MassDOT Sidewalk Analysis

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Source: 2010 Road Inventory File
MassDOT – Highway Division, District Traffic Operations Engineers

DRAFT

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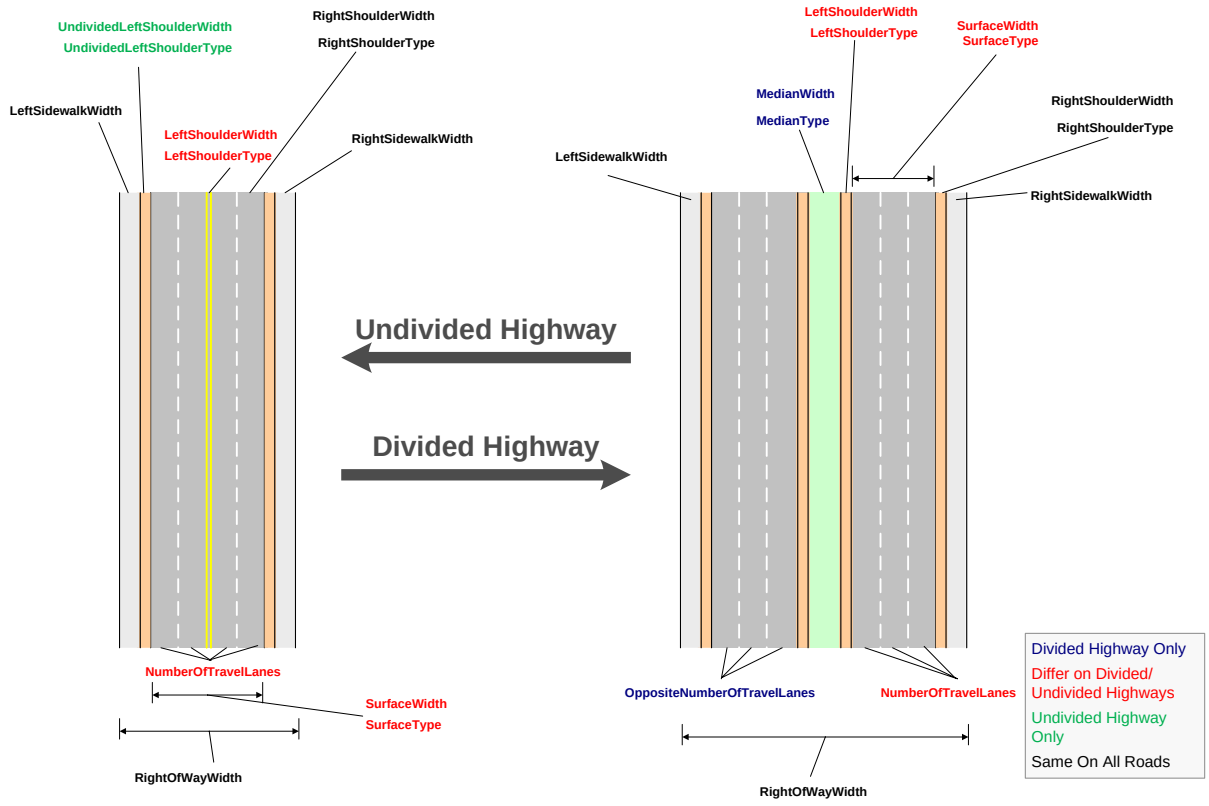
The following tables have been developed to display the number of miles of sidewalk on MassDOT and Department of Conservation and Recreation roadways as of March 12th, 2010. The Office of Transportation Planning has started a process to update several Road Inventory attributes including those describing sidewalks that should be completed by early 2012. Table 1 provides a summary of total miles currently recorded in the Road Inventory. The summary details sidewalk mileage by MassDOT Highway District on both sides of the roadways.

In the road inventory, a numbered route is recorded by the primary direction it travels (Northbound (NB) or Eastbound (EB)) and again in it's opposing direction (Southbound (SB) or Westbound (WB)) because different events such as roadway intersections can occur on either side of the roadway. The distinction is more evident when the road inventory differentiates between divided and undivided roadways. See diagram 1.

