TECHNICAL MEMORANDUM

TO: Mr. David Spitz, AICP
Town Planner

FROM: Jon W. Dietrich, P.E.
Derek L. Hug, P.E.

DATE: August 13, 2008
Revised: December 28, 2009

RE: Traffic Analysis Comparison of Zoning Alternatives
East Harwich Village Center

The following memo outlines the potential impact of the traffic generated by two proposed buildout scenarios on the adjacent roadway network at the East Harwich Village Center. These scenarios include an analysis of year 2018 full buildout conditions using different zoning scenarios. The existing zoning for the Village Center area, referred to as Scenario 1, and a denser zoning option, referred to as Scenario 4, were analyzed for this technical memorandum. Analyses were conducted assuming all access to parcels within the district will be provided through a ring road that will run through the district. The ring road is assumed to have two intersections with Orleans-Harwich Road (Route 39), one to the southwest and one to the northeast of Brewster-Chatham Road (Route 137). It will also form two intersections with Route 137, one to the northwest and one to the southeast of Route 39. This assumption will place the maximum possible demand on the four ring road intersections. All five study intersections, including the four ring road intersections as well as the intersection of Route 137 and Route 39, were analyzed as both conventional signalized intersections and as roundabouts under each scenario. Finally, capacity analyses of the Route 137 and Route 39 road segments at the edges of the district were analyzed to determine if these roadway segments can provide adequate capacity to serve the district at full buildout.

With the addition of the ring road, the Village Center area will be partitioned into four separate quadrants. A graphical representation of the schematic layout of the ring road and four quadrants can be found in Figure 1. These quadrants are defined as the areas between the ring road and Routes 137 and 39. Quadrant A is located between Route 137 and Route 39 to the north of the intersection, with Quadrant B to the west, Quadrant C to the south and Quadrant D located to the east. Under the two proposed scenarios, each quadrant was planned with varying footprints of retail, office, restaurant and, in the case of Scenario 4, housing space. The ring road is intended to provide a boundary for the Village Center commercial tenants, with housing-only development proposed outside of Quadrants A and B.

The following paragraphs describe the methodology used to develop estimates of traffic conditions under the two buildout scenarios, and summarize the results of the analyses.

TRAFFIC VOLUMES

In order to determine the full buildout traffic volumes for analysis and evaluation, the existing traffic counts were expanded to account for general traffic growth through the design year of 2018, and the anticipated traffic increases due to the buildout of the two scenarios were calculated and added to the expanded traffic volumes.

Traffic Volume Adjustments

The basis for the traffic volumes used in these analyses are July 2007 counts gathered via the loop detectors at the intersection of Route 137 and Route 39 and obtained from the Cape Cod Commission. By utilizing these summer traffic volumes, the resulting analyses will constitute peak-season conditions in the district area.

A number of businesses currently occupy the area within the proposed village district. These businesses range from a bank and a Post Office to a theater, office space and retail developments. The ITE *Trip Generation, 7th Edition* was used to estimate existing trip generation from these businesses. The estimated trips from the existing uses in the village district were removed from the roadways based on the trip distribution described in the Trip Distribution section of this technical memorandum.

In order to estimate traffic conditions for the design year of 2018, the 2007 volumes were expanded to account for general background traffic growth. The growth rate in the vicinity of the project was determined to be 4.0% per year. This rate was determined by using historical traffic data supplied by the Cape Cod Commission for the years of 1996, 1998, 1999 and 2002. The 2007 existing volumes were then projected to the 2018 design year.

Development-Based Traffic Volumes

In order to determine the net traffic increase (trip ends) anticipated to be generated by the full buildout of the two zoning scenarios, the site-generated traffic estimates for each proposed land use were based on empirical data gathered and published in *Trip Generation, 7th Edition*, by the Institute of Transportation Engineers (ITE). The increase was calculated by computing the difference between the scenario-specific trip generation and the expected trip generation of the existing uses within the district.

As noted above, there are two scenarios that are being considered and analyzed. These development scenarios were provided to us by Horsley Witten Group. Scenario 1 proposes a total of 233,188 square feet of retail space, 233,188 square feet of office space and 51,819 square feet of restaurant space. Additionally, Scenario 1 includes a total of 175 additional housing units in the area currently zoned for residential development, located near Quadrants A and B.

Scenario 4 proposes denser development, with 283,512 square feet of retail space, 283,512 square feet of office space, and 63,003 square feet of restaurant space. Scenario 4 also includes

310 integrated housing units within the four quadrants, along with 131 additional housing units in the area currently zoned for residential development, located near Quadrants A and B. One of the advantages to having multiple uses within a small area is the vehicle trips saved by people walking or biking rather than driving. In a dense urban center environment such as that proposed in Scenario 4, the number of vehicle trips eliminated can be significant, but is widely variable and is dependent on the density and mixture of uses. Specifically under Scenario 4, the calculated net trips account for an estimated 5% internal capture rate. "Internal capture" is a term that refers to a reduction in vehicle trips due to people walking or biking between various adjacent land uses, rather than creating vehicle trips.

Summaries of the total number of trips anticipated to be generated during typical weekday morning and afternoon peak hours and a typical Saturday peak hour, for both Scenarios 1 and 4, are provided below in Tables 1 and 2, respectively.

Table 1
Scenario 1 Site Generated Trips
East Harwich Village Center
Harwich, Massachusetts

PEAK HOUR/ DIREC TION	QUADRANT				TOTAL
	A	B	C	D	
Average Weekday	8,632	8,468	5,180	8,636	30,916
Entering	4,316	4,234	2,590	4,318	15,458
Exiting	4,316	4,234	2,590	4,318	15,458
AM Peak Hour	480	467	263	462	1,672
Entering	285	284	174	304	1,047
Exiting	195	183	89	158	625
PM Peak Hour	858	840	530	845	3,073
Entering	401	389	229	379	1,398
Exiting	457	451	301	466	1,675
SAT Peak Hour	1,027	1,015	628	1,058	3,728
Entering	567	561	345	587	2,060
Exiting	460	454	283	471	1,668

Table 2
Scenario 4 Site Generated Trips
East Harwich Village Center
Harwich, Massachusetts

PEAK HOUR/ DIRECTION	QUADRANT				TOTAL
	A	B	C	D	
Average Weekday	9,916	8,726	6,216	10,422	**35,280**
Entering	4,958	4,363	3,108	5,211	17,640
Exiting	4,958	4,363	3,108	5,211	17,640
AM Peak Hour	565	493	333	582	**1,973**
Entering	326	287	206	358	1,177
Exiting	239	206	127	224	796
PM Peak Hour	971	860	622	1,009	**3,462**
Entering	456	399	280	469	1,604
Exiting	515	461	342	540	1,858
SAT Peak Hour	1,195	1,058	769	1,273	**4,295**
Entering	661	584	422	708	2,375
Exiting	534	474	347	565	1,920

It is important to note that not all trips attracted to the district will come from outside the district. Given the size of the proposed district, it is anticipated that many will walk between destinations if they are in the same quadrant, but many fewer will do this if their next destination is in another quadrant. For purposes of this analysis it was assumed that users would use their vehicles to access any facility not within the same district quadrant. Similar to the internally captured trips described above, the number of these trips can vary widely dependent on the land uses and popularity of uses within each quadrant. For this analysis, it was assumed that no more than 5 percent of trips to or from each quadrant would originate from or depart to an adjacent quadrant. As an example of how these volumes were determined, the number of trips travelling from Quadrant A into Quadrant B was calculated by using 2.5 percent of the lesser of the vehicular volume exiting Quadrant A and the vehicular volume entering Quadrant B. A summary of the number of these trips assumed for the analyses is provided in Tables 3 and 4. These trips were subtracted from the trip generation numbers shown in Tables 1 and 2 to create the Net Site Generated trips summarized in Tables 5 and 6 and used in the peak hour analyses.

