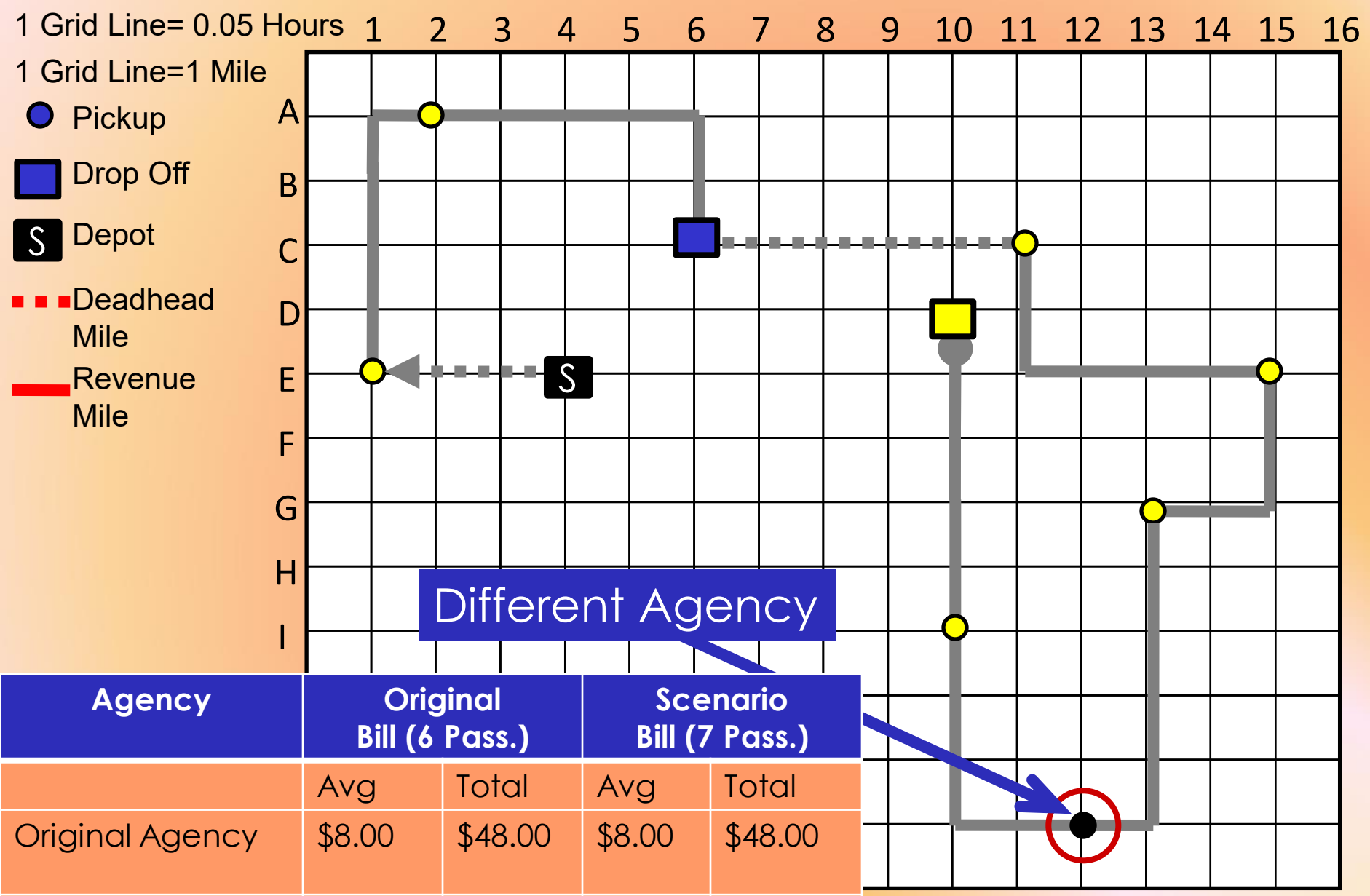
Billing Type	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Trip Rate	$8.00	$48.00	$8.00	$56.00

Trip Rate Scenario 4 - Extra Pickup, Late



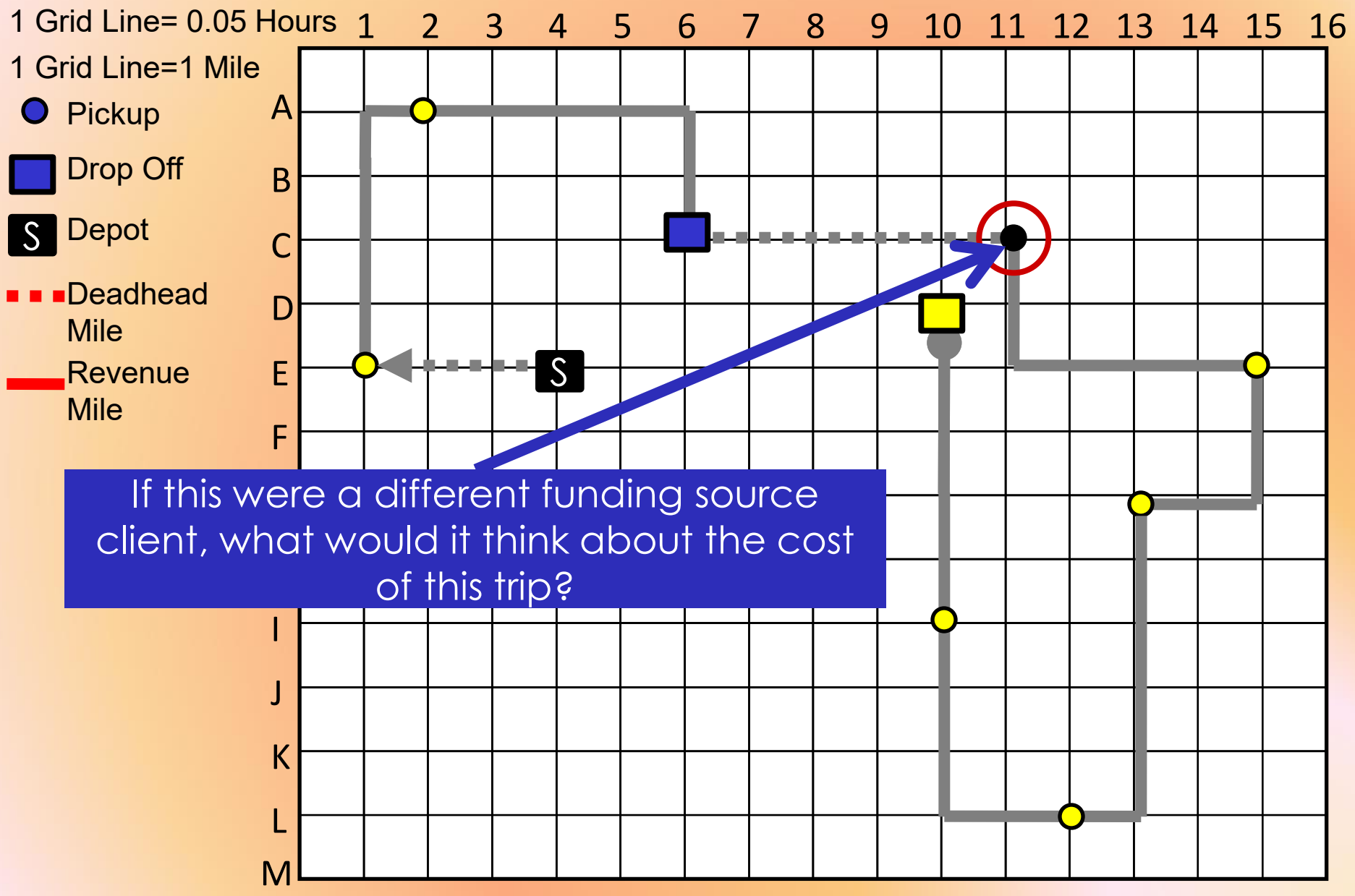
Billing Type	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Trip Rate	$8.00	$48.00	$8.00	$56.00

Trip Rate Scenario 5 - Equity



Agency	Original Bill (6 Pass.)		Scenario Bill (7 Pass.)	
	Avg	Total	Avg	Total
Original Agency	$8.00	$48.00	$8.00	$48.00
New Agency			$8.00	$ 8.00

Trip Rate Scenario 6 - Equity



Trip Rate Summary

- Equity- Overcharges short trips, undercharges long trips
- Rate Creation- Easy *(Divide total cost by total trips with assumptions for growth)*
- Data Requirements- Low
- No Shows- No impact on riders on the vehicle
- Cancellations- No impact on riders on the vehicle
- Additional Passengers- No impact on passenger bills
- Efficiency-
  - Encourages full vehicles (more passengers = more $)
  - Encourages deadhead minimization (no $ added)
  - Encourages revenue mile/hour efficiency (no $ added)
- Other- Very easy for agencies to understand, but savvy agencies may begin using your service only for the difficult trips (potential for abuse)

Direct Miles($1.50/mile)

Trip distance is calculated based on network path between the origin and destination, regardless of how the vehicle delivered the trip

Data Requirements:

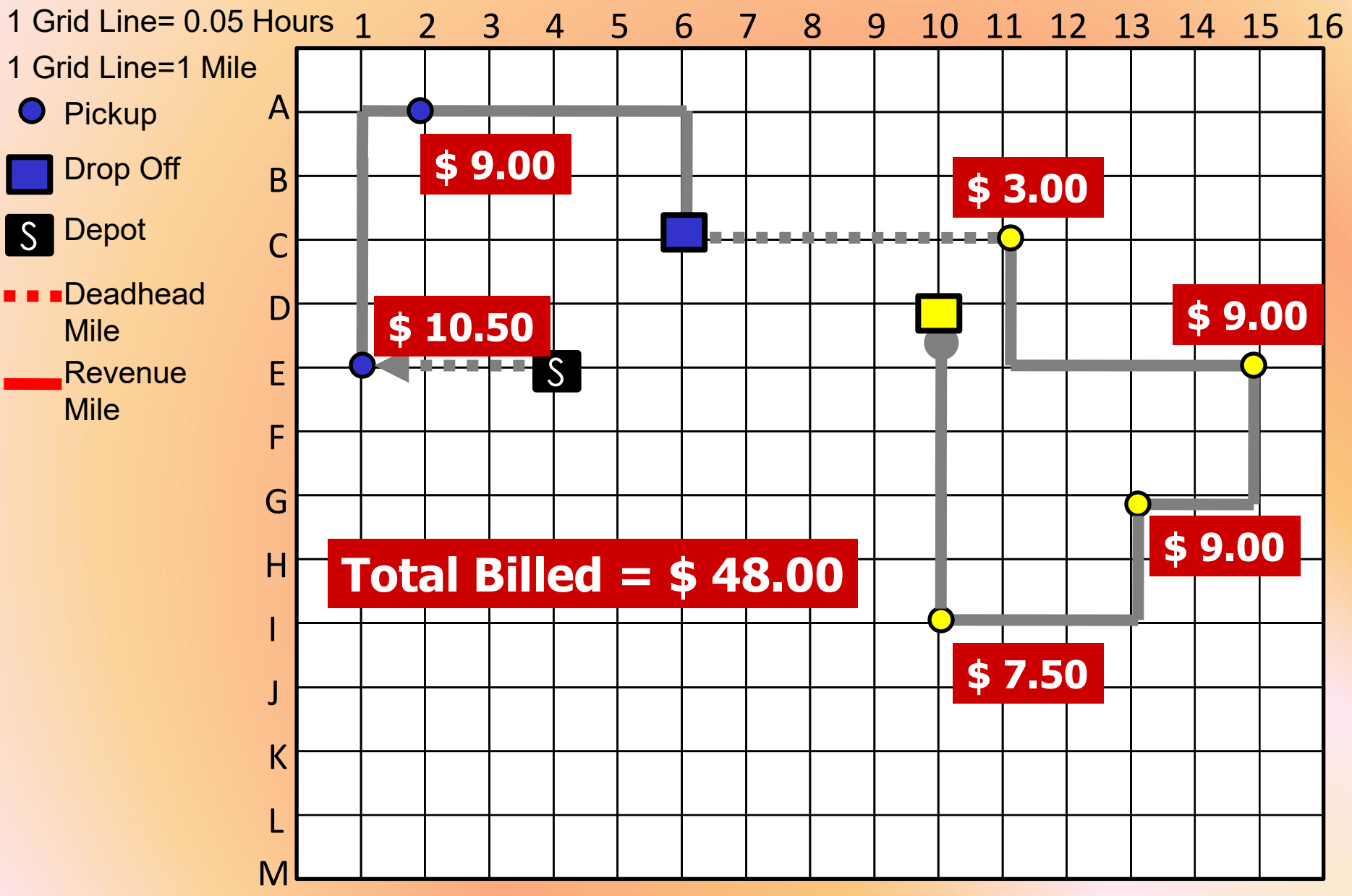
- Passenger counts
- Cancels, No Shows
- Geocoded origin and destination