Diagram 1



On undivided highways, the road inventory will record the right and left sidewalk width in the primary direction. The opposing direction will have null values for the right and left sidewalk width so that double accounting does not occur.

On divided highways, the RI will record the right and left sidewalk widths for each direction of travel. Because values on the right and left sides are recorded for divided highways, four values are possible.

Table 1 provides mileage calculations for all four values by MassDOT Highway District.

Table 1

MassDOT Highway Districts	Right side walks 2-5 ft (Miles)	Right side walks gt 5 ft (Miles)	District Totals (Miles)
1	18.81	4.52	23.32
2	52.16	4.07	56.23
3	81.49	11.68	93.17
4	113.84	70.95	184.80
5	123.36	32.58	155.94
6	77.19	85.06	162.25
State Totals	**466.86**	**208.86**	**675.72**

MassDOT Highway Districts	Left side walks 2-5 ft (Miles)	Left side walks gt 5 ft (Miles)	District Totals (Miles)
1	21.20	0.75	21.95
2	39.80	3.09	42.89
3	69.38	7.88	77.26
4	80.41	26.64	107.05
5	114.15	15.99	130.14
6	26.59	30.97	57.55
State Totals	**351.52**	**85.31**	**436.84**
Grand Total	**818.38**	**294.17**	**1,112.55**

Table 2 provides mileage calculations for all four values on all numbered routes within a MassDOT Highway District that have sidewalks.

Table 2

MassDOT Highway District	Route Key	Left Side		Right Side	
		Miles of Sidewalk 2-5 ft wide	Miles of Sidewalk Greater than 5 ft wide	Miles of Sidewalk 2-5 ft wide	Miles of Sidewalk Greater than 5 ft wide
1	Other Roadways	0.00	0.06	0.03	0.16
1	SR116 NB	1.43		1.71	
1	SR183 NB	0.29		0.64	
1	SR2 EB	3.45		4.26	
1	SR23 EB	0.38		0.49	
1	SR23 WB			0.04	
1	SR2A EB		0.04		0.04
1	SR7A NB			0.37	
1	SR8 NB	1.78	0.68	2.90	1.18
1	SR8 SB			0.27	0.02
1	SR8A-L SB			0.02	
1	SR9 EB	2.40		1.15	
1	SR9 WB			0.28	
1	US20 EB	6.09		2.39	
1	US20 WB			0.54	
1	US7 NB	5.33		3.34	0.12
1	US7 SB			0.24	
District Totals		**21.14**	**0.78**	**18.67**	**1.51**
2	Other Roadways	0.00	2.12	0.41	7.36
2	SR10 NB	2.68	0.02	2.99	0.03
2	SR101 NB	0.01			
2	SR116 NB	2.63	0.74	3.24	0.74
2	SR116 SB			0.73	
2	SR12 NB			0.12	0.01
2	SR122 NB	0.04		0.57	
2	SR141 EB		0.39	0.03	0.12
2	SR141 WB			0.32	
2	SR147 EB			0.18	
2	SR147 WB			0.09	
2	SR159 NB	0.81		2.25	
2	SR159 SB	0.04			
2	SR181 NB	0.01		0.02	
2	SR19 NB	1.83	0.03	0.35	0.03
2	SR2 EB	0.32		1.04	
2	SR2 WB			0.16	
2	SR20A EB			0.09	
2	SR21 NB		0.07		0.07
2	SR2A EB	2.24	0.04	1.88	0.04
2	SR2A WB			0.15	
2	SR32 NB	2.98	0.03	3.80	0.03