Table 3
Scenario 1 Adjacent Quadrant Trips
East Harwich Village Center
Harwich, Massachusetts

		NUMBER OF TRIPS (AM/PM/SAT PEAK HOURS)			
		Destination Quadrant			
		Quad A	Quad B	Quad C	Quad D
Departure Quadrant	Quad A	---	5/10/12	N/A	5/9/12
	Quad B	5/10/11	---	4/6/9	N/A
	Quad C	N/A	2/8/7	---	2/8/7
	Quad D	4/10/12	N/A	4/6/9	---

Table 4
Scenario 4 Adjacent Quadrant Trips
East Harwich Village Center
Harwich, Massachusetts

		NUMBER OF TRIPS (AM/PM/SAT PEAK HOURS)			
		Destination Quadrant			
		Quad A	Quad B	Quad C	Quad D
Departure Quadrant	Quad A	---	6/10/13	N/A	6/12/13
	Quad B	5/11/12	---	5/7/11	N/A
	Quad C	N/A	3/9/9	---	3/9/9
	Quad D	6/11/14	N/A	5/7/11	---

Table 5
Scenario 1 NET Site Generated Trips
East Harwich Village Center
Harwich, Massachusetts

PEAK HOUR/ DIREC TION	QUADRANT				TOTAL
	A	B	C	D	
Average Weekday	8,204	8,126	4,920	8,290	29,540
Entering	4,102	4,063	2,460	4,145	14,770
Exiting	4,102	4,063	2,460	4,145	14,770
AM Peak Hour	461	451	251	447	1,610
Entering	276	277	166	297	1,016
Exiting	185	174	85	150	594
PM Peak Hour	819	807	502	812	2,940
Entering	381	371	217	362	1,331
Exiting	438	436	285	450	1,609
SAT Peak Hour	980	976	596	1,018	3,570
Entering	544	542	327	568	1,981
Exiting	436	434	269	450	1,589

Table 6
Scenario 4 NET Site Generated Trips
East Harwich Village Center
Harwich, Massachusetts

PEAK HOUR/ DIRECTION	QUADRANT				TOTAL
	A	B	C	D	
Average Weekday	9,450	8,352	5,906	10,018	**33,726**
Entering	4,725	4,176	2,953	5,009	16,863
Exiting	4,725	4,176	2,953	5,009	16,863
AM Peak Hour	542	474	317	562	**1,895**
Entering	315	278	196	349	1,138
Exiting	227	196	121	213	757
PM Peak Hour	927	823	590	970	**3,310**
Entering	434	380	266	448	1,528
Exiting	493	443	324	522	1,782
SAT Peak Hour	1,143	1,013	729	1,226	**4,111**
Entering	635	562	400	686	2,283
Exiting	508	451	329	540	1,828

TRIP DISTRIBUTION

The distribution of trips generated by the proposed development was determined based on Year 2000 Journey to Work information provided by the United States Census Bureau, the location of nearby population centers, and the existing roadway and highway network. Based on this information, the following arrival/departure pattern into and out of the Village Center was assumed for the net traffic volumes for both scenarios:

- 70% via Route 137 to/from the northwest
- 5% via Route 39 to/from the northeast
- 10% via Route 137 to/from the southeast
- 15% via Route 39 to/from the southwest

A summary of the proposed trip distribution for each quadrant can be seen in Figures 2 through 5. This distribution was then applied to the net traffic volumes for each scenario, shown in Figures 6 through 11. Figures 6 through 11 also show the traffic anticipated between adjacent quadrants.

These volumes were then added to the adjusted 2018 traffic volumes described in the Traffic Volumes section above, creating the 2018 Build Condition volumes shown in Figures 12 through 17.

CAPACITY ANALYSES

Several types of capacity analyses were performed to determine the peak hour traffic operations of the proposed scenarios on the surrounding roadways. These included the following: Synchro 7 signalized capacity analyses at the existing intersection of Route 137 and Route 39, as well as at the four intersections that will be created as a result of the proposed ring road; roundabout analyses of the same five intersections conducted with SIDRA; and HCS+ two-way, two-lane highway capacity analyses for the segments of Route 137 and Route 39 at the outer boundaries of the Village Center. A description of each analysis is summarized in the following sections.

Signalized Intersections Assumption

Signalized intersection capacity analyses were conducted using Synchro Professional Software, Version 7. When discussing intersection capacity analyses results, the term usually used to describe the operating condition of the road or intersection is Level of Service (LOS). LOS is a measure of the delay experienced by stopped vehicles at an intersection, and is intended to describe the level of driver discomfort, frustration, fuel consumption, and lost travel time experienced at an intersection as a whole, an individual approach, or an individual lane group. LOS is rated on a scale from A to F, with LOS A describing a condition of very little delay and LOS F describing a condition where delays will be generally unsatisfactory to most drivers. The

LOS grade is assigned based on the amount of calculated delay, with LOS D or better generally considered to be acceptable for urban and suburban areas.

Capacity analyses at the four intersections that will be created by the intersections of Route 137 and Route 39 with the proposed ring road were conducted in order to determine the necessary timing, phasing, and roadway geometry to ensure that all individual movements at the intersection experience LOS D or better conditions, as well as reasonable vehicle queue lengths (i.e. backup) during all peak hours for each zoning scenario.
Using the above referenced methodology, weekday morning and afternoon, and Saturday peak hour capacity analyses were conducted at all five of the intersections in the proposed development created by Route 137, Route 39 and the proposed ring road.

Table 7 presents a summary of the levels of service at the intersections. Copies of the analysis worksheets and schematic illustrations of the study intersections as analyzed and described below can be found attached.

Table 7
Signalized Intersection Capacity Analyses Summary
East Harwich Village Center
Harwich, Massachusetts

LOCATION	LEVEL OF SERVICE / AVERAGE DELAY (sec)					
	Scenario 1			Scenario 4		
	AM Peak Hour	PM Peak Hour	SAT Peak Hour	AM Peak Hour	PM Peak Hour	SAT Peak Hour
Route 137 at Route 39	C/27.6	C/31.6	C/32.8	C/31.5	D/37.4	D/37.8
Route 137 at Ring Road (NW)	B/17.5	C/26.0	C/27.3	C/20.8	D/35.4	C/32.7
Route 39 at Ring Road (NE)	B/10.0	B/16.7	B/16.5	B/10.8	B/16.9	B/18.5
Route 137 at Ring Road (SE)	B/11.0	B/16.6	B/18.2	B/17.4	C/23.6	C/26.6
Route 39 at Ring Road (SW)	A/7.6	B/12.4	B/11.7	A/9.3	B/16.0	B/16.1

In order to achieve the results shown in Table 7 above, both the geometry and signal timing and phasing at each intersection was developed with the intention of creating a single intersection plan that would most efficiently accommodate all three peak hours under consideration, for each scenario.

At the northwest intersection of Route 137 and the ring road under Scenario 1, the intersection was analyzed with two through lanes on each Route 137 approach. In addition to these lanes, the northbound approach was analyzed with one dedicated left turn lane, while the southbound approach featured two dedicated left turn lanes and a dedicated right turn lane. Each of the ring

road approaches were analyzed with a single lane for through and right-turning movements. The westbound ring road approach consists of a single dedicated left turn lane, while the eastbound ring road approach has two dedicated left turn lanes. Both Route 137 approaches to Route 39 were analyzed with two dedicated left turn lanes, and the existing right turn only lanes were converted to include through movements as well. This required that two lanes be provided for traffic exiting the intersection on each of the Route 137 legs of the intersection. In addition, the analysis included the addition of a second dedicated left turn lane on the Route 39 eastbound approach. The intersection of Route 137 at the ring road to the southeast consists of a single dedicated left turn lane and a single shared through/right turn lane on all four approaches. Both Route 39/ring road intersections were analyzed with a single dedicated left turn lane and a single through lane on three of the four approaches, with the southbound ring road approach needing only a single lane.