low

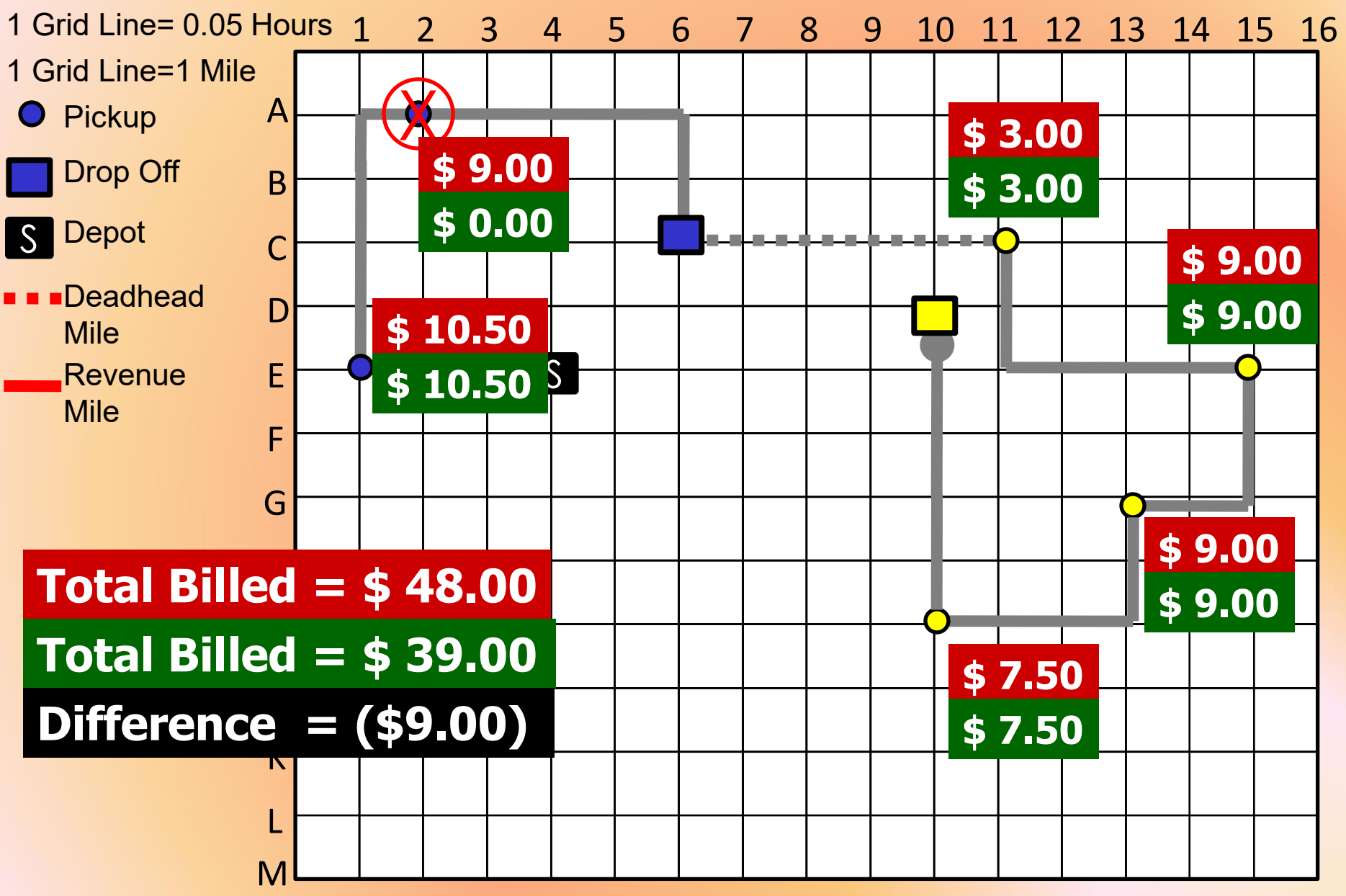
Direct Miles Required Data

Route					Driver Manifest										
Date		Driver		Actual Start Time		Start Odom		1st Stop Time			1st Stop Odom				
				Actual End Time		End Odom		Last Stop Time			Last Stop Odom				
In/Out	Appt. Time	Client		Origin/ Destination				Mob. Aid	Agency	Miles	Units		No Show	Can-celled	

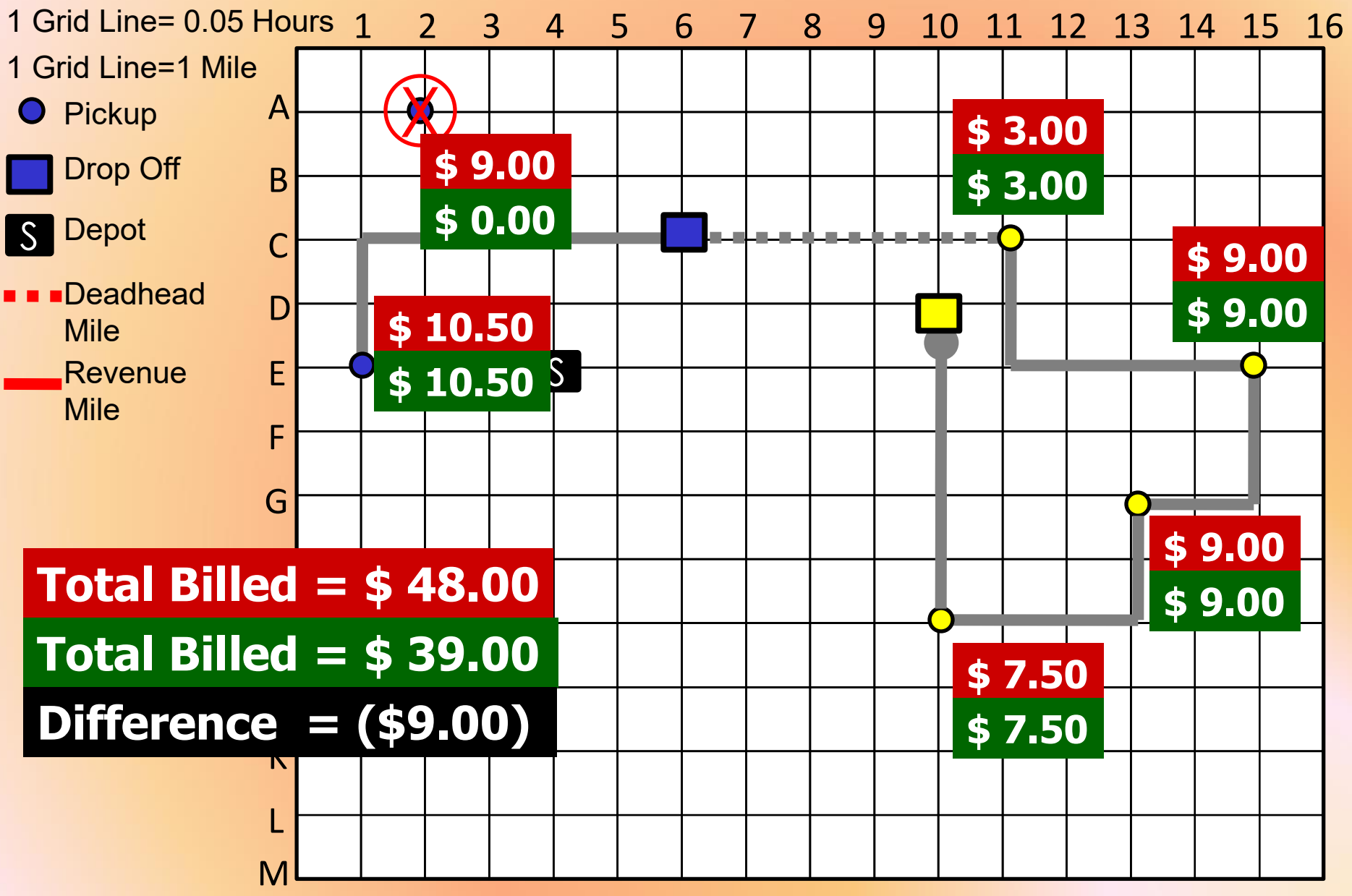
Direct Miles Rate ($1.50)