2	SR32 SB	0.06		0.11	
2	SR33 NB	0.17		2.34	0.02
2	SR33 SB			3.16	0.02
2	SR57 WB				0.29
2	SR63 NB	0.91	0.02	0.84	0.02
2	SR66 EB	0.03		0.03	
2	SR67 NB	1.03		1.14	
2	SR68 NB	1.49		0.48	
2	SR83 SB		0.05		
2	SR9 EB	4.44	0.41	1.68	0.48
2	SR9 WB			0.70	
2	US20 EB	3.17	0.22	5.83	0.22
2	US20 WB			0.43	
2	US202 NB	4.91	0.67	2.78	0.21
2	US202 SB			0.36	0.15
2	US5 NB	7.91		3.12	
2	US5 SB			3.81	
District Totals		**37.68**	**4.80**	**45.21**	**9.83**
3	Other Roadways	0.00	5.08	0.92	9.49
3	SR109 EB	0.04			
3	SR110 EB	1.45			
3	SR111 NB	2.08	0.51	0.84	0.23
3	SR111 SB				0.21
3	SR113 EB	0.05			
3	SR115 NB	0.02			
3	SR117 EB	0.01		0.01	
3	SR119 EB	1.22		2.27	
3	SR12 NB	8.28	0.05	10.94	0.07
3	SR12 SB			0.52	0.02
3	SR122 NB	7.69	1.39	5.45	1.06
3	SR122A NB	2.37	0.49	4.84	0.72
3	SR122A SB				0.33
3	SR126 NB	2.10		1.59	0.02
3	SR13 NB	0.03		0.03	
3	SR131 EB	3.27		0.46	
3	SR131 WB			0.04	
3	SR135 EB	0.30		1.13	0.02
3	SR140 NB	4.32		8.26	0.40
3	SR140 SB	0.00		0.92	
3	SR16 EB	1.99		2.87	
3	SR169 NB	0.91	0.02	0.91	0.02
3	SR193 NB	0.46		0.05	
3	SR197 NB	1.59		0.15	
3	SR2 EB				0.10
3	SR225 EB			0.01	
3	SR27 NB	0.26	0.01	0.27	0.01
3	SR2A EB	5.69	1.05	4.44	1.39
3	SR2A WB			0.38	0.06
3	SR30 EB	0.63	2.41	0.01	0.32
3	SR31 NB	0.01	0.03	0.56	0.03

3	SR56 NB	0.26		0.22	
3	SR62 EB	0.16	0.09	0.02	0.09
3	SR68 NB	0.57		0.56	
3	SR70 NB	0.46	0.60		0.85
3	SR85 NB	0.93		0.19	0.49
3	SR9 EB	5.97	0.03	9.07	1.01
3	SR9 WB			6.99	2.92
3	US20 EB	11.16	0.26	6.27	
3	US20 WB			1.74	
District Totals		**64.30**	**12.04**	**72.92**	**19.87**
4	Other Roadways	0.00	15.37	8.21	23.37
4	SR107 NB		1.88	3.18	2.77
4	SR107 SB			0.35	0.07
4	SR110 EB	15.89	1.30	6.16	2.03
4	SR110 WB			1.23	0.62
4	SR113 EB	3.29	0.15	2.13	0.03
4	SR113 WB			1.18	
4	SR114 EB	2.32	0.47	2.28	0.43
4	SR114 WB	0.34	0.19	0.93	0.24
4	SR117 EB	0.04		0.04	
4	SR125 NB	1.23	1.71		1.22
4	SR125 SB		0.33		0.45
4	SR127 NB	3.90	2.06	4.73	2.01
4	SR128 NB	0.05		0.22	
4	SR128 SB			0.17	
4	SR129 EB	2.50	0.35	2.65	0.50
4	SR129 WB	0.20	0.07	0.58	0.49
4	SR133 EB	0.76		1.26	0.61
4	SR145 NB	0.46		1.72	0.05
4	SR145 SB			0.89	0.01
4	SR150 NB	0.01			0.01
4	SR16 EB	0.09	0.01	2.96	0.63
4	SR16 WB			1.82	2.65
4	SR1A NB	12.85	1.92	10.39	6.33
4	SR1A SB		0.02	0.35	4.30
4	SR2 EB			0.56	
4	SR2 WB			0.12	
4	SR22 NB			0.05	
4	SR28 NB	5.33	2.56	8.63	4.15
4	SR28 SB	0.33		4.50	0.70
4	SR2A EB	1.35		4.56	
4	SR2A WB			0.09	
4	SR35 NB	0.13		0.13	
4	SR38 NB	7.49	0.04	6.95	0.28
4	SR38 SB			0.21	0.41
4	SR3A NB	2.82	4.38	1.70	6.67
4	SR3A SB			0.34	0.21
4	SR4 NB	1.66	0.17	0.72	0.30
4	SR4 SB			0.39	