Despite the higher development density under Scenario 4, leading to slightly higher overall volumes at the study intersections, no additional improvements were required in the analyses to allow the intersections to operate at good levels of service under this scenario.

Roundabouts Assumption

Roundabout intersection capacity analyses were conducted using SIDRA Intersection, Version 3.2. The same measurement of Level of Service is provided from this software as in the signalized intersection analyses above. Similar to the signalized analyses, weekday morning and afternoon, and Saturday peak hour capacity analyses were conducted at all five of the study intersections.

Table 8 presents a summary of the levels of service at the intersections. Copies of the analysis worksheets and schematic illustrations of the study intersections as analyzed can be found attached.

In order to achieve the results shown in Table 8 below, the geometry of each intersection was once again developed in order to accommodate all three peak hour conditions for each scenario.

Under Scenario 1, the northwest intersection of Route 137 and the ring road was analyzed as a two-lane roundabout, where the Route 137 approaches each consist of two lanes. The ring road approaches at this intersection each include one approach lane into the roundabout to handle through and left-turning traffic, plus a channelized right turn slip lane for right-turning vehicles. The intersection of Route 137 and Route 39 is also a two-lane roundabout with all four approaches consisting of two approach lanes into the roundabout The southeast intersection of Route 137 with the ring road, also a two-lane roundabout, consists of two-lane approaches on Route 137 and single-lane approaches on the ring road. Both Route 39 intersections with the ring road were analyzed as single-lane roundabouts.

Table 8
SIDRA Roundabout Capacity Analyses
East Harwich Village Center
Harwich, Massachusetts

LOCATION	LEVEL OF SERVICE / AVERAGE DELAY (sec)					
	Scenario 1			Scenario 4		
	AM Peak Hour	PM Peak Hour	SAT Peak Hour	AM Peak Hour	PM Peak Hour	SAT Peak Hour
Route 137 at Route 39	A/6.4	A/9.2	B/11.4	A/6.2	A/9.1	B/10.3
Route 137 at Ring Road (NW)	A/4.2	A/9.2	B/10.3	A/4.4	A/9.4	A/10.0
Route 39 at Ring Road (NE)	A/3.4	A/4.8	A/5.8	A/3.8	A/5.3	A/5.8
Route 137 at Ring Road (SE)	A/3.4	A/4.4	A/4.8	A/3.7	A/4.9	A/5.3
Route 39 at Ring Road (SW)	A/4.9	A/5.1	A/6.8	A/3.5	A/4.9	A/7.7

Accordingly, the roundabout analysis assumes that Route 137 would have to be widened to accommodate four (4) lanes, two-lane approaches in both the northbound and southbound directions.

Under Scenario 4, similar to Scenario 1, all roundabouts along Route 137 were analyzed as two-lane roundabouts, and the two Route 39 intersections with the ring road would be single-lane roundabouts. However, the eastbound ring road approach at the northwest intersection of Route 137 and the ring road was analyzed with a two-lane approach into the roundabout, with the left lane dedicated for left-turning traffic. Additional improvements over Scenario 1 included adding channelized slip lanes for right turns on the southbound and eastbound approaches at the intersection of Route 137 and Route 39.

Two-Way, Two-Lane Highways

In addition to the intersection capacity analyses noted above, in order to determine if the existing geometry of the primary roadways feeding the district, Routes 137 and 39, will allow for enough capacity to handle the increased volumes, an analysis of each of the road segments on Route 137 and Route 39 leading to/from the Village Center was conducted using HCS+ software. This software utilizes the methods contained in the National Academy of Science's *Highway Capacity Manual*, 2000. The LOS grades assigned by this methodology are related to the Percent Time Spent Following (PTSF) for vehicles on the roadway segment. This analysis takes into account the geometric characteristics of the roadway, along with the number of opposing vehicles (per hour), the number of access points per mile, and the type of terrain encountered on the segment. The results of the analyses are tabulated in Table 9.

Table 9
Two-Way, Two Lane Highway Analyses
East Harwich Village Center
Harwich, Massachusetts

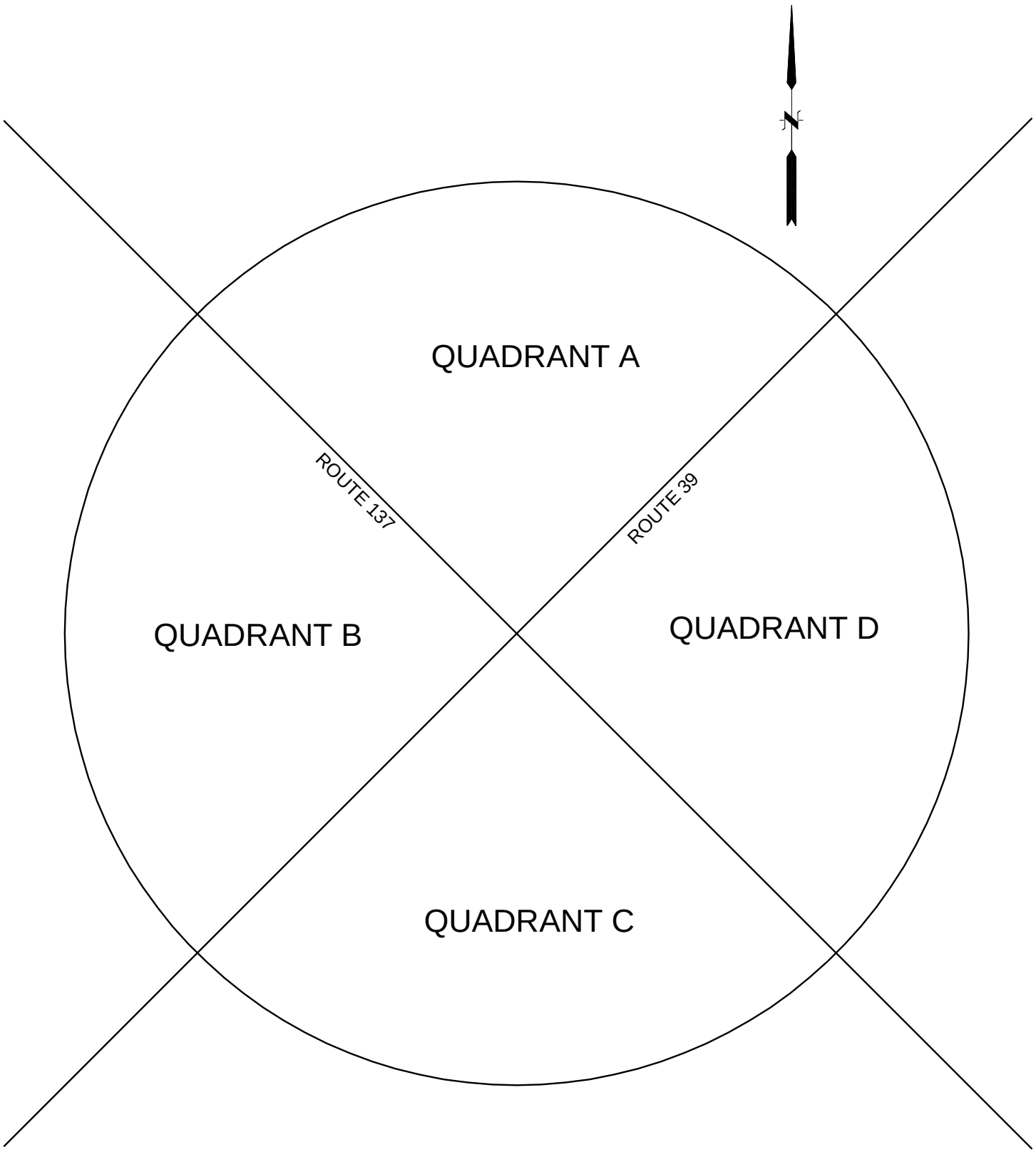
ROADWAY SEGMENT	LEVEL OF SERVICE					
	Scenario 1			Scenario 4		
	AM Peak Hour	PM Peak Hour	SAT Peak Hour	AM Peak Hour	PM Peak Hour	SAT Peak Hour
Route 137 (Northwest)	E	F	F	E	F	F
Route 39 (Northeast)	C	D	D	C	D	D
Route 137 (Southeast)	D	D	D	D	D	D
Route 39 (Southwest)	D	D	D	D	D	E

As shown, the Route 137 corridor between Route 6 and the Village Center District may require additional improvements (e.g. additional travel lanes) in order to effectively carry the anticipated traffic volumes to and from the Village Center during peak travel hours. It is anticipated that the other corridors providing access to the District will continue to have adequate capacity to serve the area after full buildout is achieved, although it is possible that during the busiest periods of the year Route 39 to the west of the district could begin to approach its capacity.