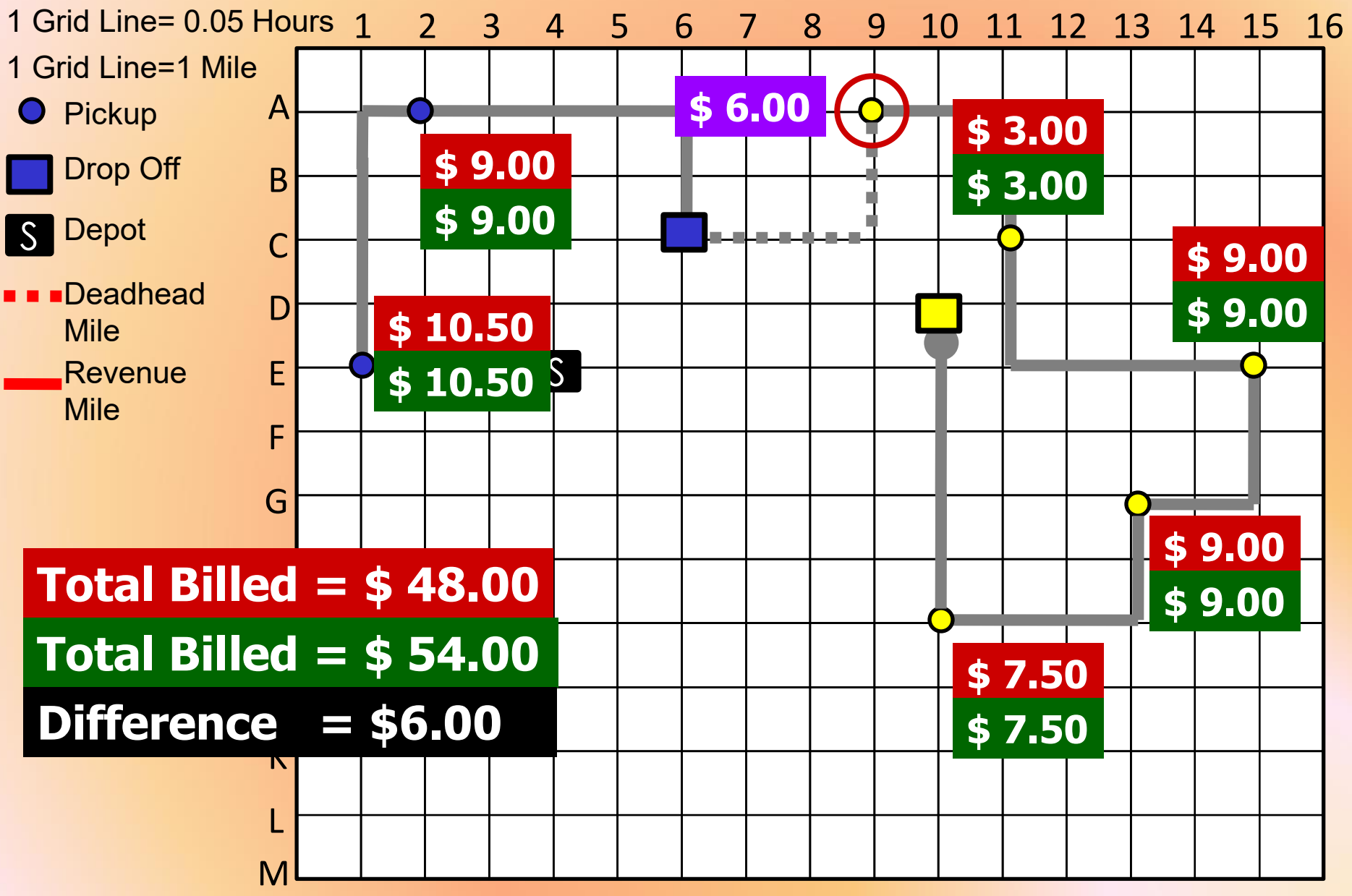
Direct Miles Scenario 1 - No Show



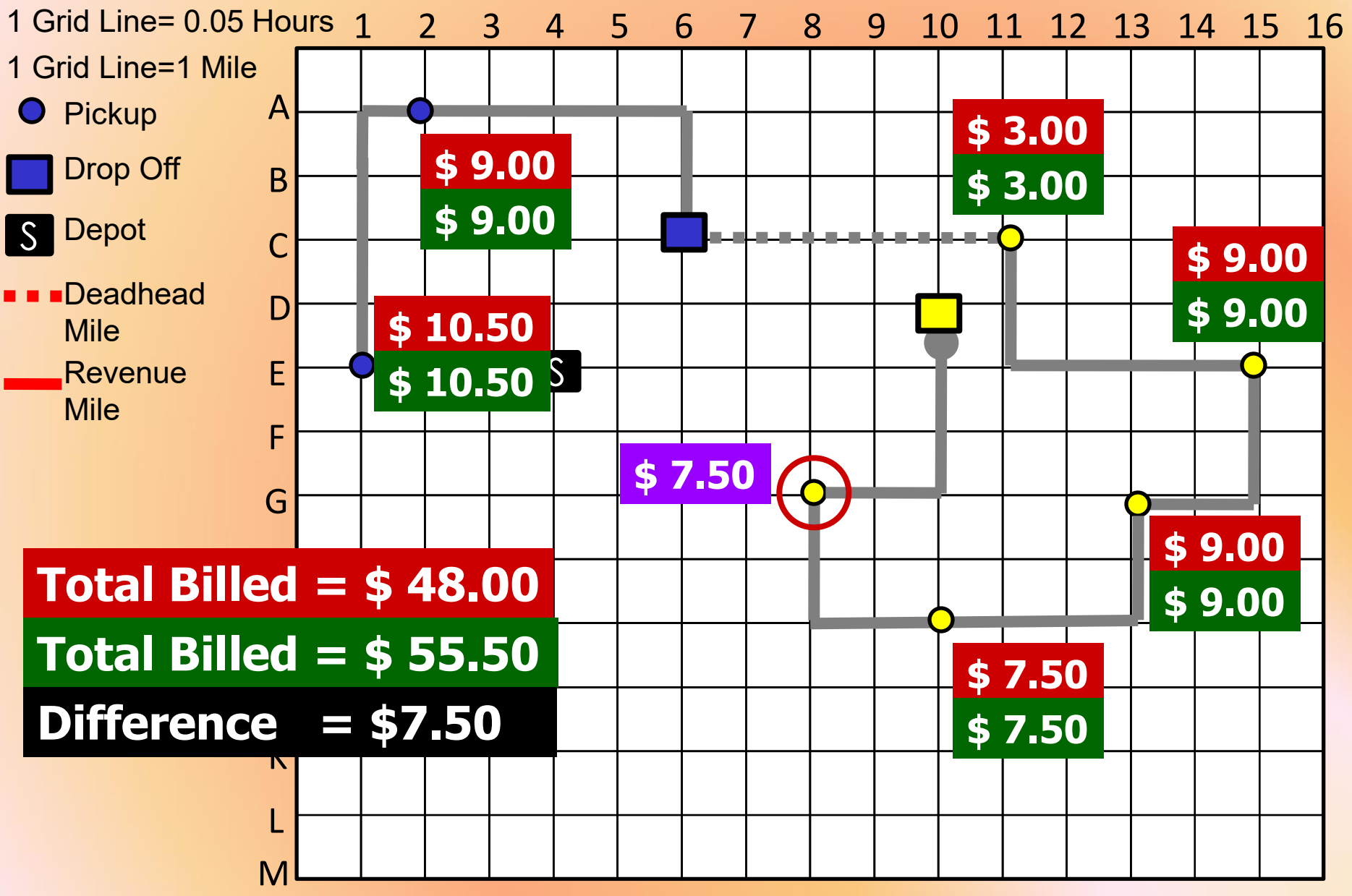
Direct Miles Scenario 2 - Cancellation



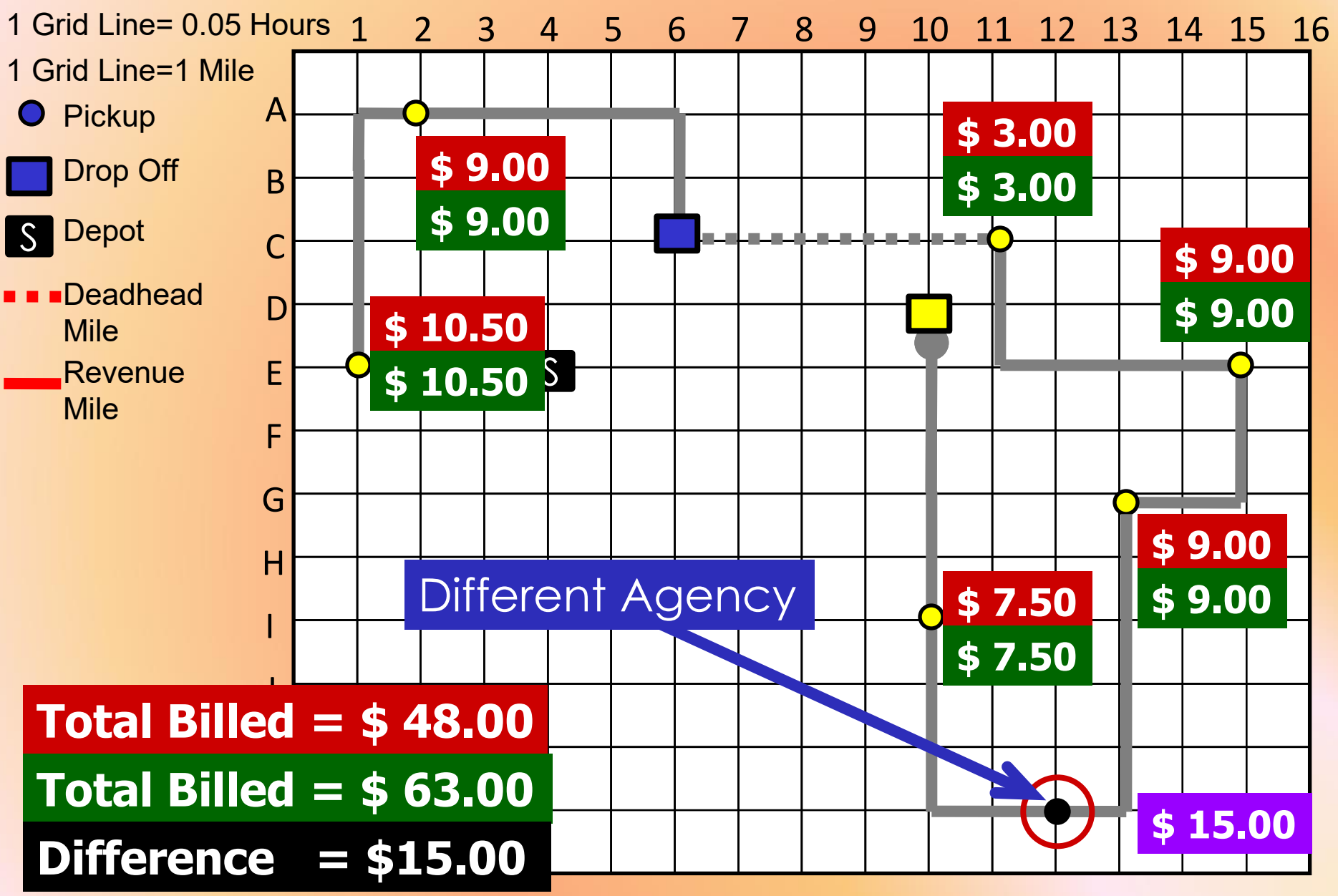
Direct Miles Scenario 3 - Extra Pickup, Early



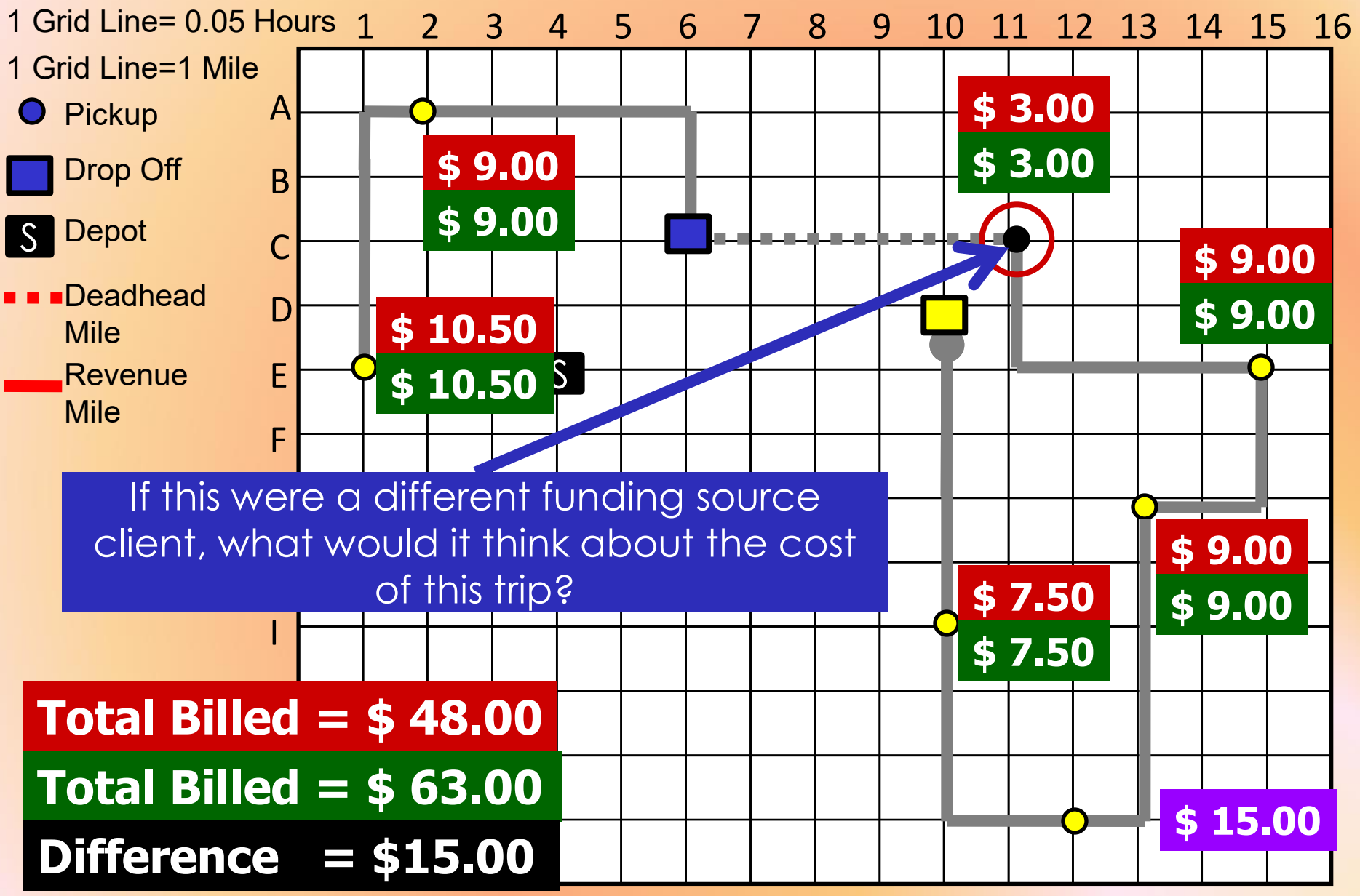
Direct Miles Scenario 4 - Extra Pickup, Late