4	SR40 EB	0.29			
4	SR60 EB				2.40
4	SR60 WB			0.14	1.85
4	SR62 EB	0.93		0.68	0.56
4	SR62 WB				0.07
4	SR97 NB	0.15		0.15	0.01
4	SR97 SB			0.05	0.36
4	SR99 NB			0.04	0.10
4	SR99 SB			0.12	0.03
4	US1 NB	0.21	0.09	7.68	0.60
4	US1 SB			6.08	0.33
4	US20 EB	0.40		1.03	0.05
4	US20 WB			0.34	0.16
4	US3 NB		0.73		4.16
4	US3 SB				0.21
District Totals		**65.04**	**33.80**	**98.68**	**72.43**
5	Other Roadways	0.00	19.31	3.71	10.92
5	SR103 EB	0.95		1.46	1.41
5	SR104 EB	0.00		0.05	0.42
5	SR105 NB	0.62		1.78	
5	SR105 SB			0.04	
5	SR106 EB	0.03	0.05	0.00	0.15
5	SR106 WB			0.00	0.10
5	SR114A NB	0.37		0.37	
5	SR121 NB			0.46	
5	SR123 EB	4.44		7.26	1.83
5	SR123 WB	0.49		0.49	
5	SR130 NB	0.19			
5	SR138 NB	6.44	1.53	4.81	0.94
5	SR138 SB			0.05	
5	SR139 EB	0.76		3.03	2.49
5	SR140 NB	1.70	0.02	5.04	0.02
5	SR152 NB			0.06	0.07
5	SR18 NB	8.58	0.23	4.87	0.26
5	SR18 SB	0.05		0.05	0.19
5	SR1A NB	6.72	0.24	4.81	0.59
5	SR1A SB	0.02		0.18	
5	SR228 NB		0.57		0.57
5	SR27 NB	0.02	0.21	1.72	2.36
5	SR27 SB				0.12
5	SR28 NB	19.40	3.67	19.28	1.54
5	SR28 SB			0.47	
5	SR28A NB	0.35		3.09	
5	SR37 NB	2.25	0.04	0.85	1.44
5	SR3A NB	4.36	0.41	11.49	1.89
5	SR3A SB			0.16	0.41
5	SR53 NB	1.08		0.81	
5	SR53 SB			0.12	
5	SR6A EB	10.60		5.00	0.42

5	SR79 NB			0.10	
5	SR79 SB			0.13	
5	SR81 NB				0.10
5	SR81 SB				0.10
5	SR88 NB			0.29	
5	SR88 SB			0.27	
5	US1 NB	1.02	2.32	4.85	3.81
5	US1 SB		0.39	2.46	2.99
5	US44 EB	3.28	0.54	2.15	0.50
5	US44 WB			0.26	
5	US6 EB	20.80	2.08	15.20	2.44
5	US6 WB	0.31		8.93	0.53
District Totals		**94.84**	**31.59**	**116.15**	**38.61**
6	Other Roadways	0.00	14.55	14.51	47.74
6	SR109 EB	0.93	0.06	1.16	0.06
6	SR135 EB	0.01		1.50	
6	SR138 NB	1.16	0.60	0.71	0.66
6	SR138 SB			0.37	0.05
6	SR145 NB	0.07		0.18	
6	SR145 SB				0.01
6	SR16 EB	0.78	0.29	0.96	1.36
6	SR16 WB			0.12	0.86
6	SR18 NB	0.63	1.60	0.24	2.23
6	SR18 SB		0.06	0.21	0.53
6	SR1A NB	0.31	0.06	0.30	1.12
6	SR1A SB	0.03		0.05	1.13
6	SR2 EB		0.17	0.10	0.26
6	SR2 WB				0.13
6	SR203 EB		0.44	0.58	4.05
6	SR203 WB			1.38	0.83
6	SR28 NB	1.88	4.26	2.86	6.33
6	SR28 SB			0.21	2.32
6	SR2A EB		0.47		0.48
6	SR2A WB				0.01
6	SR3 NB				1.12
6	SR3 SB			1.62	1.66
6	SR37 NB	0.41	1.71	0.81	2.67
6	SR37 SB				0.08
6	SR38 NB		0.25	0.17	
6	SR38 SB				0.35
6	SR3A NB	1.33	0.05	1.67	0.48
6	SR3A SB			0.43	
6	SR53 NB	0.75	3.00	0.98	1.86
6	SR9 EB			5.53	2.40
6	SR9 WB			5.75	2.82
6	US1 SB				0.41
6	US20 EB	3.42	0.19	0.68	0.76
6	US20 WB			0.13	
6	US3 NB	0.02	3.23	0.34	4.89