CONCLUSIONS

Based on the above analyses, under either Scenario 1 or Scenario 4, either signalized intersections or roundabouts can be utilized to promote safe and efficient movement of the anticipated traffic volumes in conjunction with a ring road configuration. However, the analyses show that the Route 137 corridor between Route 6 and the district will likely require improvements to increase capacity in order to handle the traffic increases anticipated under both Scenario 1 and Scenario 4, based on a 10-year traffic projection.

We hope that this technical memorandum assists the Town of Harwich determine the viability of different zoning options within the East Harwich Village Center. If you have any questions, feel free to call either Derek Hug at (508) 946-1747 ext. 4563 or Jon Dietrich at (508) 946-1747 ext. 4438.

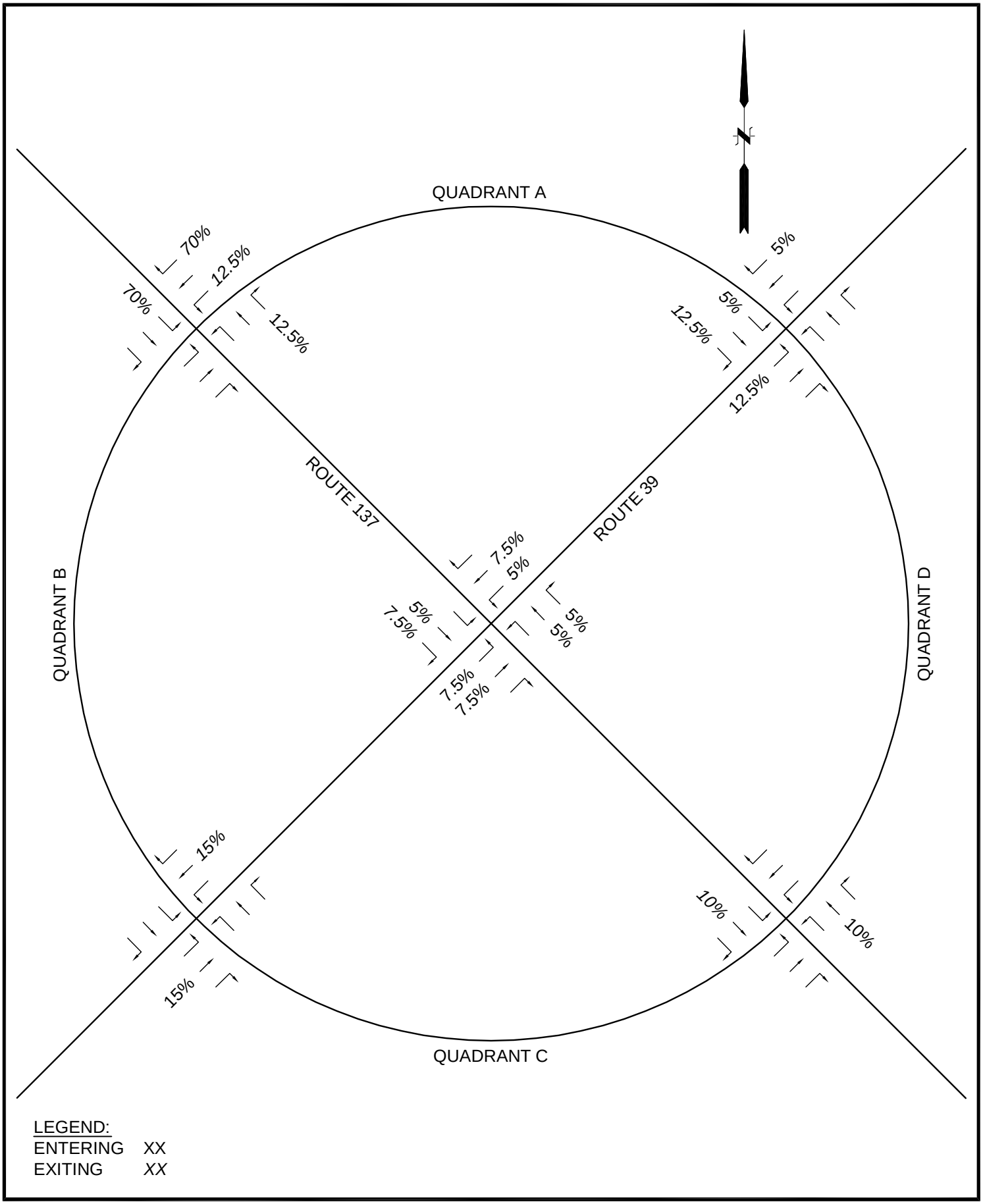


File Path: J:\DWG\P2007\0972\A10\Plan\TRIP DIST.dwg, Layout: QUADRANTS Mon, Dec 28, 2009 - 10:24 AM User: dhug

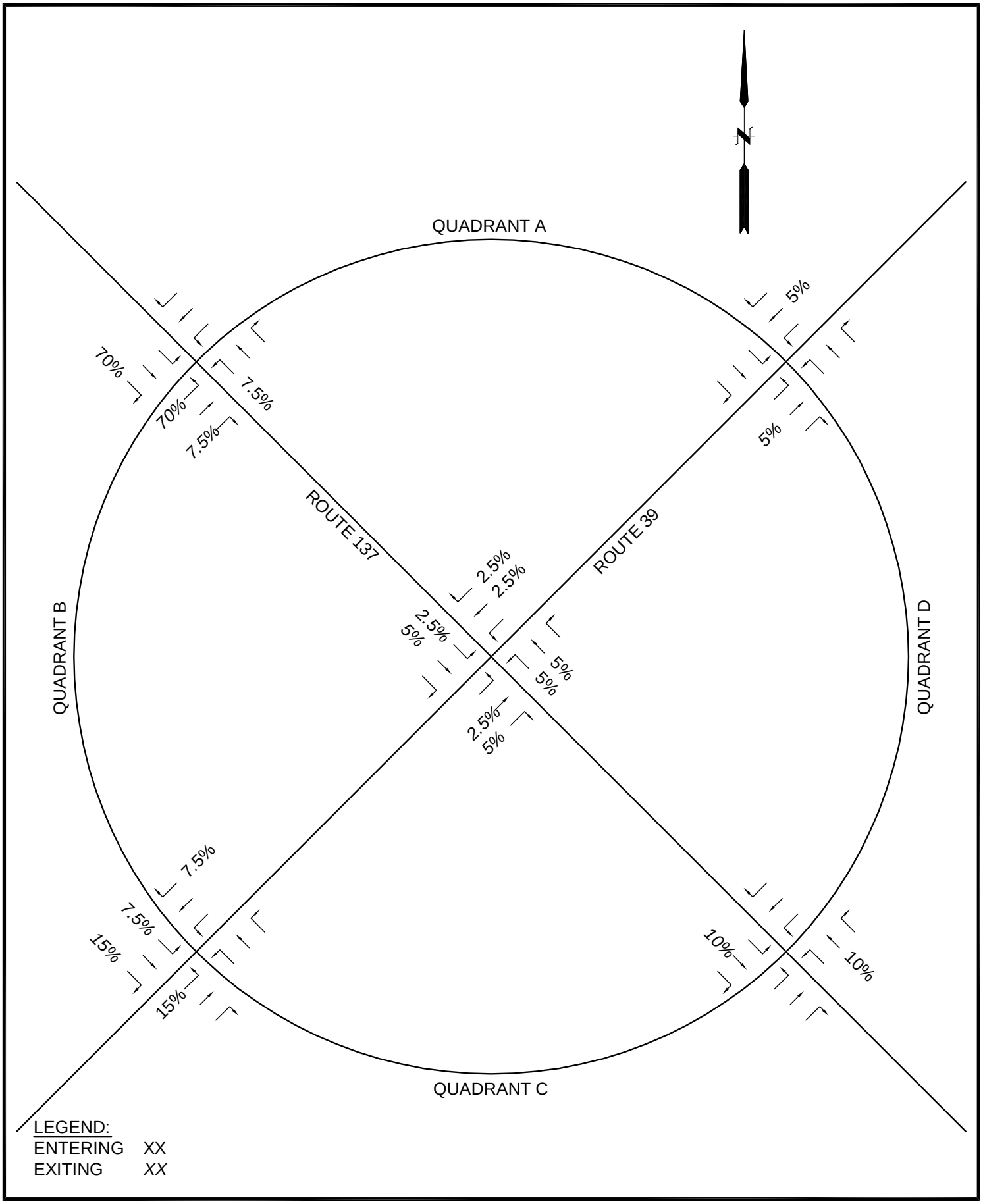
UCS: | MS VIEW: | LMAN: | CTB:

SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	EAST HARWICH VILLAGE CENTER VILLAGE CENTER LAYOUT HARWICH MASSACHUSETTS

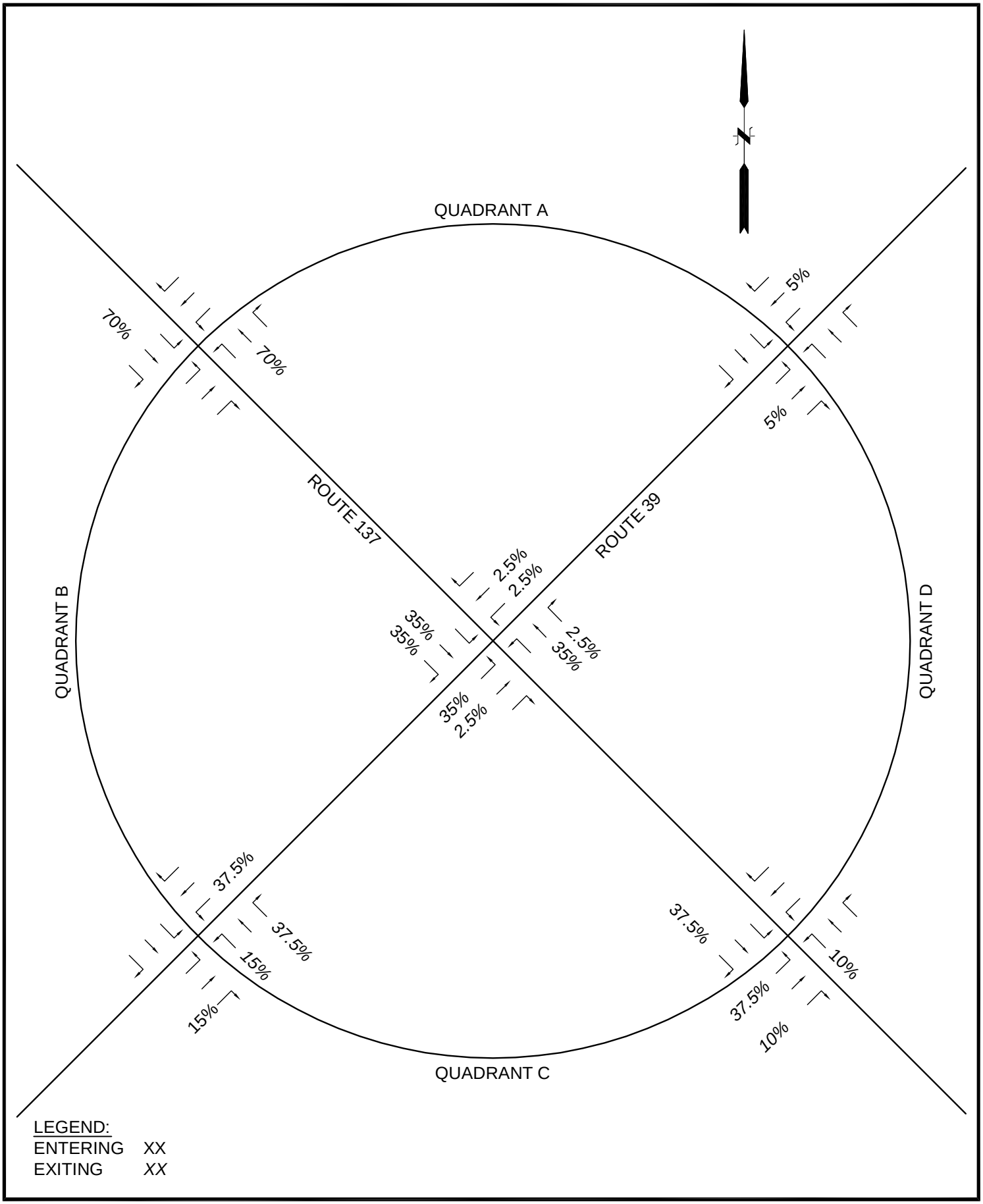
PROJ. No.: 2007-0972.A10
DATE: DECEMBER 2009
FIG. 1