Direct Miles Scenario 5 - Equity



Trip Rate Scenario 6 - Equity



Direct Miles Summary

- Equity- Undercharges short trips, overcharges long trips
- Rate Creation- Easy *(Divide total cost by total trips with assumptions for growth)*
- Data Requirements- Low
- No Shows- No impact on riders on the vehicle
- Cancellations- No impact on riders on the vehicle
- Additional Passengers- No impact on passenger bills
- Efficiency-
  - Encourages full vehicles (more passengers = more $)
  - Encourages deadhead minimization (no $ added)
  - Encourages revenue mile/hour efficiency (no $ added)
- Other- Very easy for agencies to understand, but savvy agencies may begin using your service only for short trips

Zone Based Fares ($4.70 per zone)

A specific fee is charged based on the origin and destination zones of the passenger

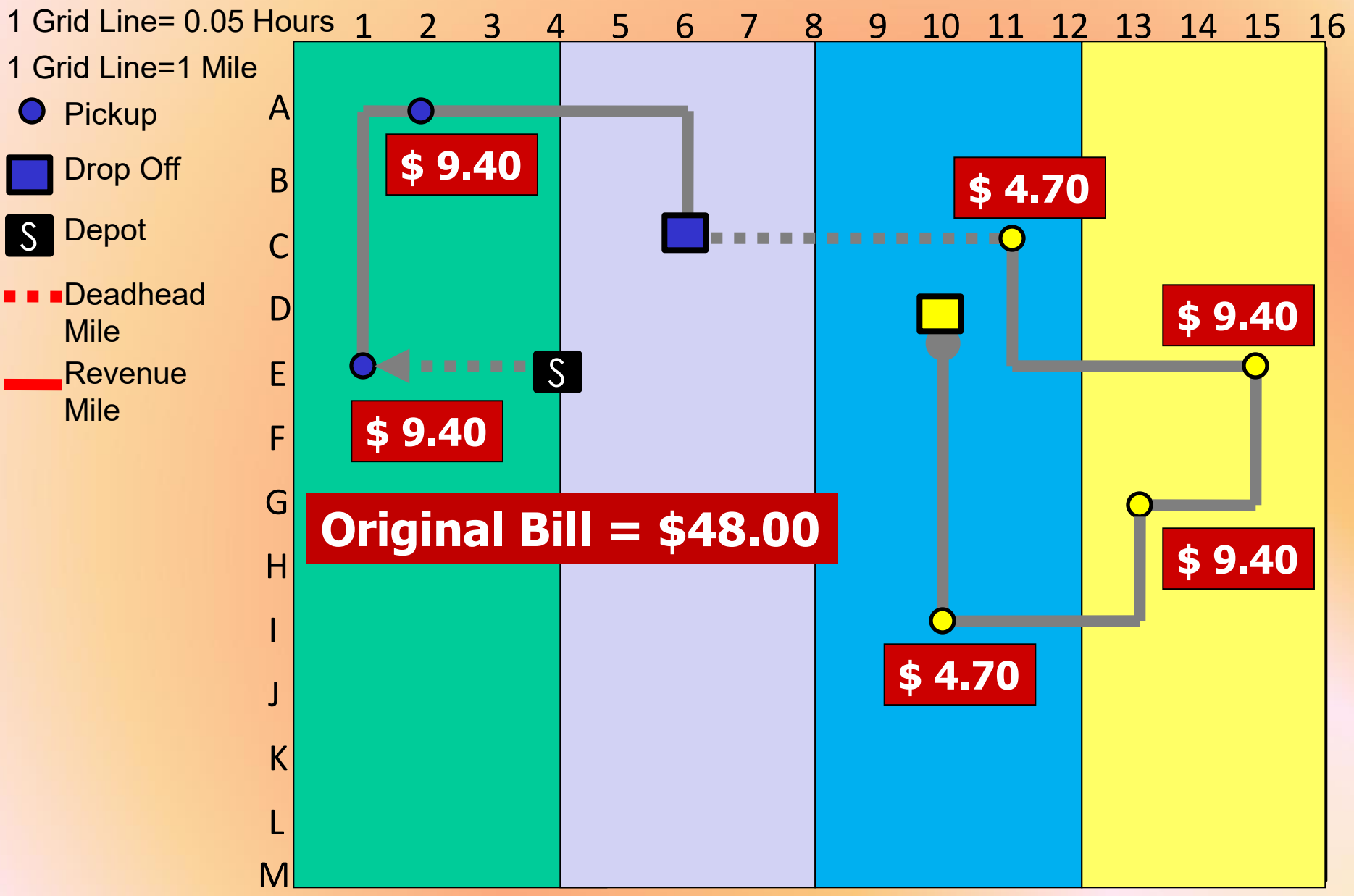
Data Requirements:

- Passenger origin and destination
- Passenger counts
- Cancels, No Shows

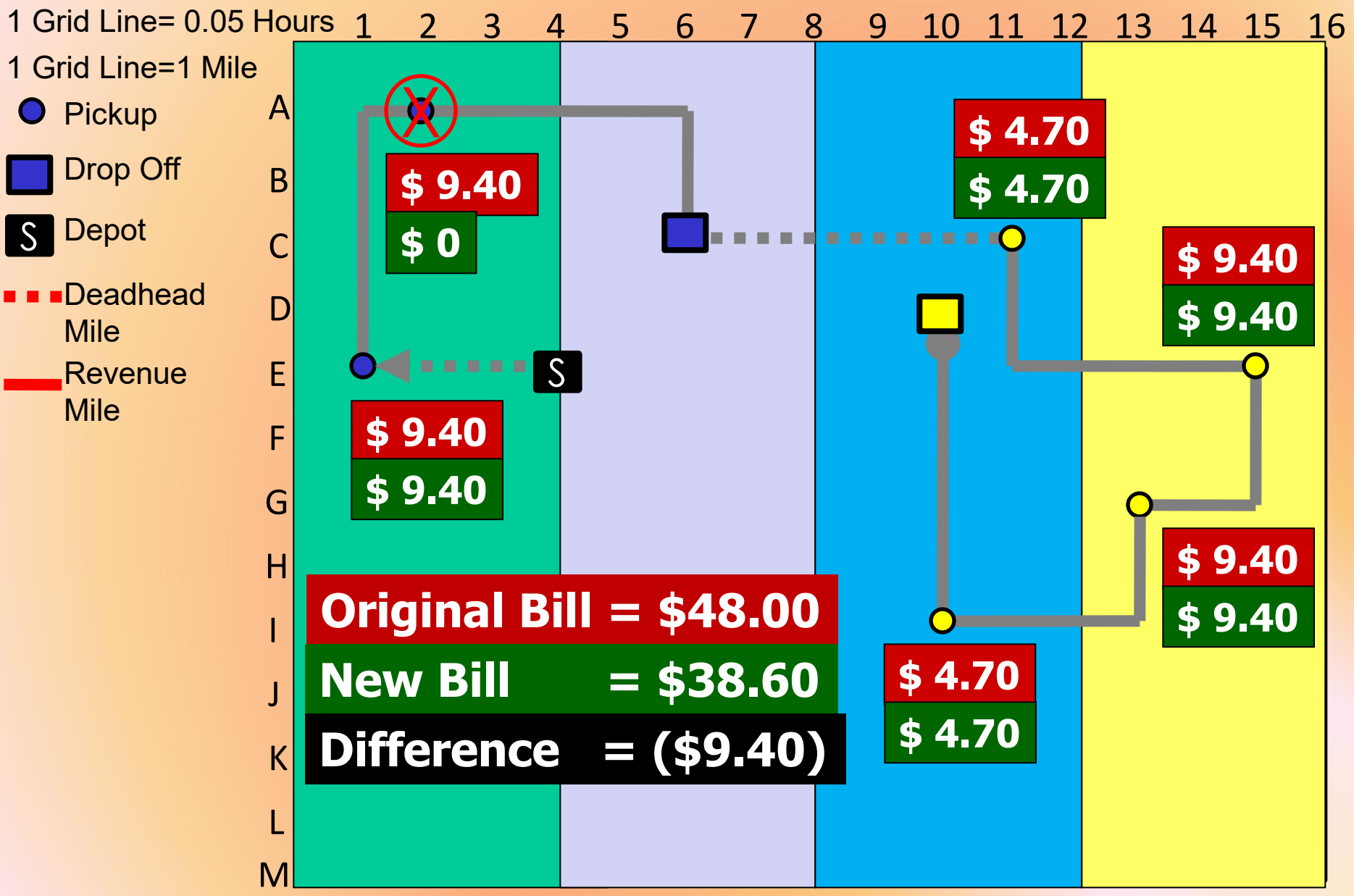
Zone Based Fares - Required Data

Route					Driver Manifest										
Date		Driver		Actual Start Time		Start Odom		1st Stop Time			1st Stop Odom				
				Actual End Time		End Odom		Last Stop Time			Last Stop Odom				
In/Out	Appt. Time	Client			Origin/ Destination			Mob. Aid	Agency	Miles	Units		No Show	Can-celled	

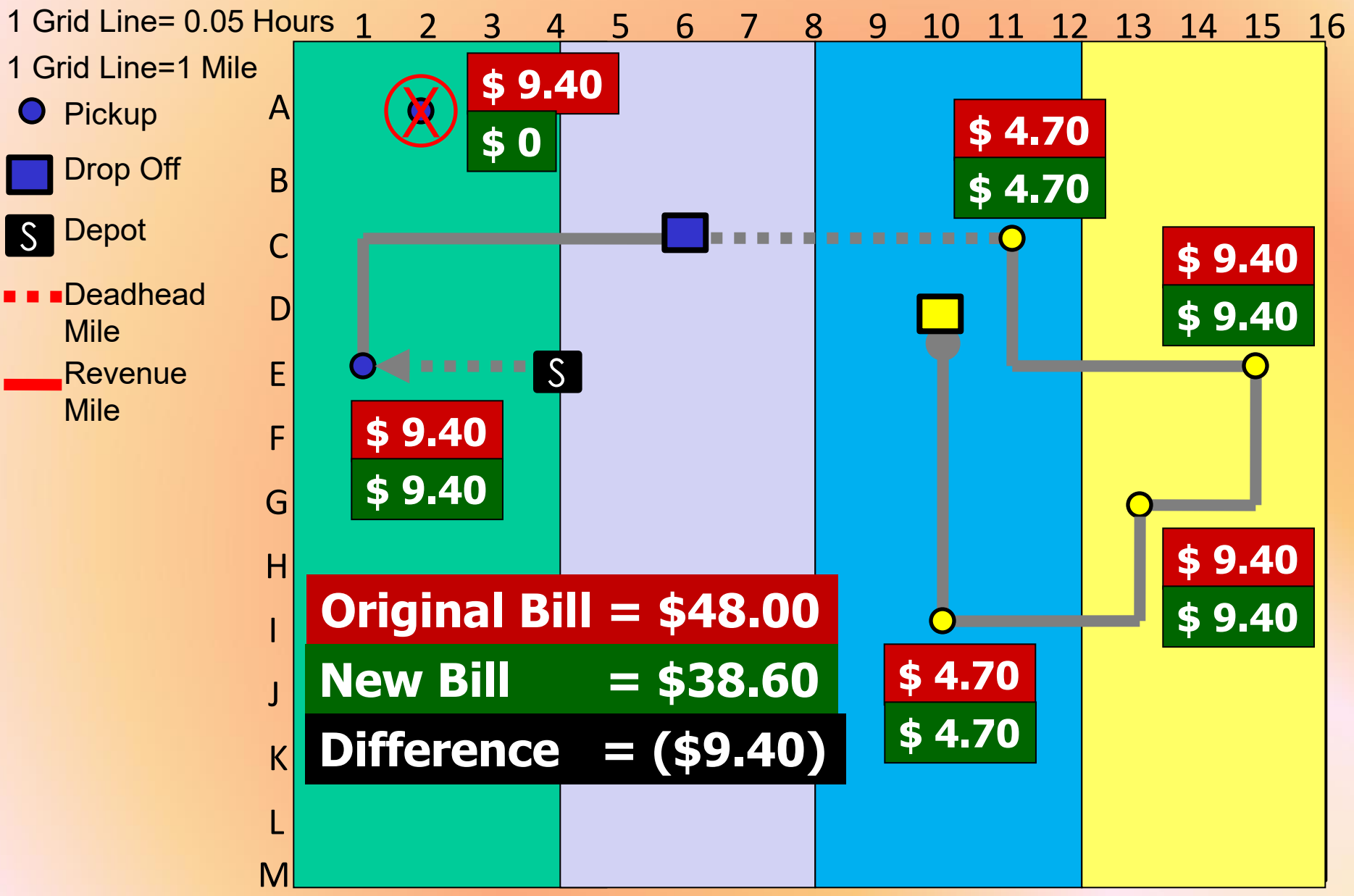
Zone Based Fares ($4.70 per zone)