6	US3 SB	0.30		0.44	1.57
District Totals		**12.04**	**31.00**	**43.96**	**91.21**
State Total		**295.04**	**114.01**	**395.61**	**233.47**
Grand Total		#			

MassDOT Planning has been developing a data layer that shows convergent and divergent intersection points throughout the roadway network. For simple “T” or “Y” type intersection configurations, the conceptual crossing of two streets is represented by a single point created where the two streets cross (intersect). Such occurrences represent a one-to-one relationship where there is a single intersection point representing a single instance where two roadways cross. Intersections with turning lanes dramatically change this one-to-one relationship, because the divergent and convergent points of the turning lane change the one-to-one relationship to a one-to-many relationship. Instead of having 1,000 intersection points representing 1,000 intersections, we now have 1,000 intersection points that in reality consists of far less than 1,000 intersections. Unfortunately, at this point in the intersection layer’s development it is impossible to know how many intersections truly exists based on the number of intersection points.

Intersections have been separated into Mainline intersections for roadway crossings and Ramp intersections for intersections at the ends of highway ramps. Table 3 provides a breakdown of intersections by MassDOT Highway Districts and intersection type.

Table 3

	MassDOT Intersections		MassDOT Intersections with Sidewalks	
District	**Mainline**	**Ramps**	**Mainline**	**Ramps**
District 1	1,594	8	435	4
District 2	1,724	268	662	65
District 3	2,346	508	1,216	85
District 4	2,636	721	1,835	269
District 5	4,512	747	2,233	103
District 6	1,584	339	1,316	136
Total	14,396	2,591	7,697	662

Each MassDOT Highway District maintains a non-standardized and unique database of signalized intersection data. Together, the separately maintained data sets track a total of 1,648 signalized intersections. These databases predominately contain MassDOT owned signalized intersections; however each database also contains an assorted collection of different types of signalized intersection types such as mid-block cross walk signals, intersections that have been removed, locations where police officers are deployed on a weekly base and intersections owned by other entities.

To date, all 1,648 intersections have been successfully incorporated into a spatial data layer. With District feedback 1,577 signalized intersections are MassDOT owned, 1,565 are MassDOT owned and maintained, with 12 intersections maintained but owned by another entity. District feedback also indicates that 845 intersections have pedestrian phases, 1,079 intersections have sidewalks, and 1,001 intersections have crosswalks.

Table 4

District	Total records in the District Database	MassDOT Owned Signalized Intersections Reported by Districts							Owned by other entity Maintained by MassDot	Owned by other entity Maintained by Other	Data Not Available
		Total	with Ped Phase	with Sidewalks	with Crosswalks	Flashers	Maintained by MassDOT	Maintained by Other Entity			
1	52	52	33	37	35	-	52	-	-	-	-
2	134	134	53	73	61	33	133	-	-	-	1
3	246	243	147	187	173	2	243	-	-	-	3
4	418	374	240	314	282		372	2	1	42	1
5	604	594	224	305	298	158	588	5	-	10	1
6	194	182	148	163	152	8	177	5	-	12	-
Total	1,648	1,579	845	1,079	1,001	201	1,565	12	1	64	6

MassDOT owned signalized intersections with sidewalks may dramatically increase as more sidewalks are located through the video log review process.