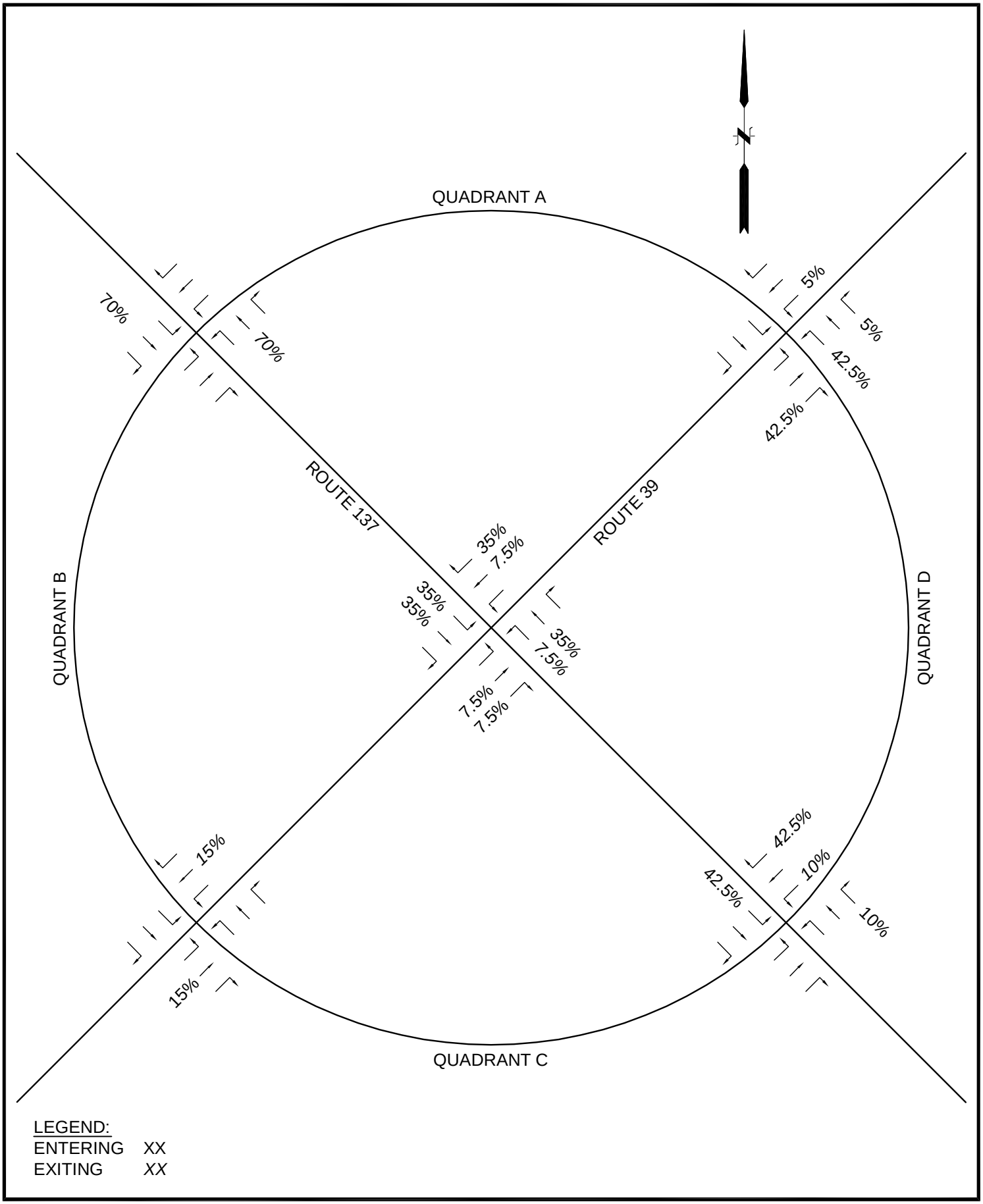
SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	EAST HARWICH VILLAGE CENTER SITE GENERATED TRAFFIC DISTRIBUTION QUADRANT A HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 2



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	EAST HARWICH VILLAGE CENTER SITE GENERATED TRAFFIC DISTRIBUTION QUADRANT B HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 3



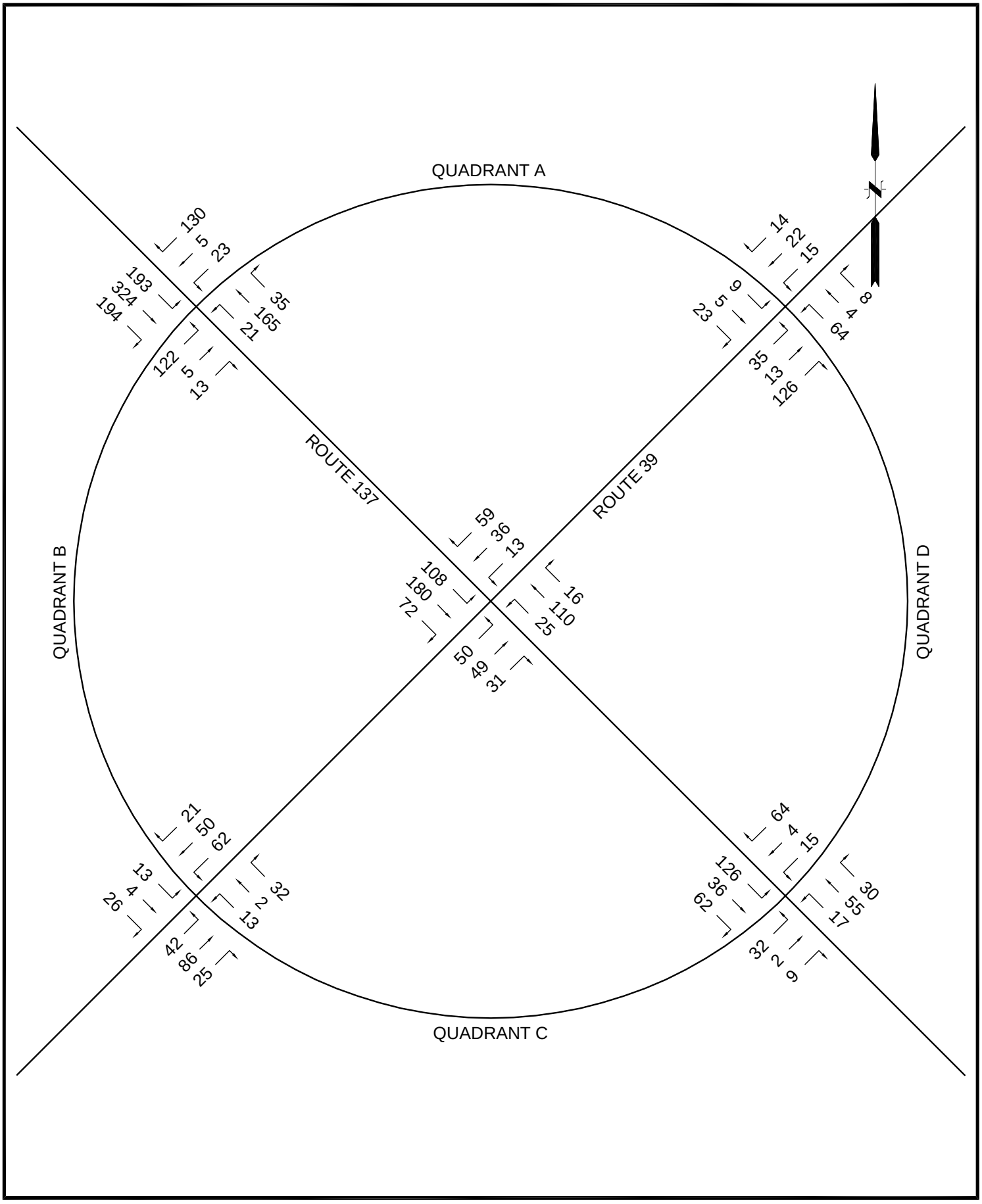
SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	EAST HARWICH VILLAGE CENTER SITE GENERATED TRAFFIC DISTRIBUTION QUADRANT C HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 4



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	EAST HARWICH VILLAGE CENTER SITE GENERATED TRAFFIC DISTRIBUTION QUADRANT D HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 5