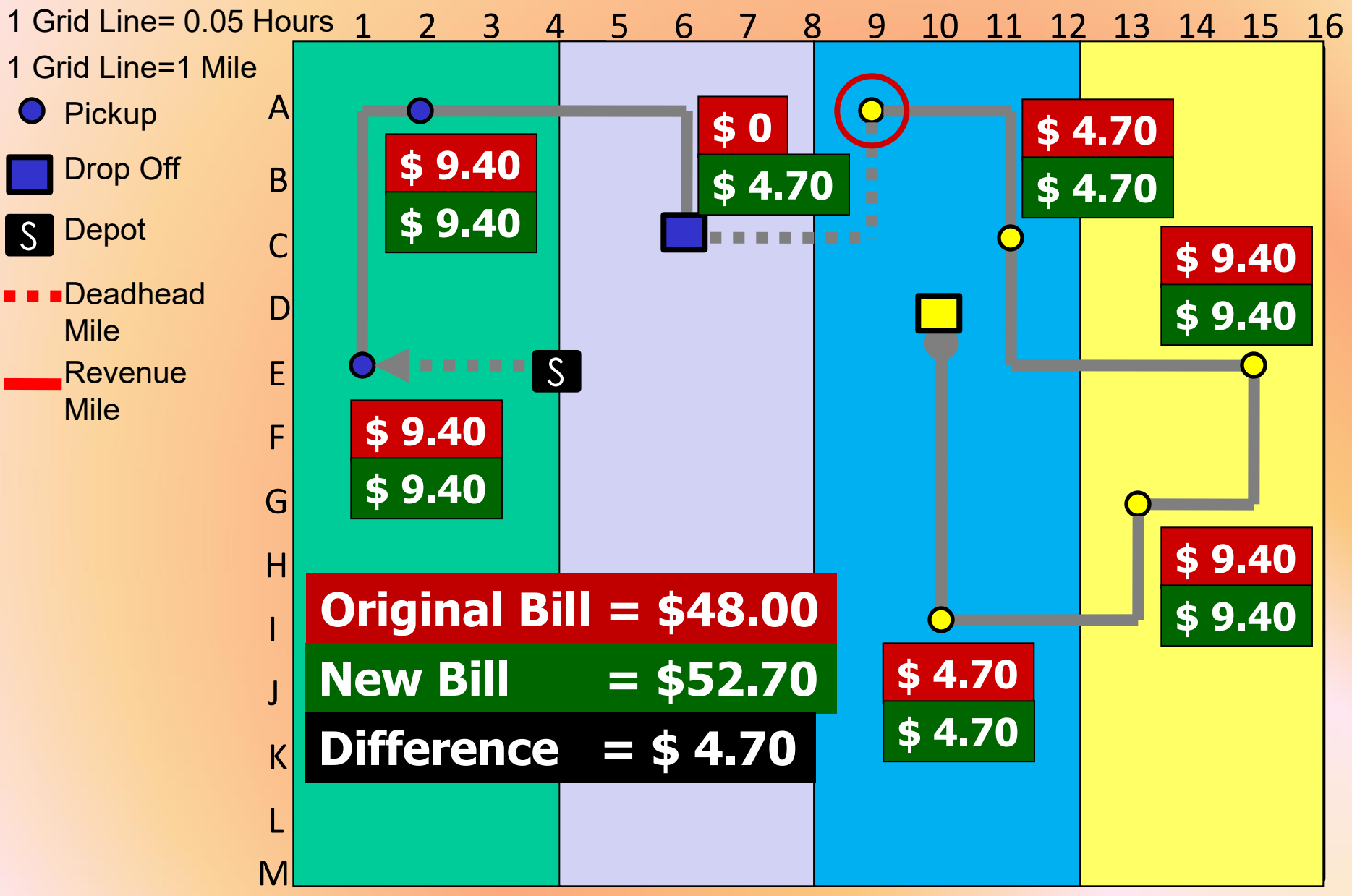
Zone Based Fares Scenario 1 - No Show



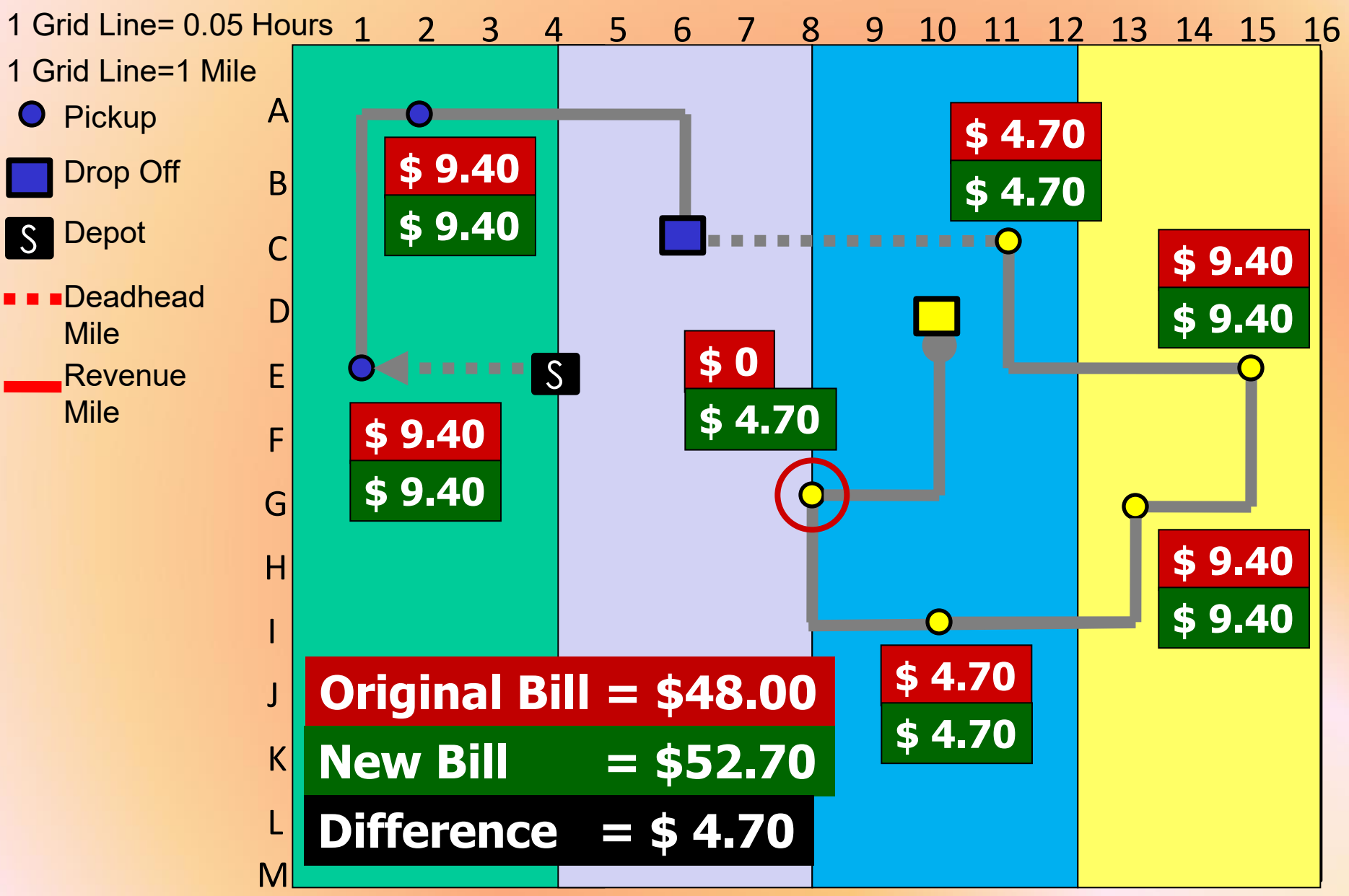
Zone Based Fares Scenario 2 - Cancellation



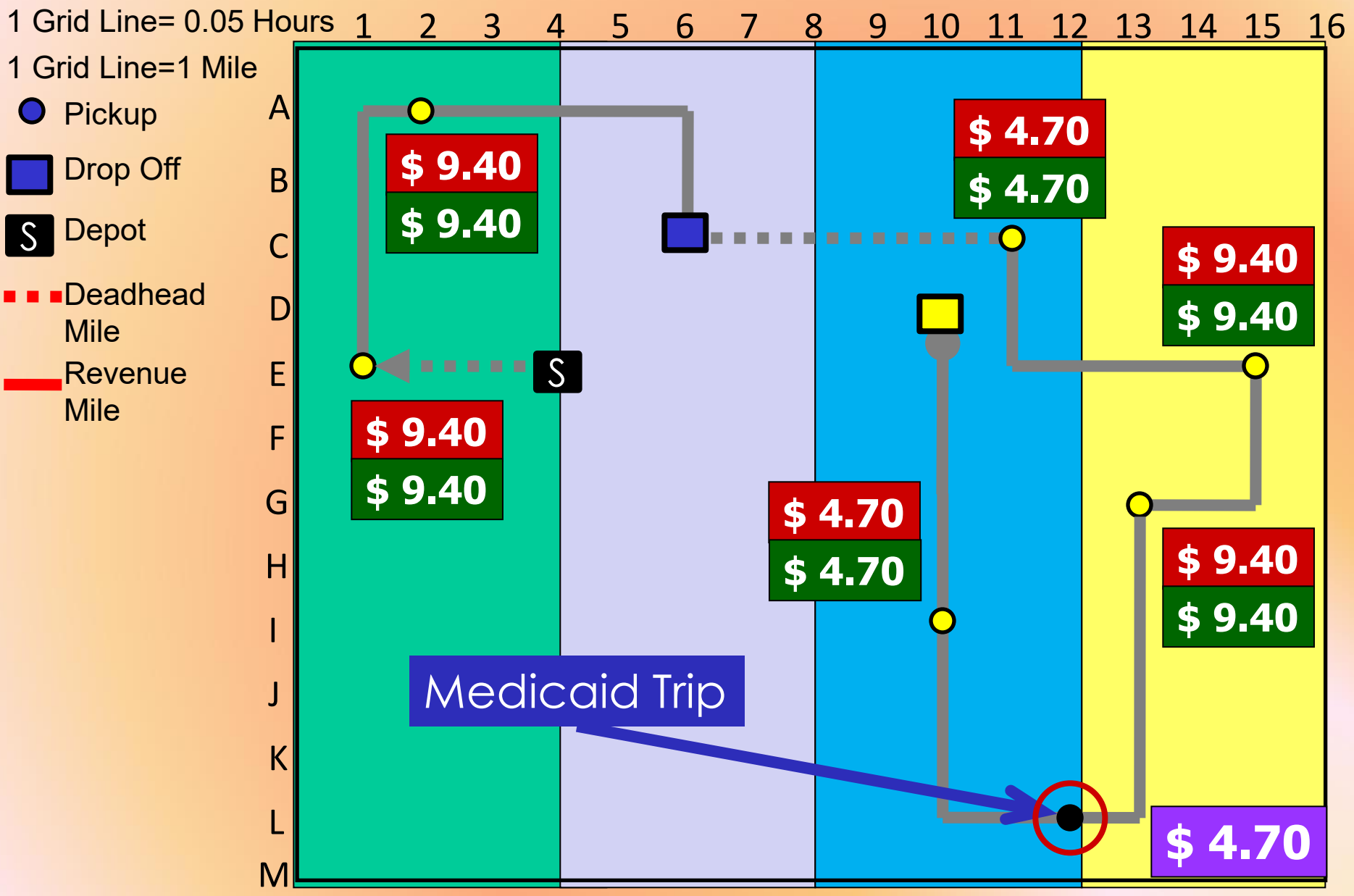
Zone Based Fares Scenario 3 - Extra Pickup, Early