The signalized intersections are a subset of the intersection layers discussed on the previous page. The two layers were developed from different data sources for different purposes. As such, because the layers are intrinsically related, MassDOT has started an effort to allow the two layers to be linked together which should be complete by the end of December 2011.

Question 1:

How many miles of sidewalk and intersections could we expect to be surveyed and upgraded to ADA standards if we expand the scope of work for roadway repaving/reconstruction type projects to include such activities.

The following table illustrates how many miles of sidewalk could have been surveyed and updated to ADA standards if such activities where added to the scope of work for roadway repaving and construction type contracts. An analysis for signalized intersections can take place soon, however this will have to wait until the intersection layer is updated to accommodate our questions.

Table 5

MassDOT roadway resurfacing type projects in Miles
2002-2012

MassDOT sidewalk base length (Miles)	1113								
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Completed statewide	145	113	196	138	247	139	198	166	230
Completed along MassDOT roadways with sidewalks	10	15	13	9	23	17	22	26	17
Percent of Projects overlapping Sidewalk areas	7.1%	13.2%	6.7%	6.6%	9.4%	12.4%	11.2%	15.5%	7.5%
Percent of Sidewalk Total length	0.9%	1.3%	1.2%	0.8%	2.1%	1.5%	2.0%	2.3%	1.5%

	2011	2012
Active Statewide	108	131
Active along MassDOT roadways with sidewalks	9	11
Percent of Projects overlapping Sidewalk areas	8.7%	8.7%
Percent of Sidewalk Total length	0.8%	1.0%
Advertised Statewide	30	
Advertised along MassDOT roadways with sidewalks	5	
Percent of Projects overlapping Sidewalk areas	16.9%	
Percent of Sidewalk Total length	0.5%	
Scheduled to be Advertised Statewide	302	90
Scheduled to be Advertised Statewide along MassDOT roadways with Sidewalks	35	4
Percent of Projects overlapping Sidewalk areas	11.6%	4.0%
Percent of Sidewalk Total length	3.1%	0.3%

Potential accumulated impact of up-grading sidewalks using roadway resurfacing type activity contracts	19.6%

The following table contains the values used to query Planning's project tracking database to obtain the results shown in Table 5.

Query values

Completed Project types included in mileage calculations:	Hwy Reconstr - Added Capacity Hwy Reconstr - Major Widening Hwy Reconstr - Restr and Rehab' Hwy Reconstr-No Added Capacity Hwy. Reconstr - Minor Widening Resurfacing
Active Project types included in mileage calculations:	DOWNTOWN STREETSCAPE IMPROVEMENTS INTERSECTION IMPROVEMENTS RESURF. & REL. WK. INCLUDING REHAB. OF 6 BRIDGE DECKS RESURFACING RESURFACING & RELATED WORK ROADWAU RECONSTRUCTION ROADWAY RECONST ROADWAY RECONST. INCLUDING BRIDGE REPLACEMENT ROADWAY RECONSTR ROADWAY RECONSTRUCTION SIDEWALK CONSTRUCTION

Advertised Project types included in mileage calculations:	Resurfacing and Related Work (Including Cable Guardrail Installation) on a Section of Interstate 95 Resurfacing and Related Work on a Section of Interstate 395 Resurfacing and Related Work on a Section of Interstate 95 Resurfacing and Related Work on a Section of Route 20 Roadway Reconstruction (Including Sidewalks) on a Section of Washington Street Roadway Reconstruction and Related Work (Including Drainage) on a Section of Route 70 (Boylston and Main Streets) Roadway Reconstruction and Related Work (Including Traffic Signals) on a Section of Mill Street (Route 6 WB) Roadway Reconstruction and Related Work on a Section of Pleasant Street Roadway Reconstruction and Related Work on a Section of Westfield Street Traffic Signal Improvements and Related Work Route 110 (Lowell Street) at Intersection with Riverside Drive and Bolduc Street (Methuen Rotary) Resurfacing and Related Work on a Section of Route 101 (Ashby Road)
Scheduled to be Advertised Project types included in mileage calculations:	Hwy Reconstr - Added Capacity Hwy Reconstr - Major Widening Hwy Reconstr - Restr and Rehab Hwy Reconstr-No Added Capacity Hwy. Reconstr - Minor Widening