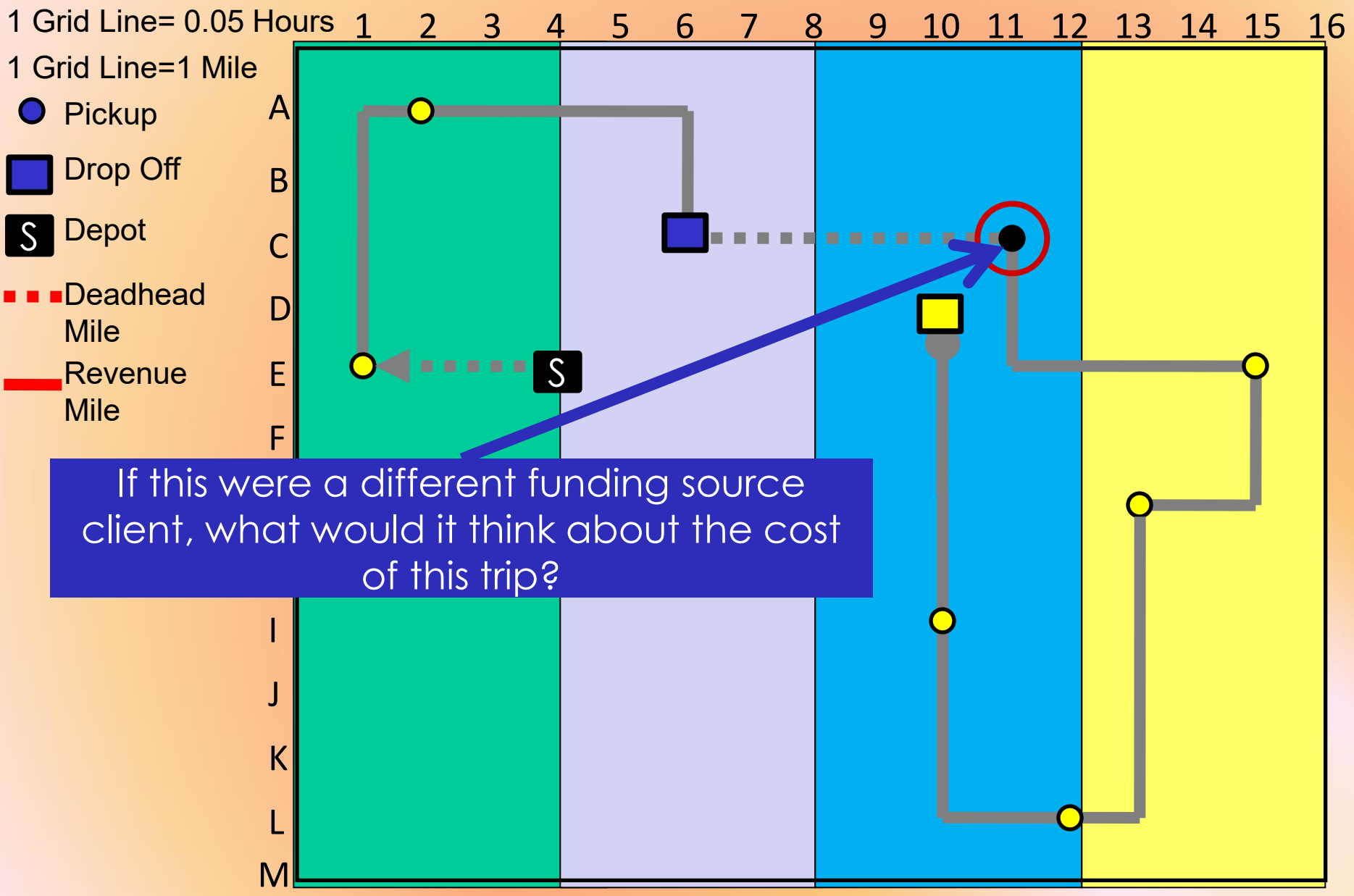
Zone Based Fares Scenario 4 - Extra Pickup, Late



Zone Based Fares Scenario 5 - Equity



Zone Based Fares Scenario 6 - Equity



Zone Based Fare Summary

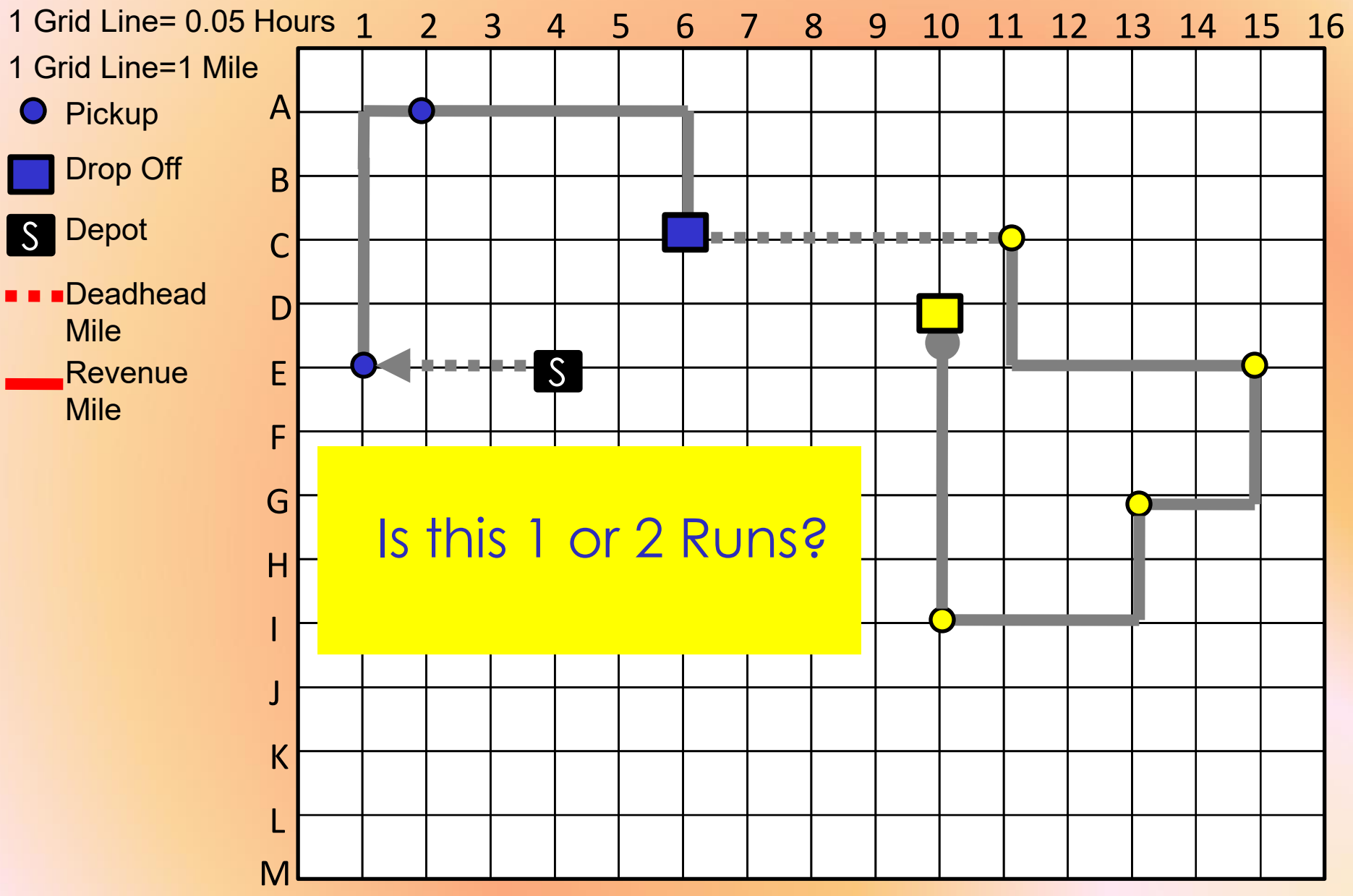
- Equity- Most equitable, based on actual origin and destination, not route
- Rate Creation- Difficult *(Determine logical zone boundaries, then determine a trip rate cost for trips within the zone and to other zones)*
- Data Requirements- High
- No Shows- No impact on riders on the vehicle
- Cancellations- No impact on riders on the vehicle
- Additional Passengers- No impact on passenger bills
- Efficiency-
  - Encourages full vehicles (more passengers = more $)
  - Encourages deadhead minimization (no $ added)
  - Encourages revenue mile/hour efficiency (no $ added)
- Other- Easy for agencies to understand and no real potential for abuse

Runs Versus Routes

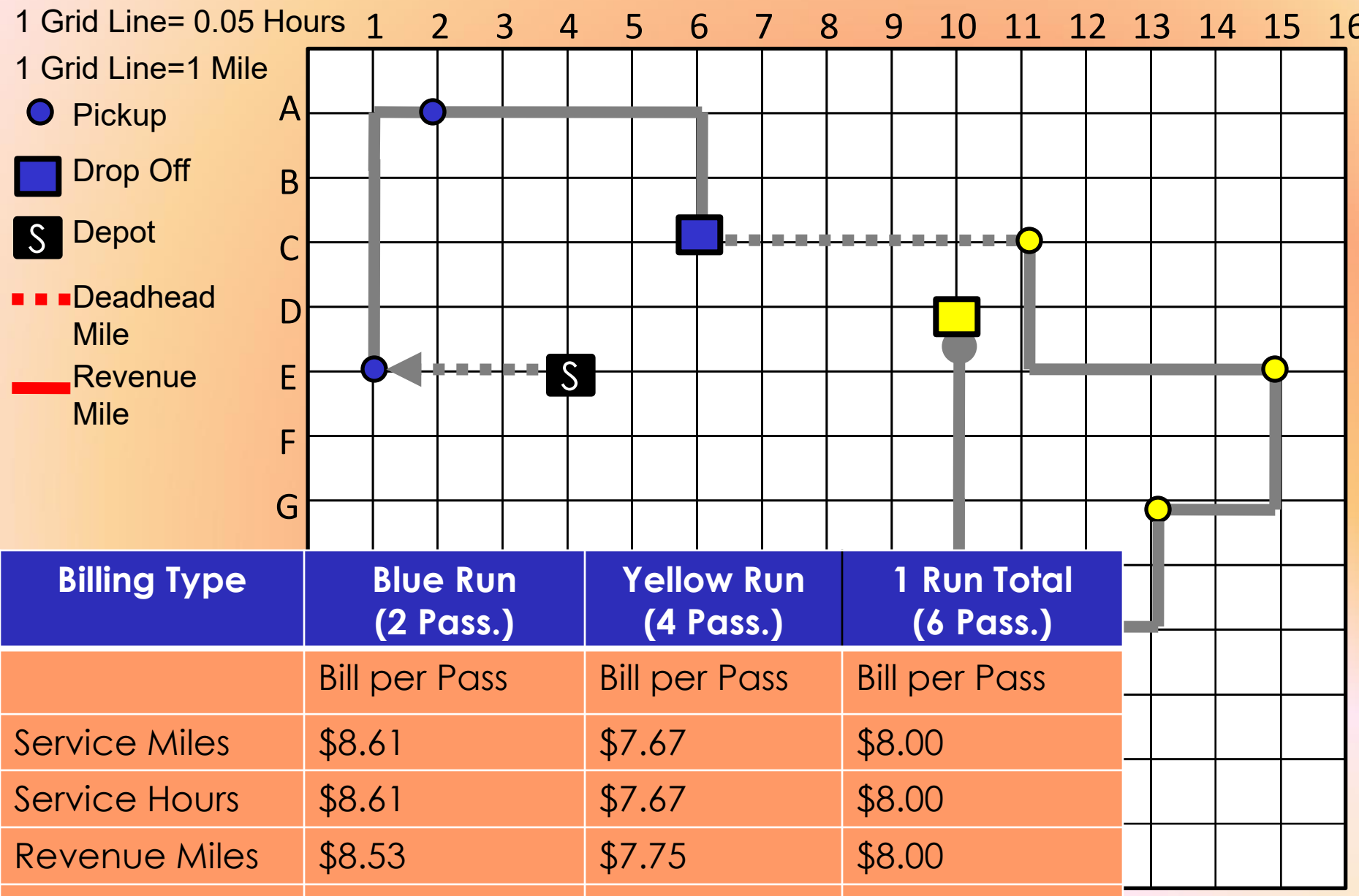
- **Route –** The path a vehicle follows while providing service.

- **Run –** A piece of work within a route (i.e. transporting seniors to a nutrition site, Work First clients to job sites, etc.).
  - Where does it start, where does it end?
  - Service and Revenue billing methods are dependent on where runs begin and end
  - Long runs could have situations where some agencies are subsidizing the more spread out trips of another agency.

Run Breakpoint Scenario



Run Breakpoint Scenario - Average Passenger Bill



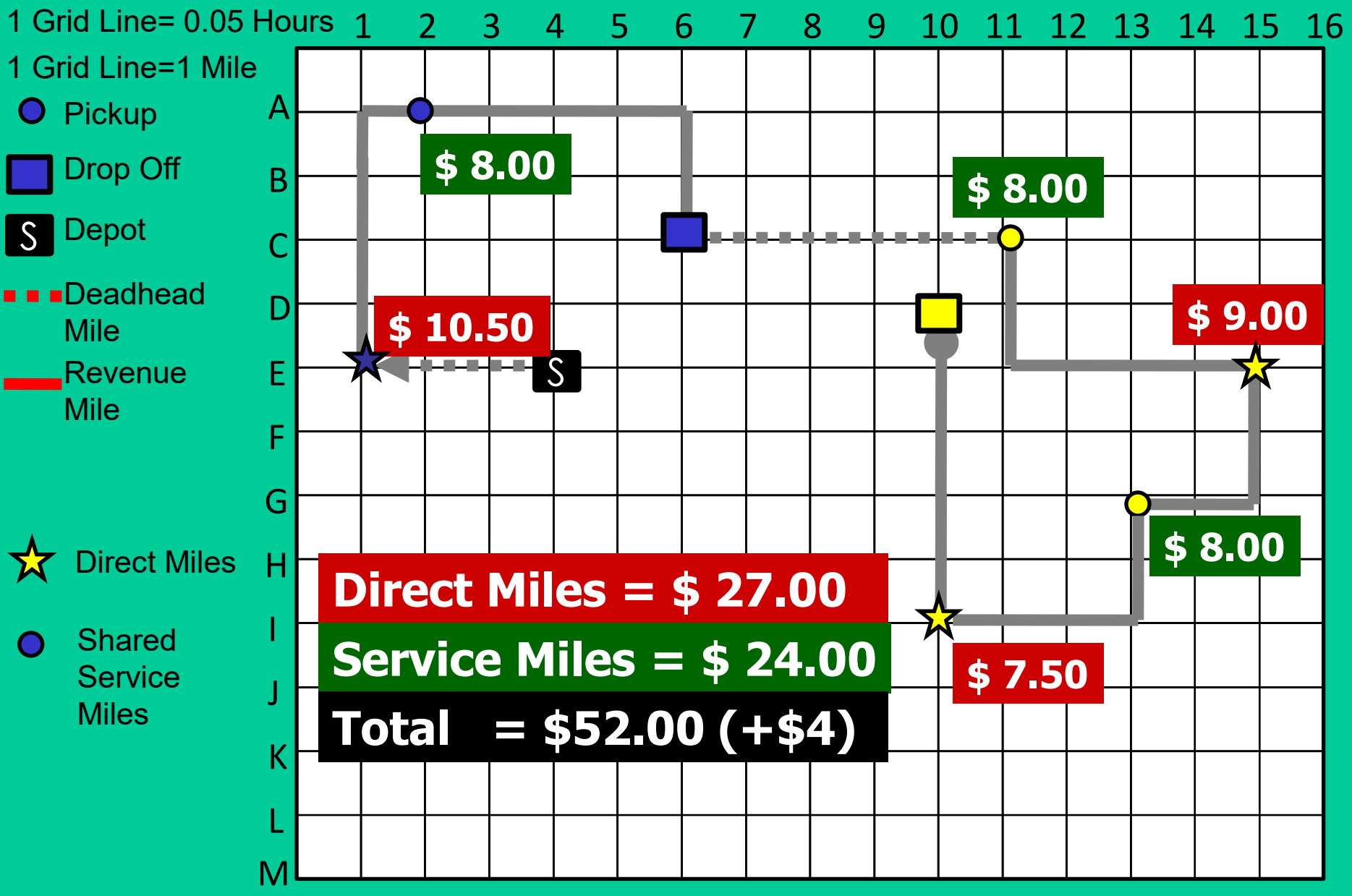
Billing Type	Blue Run (2 Pass.)	Yellow Run (4 Pass.)	1 Run Total (6 Pass.)
	Bill per Pass	Bill per Pass	Bill per Pass
Service Miles	$8.61	$7.67	$8.00
Service Hours	$8.61	$7.67	$8.00
Revenue Miles	$8.53	$7.75	$8.00
Revenue Hours	$8.53	$7.75	$8.00

Billing Type Comparison	Pass. Miles	Service Miles	Revenue Miles	Trip Rate	Direct Miles	Zone Based
Equity						☺
Protection from Misuse	☺	☺	☺			☺
Ease of Establishing Rates		☺	☺	☺	☺	
Ease of Administering		☺	☺	☺	☺	
No Show $ Impact on Other Riders				☺	☺	☺
Cancellation $ Impact on Other Riders	☺			☺	☺	☺
Extra Pass. $ Impact on Other Riders		☺	☺			
Extra Pass. Impact on Transit Revenue	☺			☺	☺	☺
Run Breakpoints Have No Impact	☺			☺	☺	☺
Encouragement of Efficiency	☺		☺	☺	☺	☺

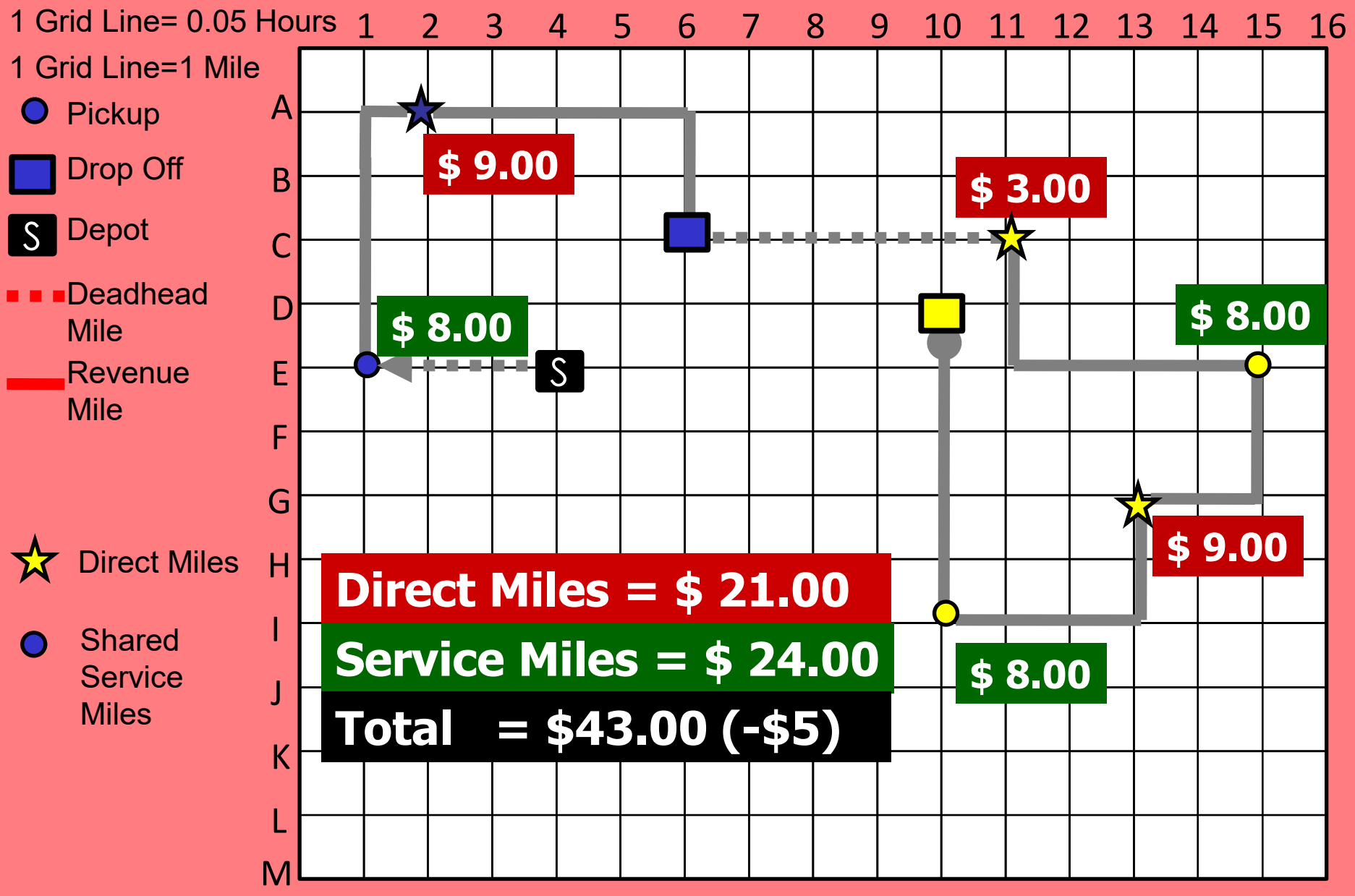
Mixed Billing Methods

- Mixing **shared** billing methods usually doesn't cause concern
- Combining **individual** versus **shared** billing will cause profit or loss
  - Depends on direct mile trip characteristics
  - You can make estimates, but you will not know until after the service is complete
- Reflect on the **equity** slides
  - Is the direct mile deviation greater or less than the average miles per trip?
  - How will other agencies/clients react?