New Construction
Resurfacing
Traffic Signals

Question 2:

If we use selected land use categories as “hot spots” to identify sections of sidewalk and intersection to place on a prioritized list, what percentage or how many miles and intersections will also be addressed?

Question 2 was conducted using Land Use data developed by MassGIS. The primary land use categories included in the analysis were:

Multi-family
General Urban; Shopping centers (this includes office parks, general retail, government buildings, transportation nodes)
Light & Heavy Industry

Visual observations indicated that clearly more than 3/4th of the MassDOT roadways with sidewalks were within ¼ mile of the land use categories listed above, leaving our ability to create a priority list limited.

Question 3:

If we create a priority list of intersections and sidewalks within ¼ miles of major traffic generators, what percentage of intersections and how many miles of sidewalks would be addressed?

Question 3 was conducted using a ¼ mile buffer zone around the following activity centers:

Table 6

Category	Matrix Value
Transportation Facilities	
Airports (MassPort, MAC)	1
MBTA Parking Lots	1
MBTA Rapid Transit Stations	1
Park and Ride Lots	1
Train stations	1
Water Taxis	1
Bikes (Off-road shared use Paths)	1
Rest Areas	1
RMVs	1
Visitor Centers	1
RTA Office	1
Public Facilities	
Court Houses	1
State Police Barracks	1
Municipal Police Station	1
DCR Pools	1
Fire Stations	1
Hospitals	3
Libraries	1
Prisons	1
All Schools K-12	2
Schools (Colleges)	2
Town Halls	1
Malls	

Grocery Stores (Large and Small)	
Mini-Markets	
Post Offices	

The Land Use 2005 GIS layer from MassGIS has the following characteristics:

- Land Use Codes 15 in the LU37_1999 field represents
  - Malls, shopping centers and larger strip commercial areas, plus neighborhood stores and medical offices (not hospitals). Lawn and garden centers that do not produce or grow the product are also considered commercial.
  - There is no way to separate the land use types within the group
  - The line work looks old compared to the 2008 Orthophotos
  - The line work looks miss-aligned
  - Multiple commercial structures and parcels are grouped into large single polygons

The Land Mark layer has the following characteristics:

- Major categories can be found
- Land Marks can have multiple codes, causing duplication

Need to add

- Malls
- Mini-Markets
- Grocery Stores Large and Small
- Post Offices

Using the above matrix values: the following miles of sidewalk were given the corresponding weight.

Table 7

Total Score	Miles of Sidewalk	Percent of Sidewalks	MassDOT Signalized Intersections	Percent of Signalized Intersections
0	521.57	47.24	379.00	35.13
1	258.06	23.37	208.00	19.28
2	128.29	11.62	117.00	10.84
3	90.00	8.15	84.00	7.78
4	50.83	4.60	57.00	5.28
5	28.50	2.58	30.00	2.78
6	11.79	1.07	11.00	1.02
7	4.51	0.41	2.00	0.19
8	5.38	0.49	3.00	0.28
9	3.35	0.30	3.00	0.28
10	0.90	0.08	-	-
11	0.69	0.06	-	-
12	0.27	0.02	-	-
Total Linear Miles	1,104.14	100.00		
Total miles with a value	582.57	52.76		

Total Signalized Intersections with a value		
Total Signalized Intersections	1,079.00	82.85
Signalized Intersections without sidewalks	185.00	

We need to calculate the percentage of sidewalks shown above that will be addressed during the prioritization process addressed in question number 1.