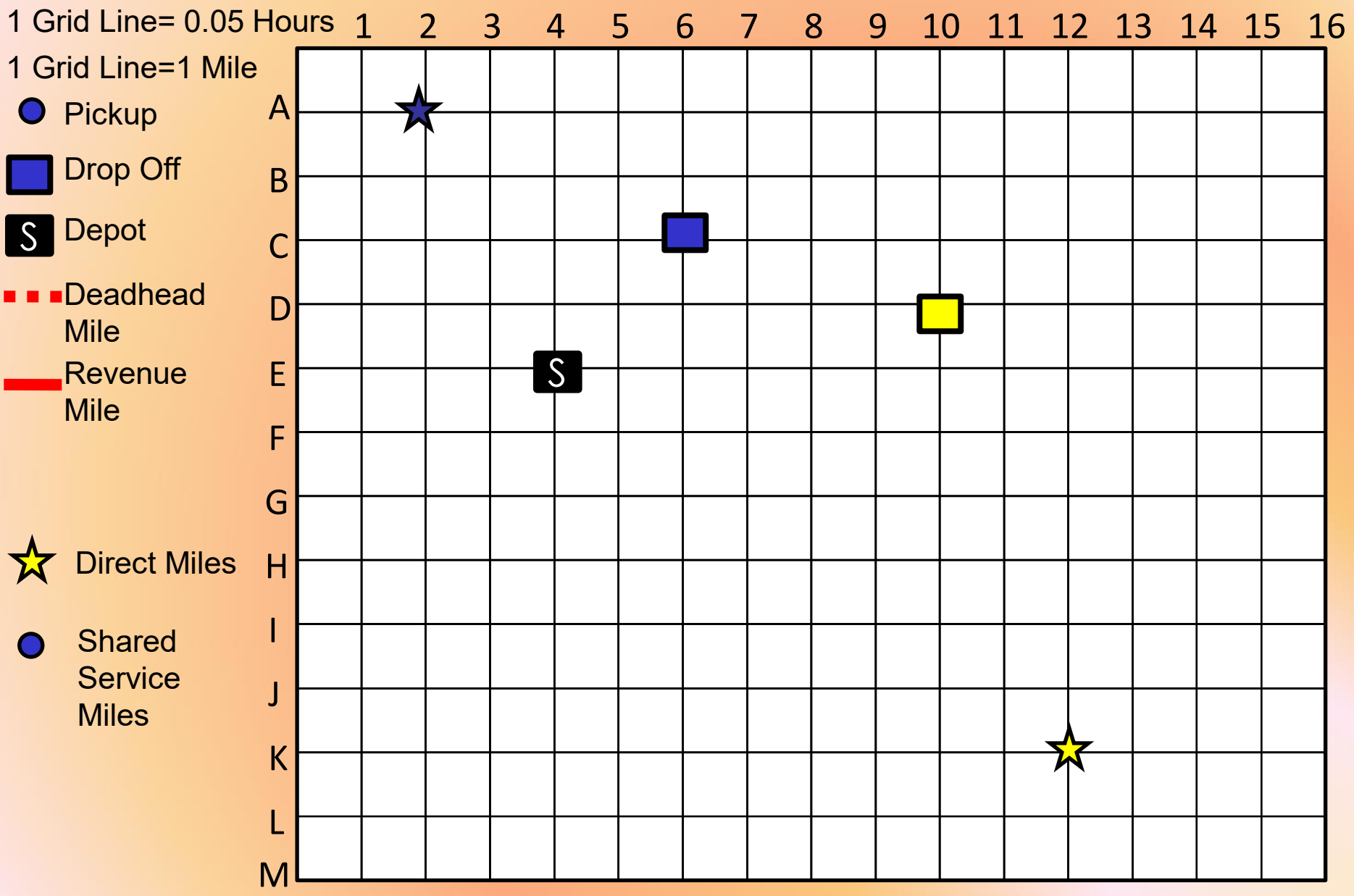
Mixed Direct Mile and Shared Service Mile #1



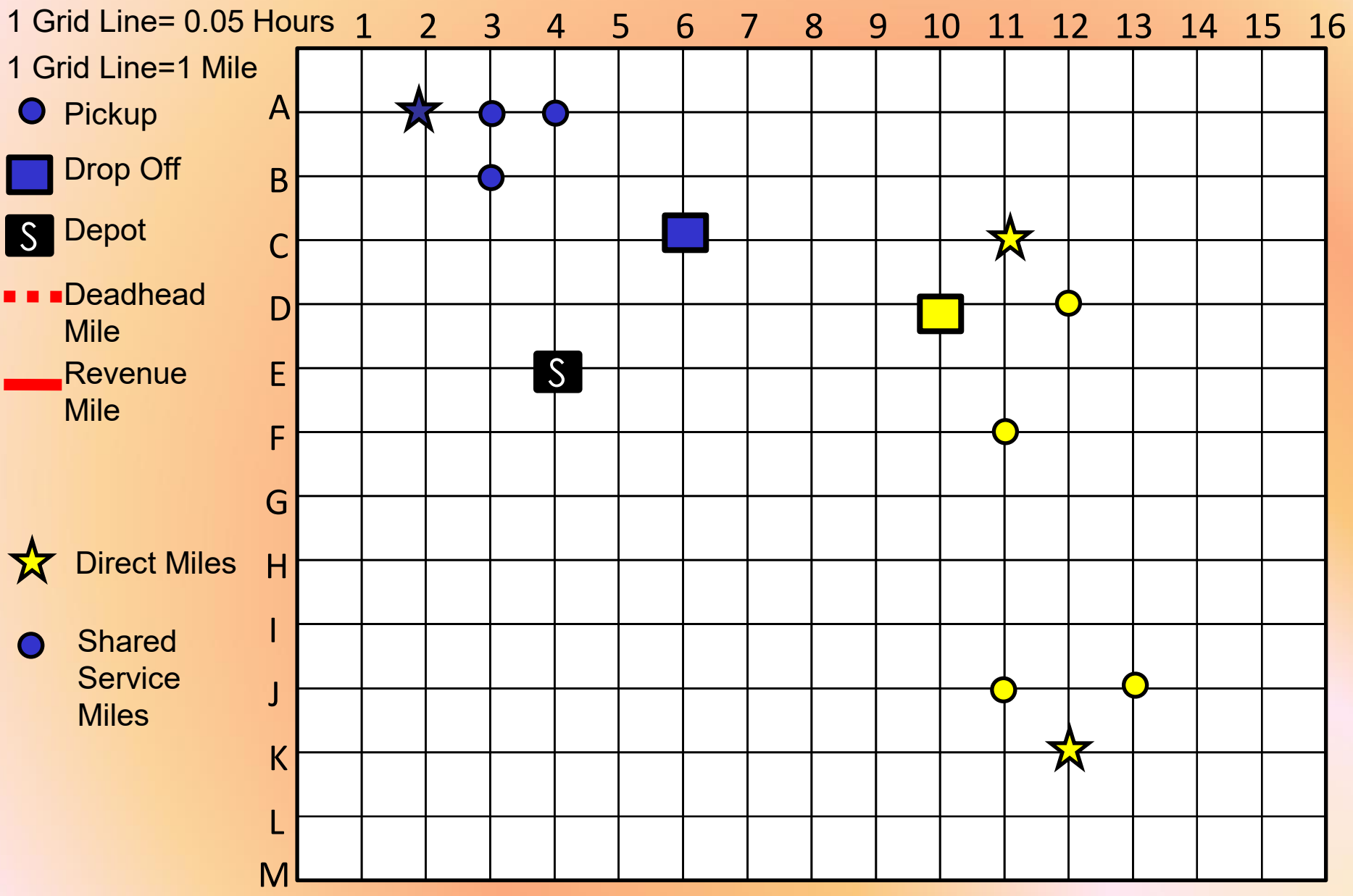
Mixed Direct Mile and Shared Service Mile #2



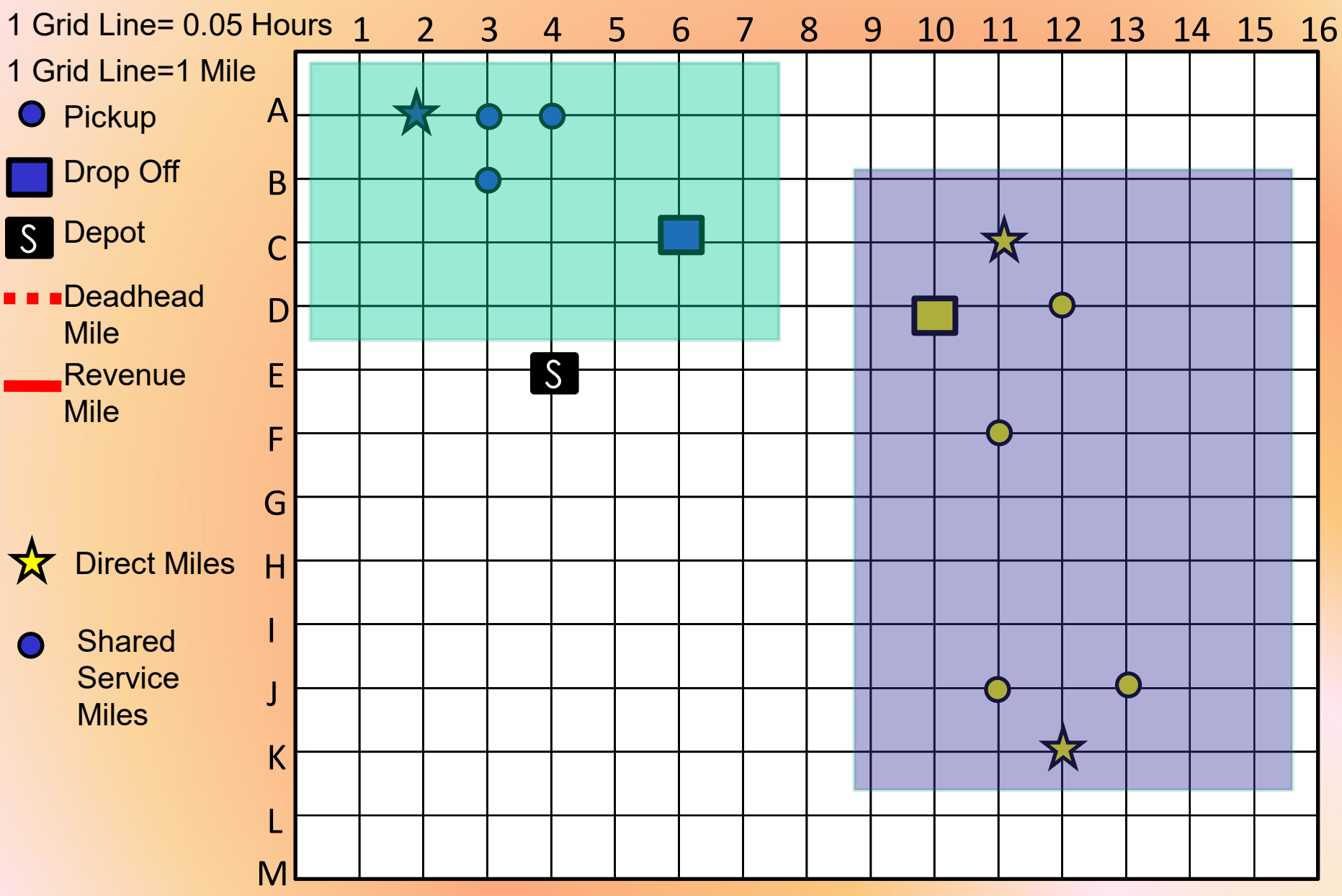
Accept Or Deny #1?



Accept Or Deny #2?



Structured Scheduling- Time and Geography



Summary

- Not all agencies **should** have the same billing method, but
- Billing methods create **subsidies** and **inequities**
- Be **intentional** in choices and monitor **outcomes**
- Medicaid Transformation
  - Simplify decision-making
  - Structure is key

Choose a billing method that encourages you to become more efficient!!!

1. Trip Rate / Zone Based
2. Passenger Mile
3. Revenue Mile/Hour