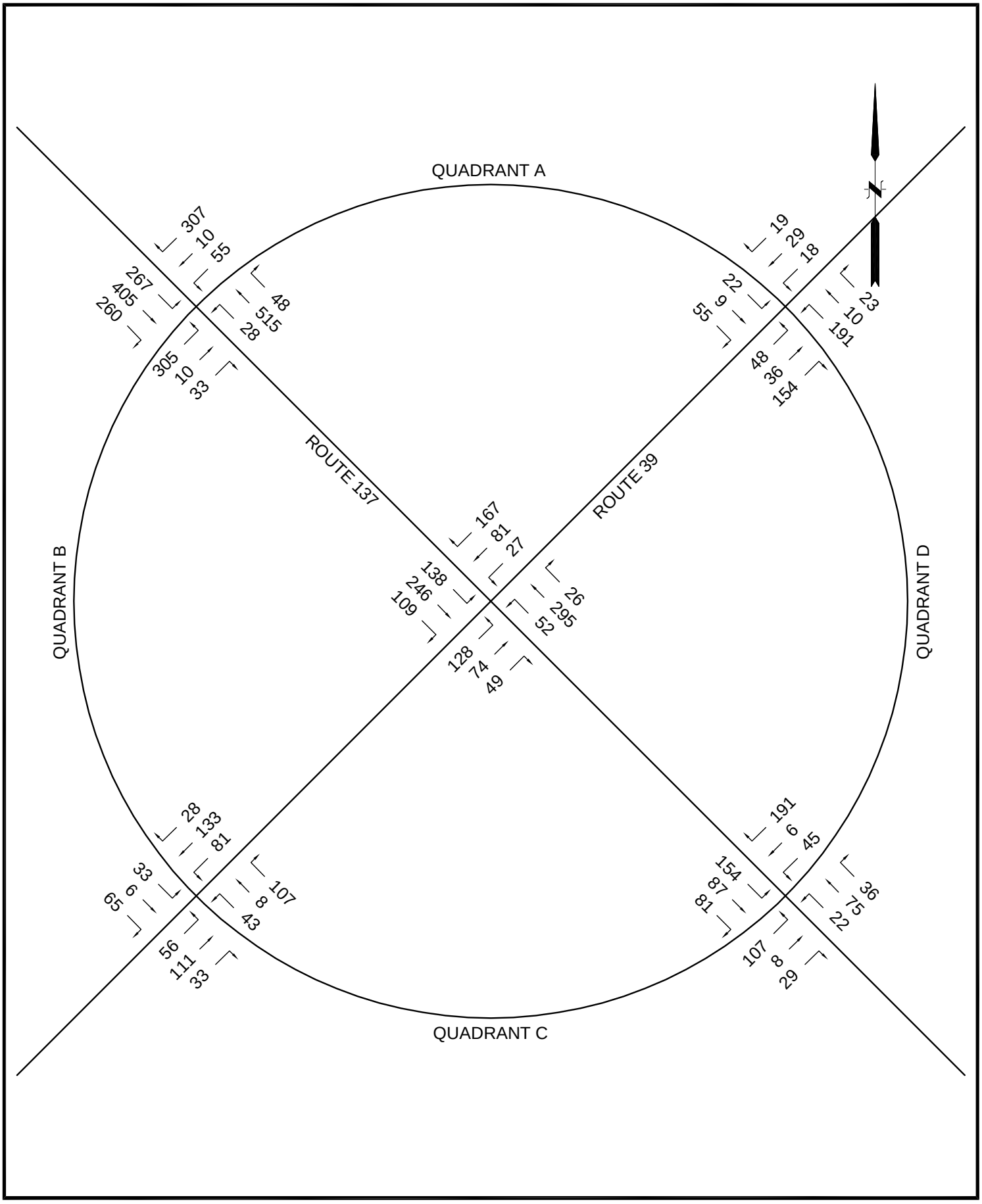
File Path: J:\DWG\P2007\0972\A10\Plan\TRIP DIST.dwg, Layout: QUAD D DIST Mon, Dec 28, 2009 - 10:24 AM User: dhug

UCS: | MS VIEW: | LMAN: | CTB:

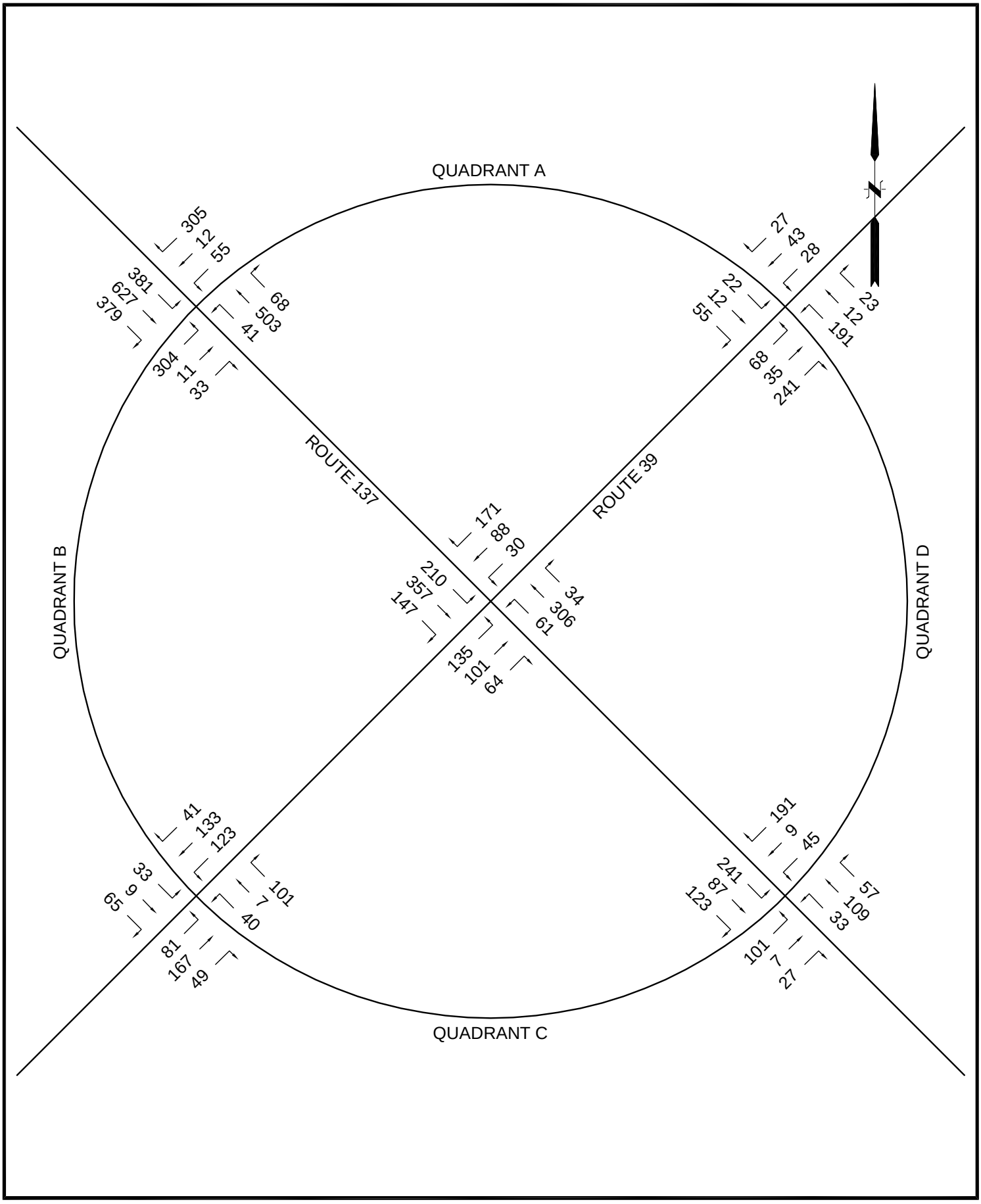


SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH SITE GENERATED TRAFFIC VOLUMES WEEKDAY AM PEAK HOUR (SCENARIO 1) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS

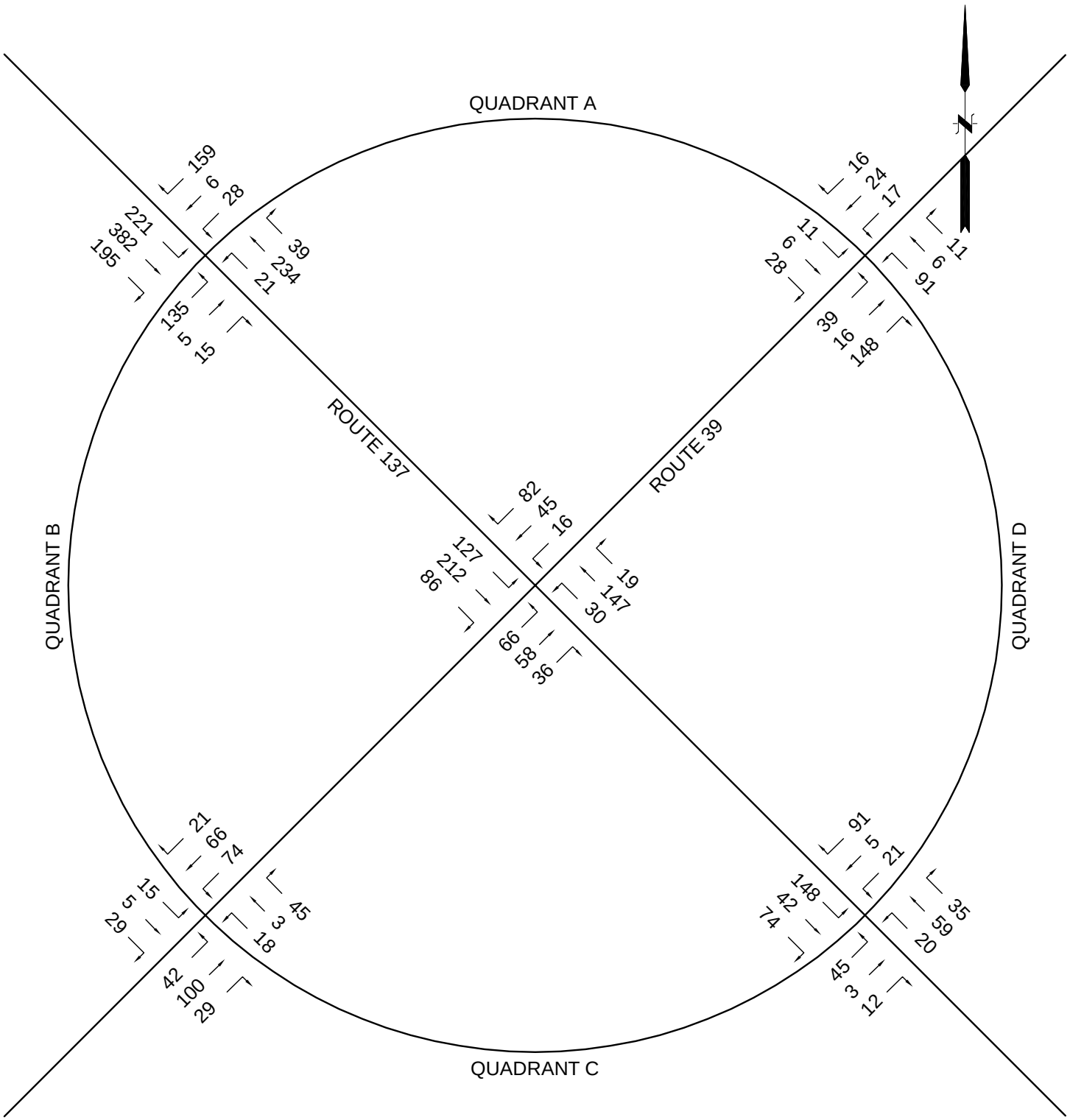
PROJ. No.: 2007-0972.A10
DATE: DECEMBER 2009
FIG. 6



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH SITE GENERATED TRAFFIC VOLUMES WEEKDAY PM PEAK HOUR (SCENARIO 1) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 7



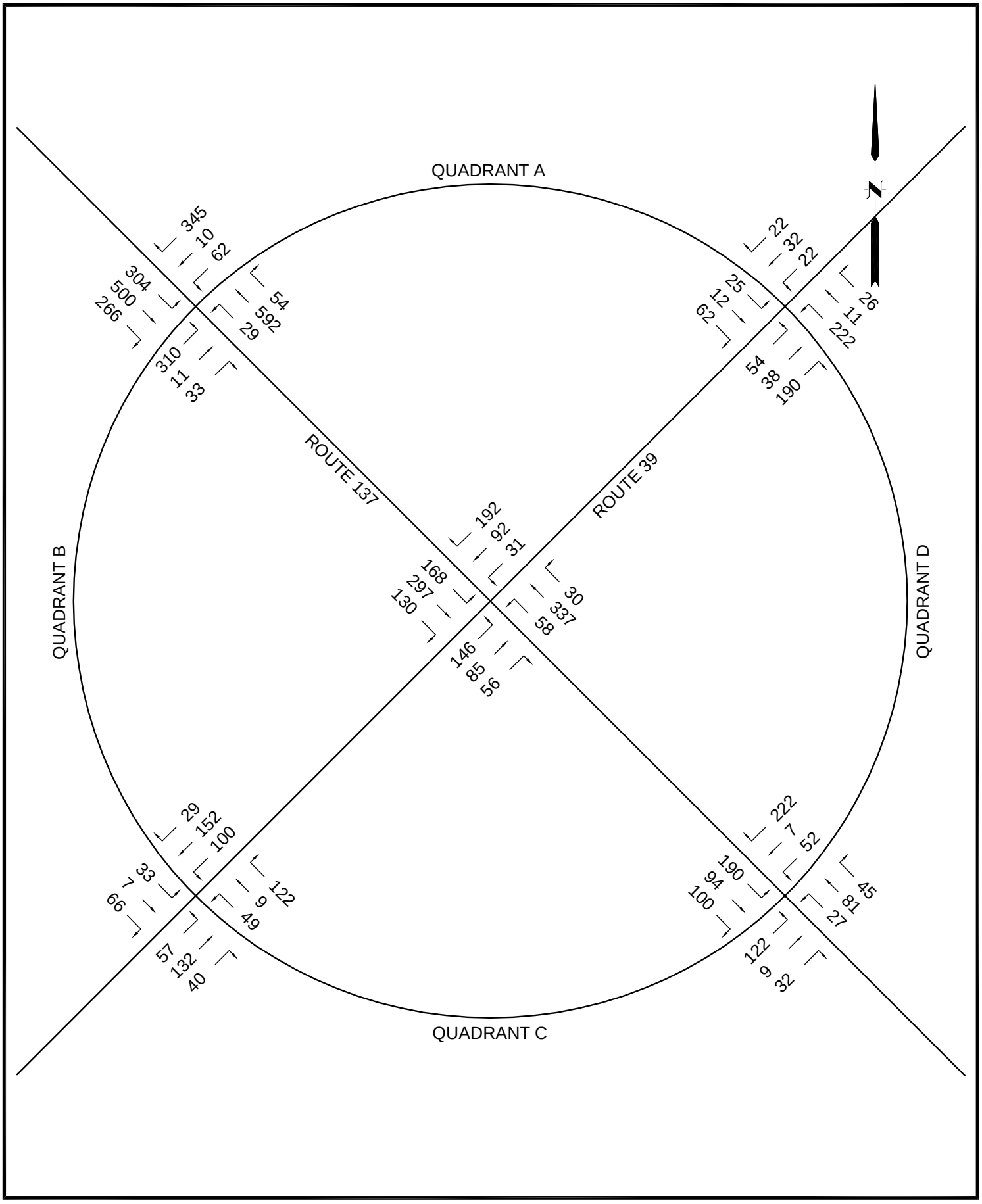
SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH SITE GENERATED TRAFFIC VOLUMES SATURDAY PEAK HOUR (SCENARIO 1) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 8



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH SITE GENERATED TRAFFIC VOLUMES WEEKDAY AM PEAK HOUR (SCENARIO 4) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 9

File Path: J:\DWG\P2007\0972\A10\Plan\TRIP GEN002.dwg, Layout: AM-S4 Mon, Dec 28, 2009 - 10:25 AM User: dhug

UCS: | MS VIEW: | LMAN: | CTB:



File Path: J:\DWG\P2007\0972\A10\Plan\TRIP GEN002.dwg, Layout: PM-S4 Mon, Dec 28, 2009 - 10:25 AM User: dhug

UCS: | MS VIEW: | LMAN: | CTB:

SCALE:
HORZ.: NTS
VERT.:
DATUM:
HORZ.:
VERT.:
0 X X
GRAPHIC SCALE

WWW.FandO.COM

FUSS & O'NEILL
Disciplines to Deliver

317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070

TOWN OF HARWICH

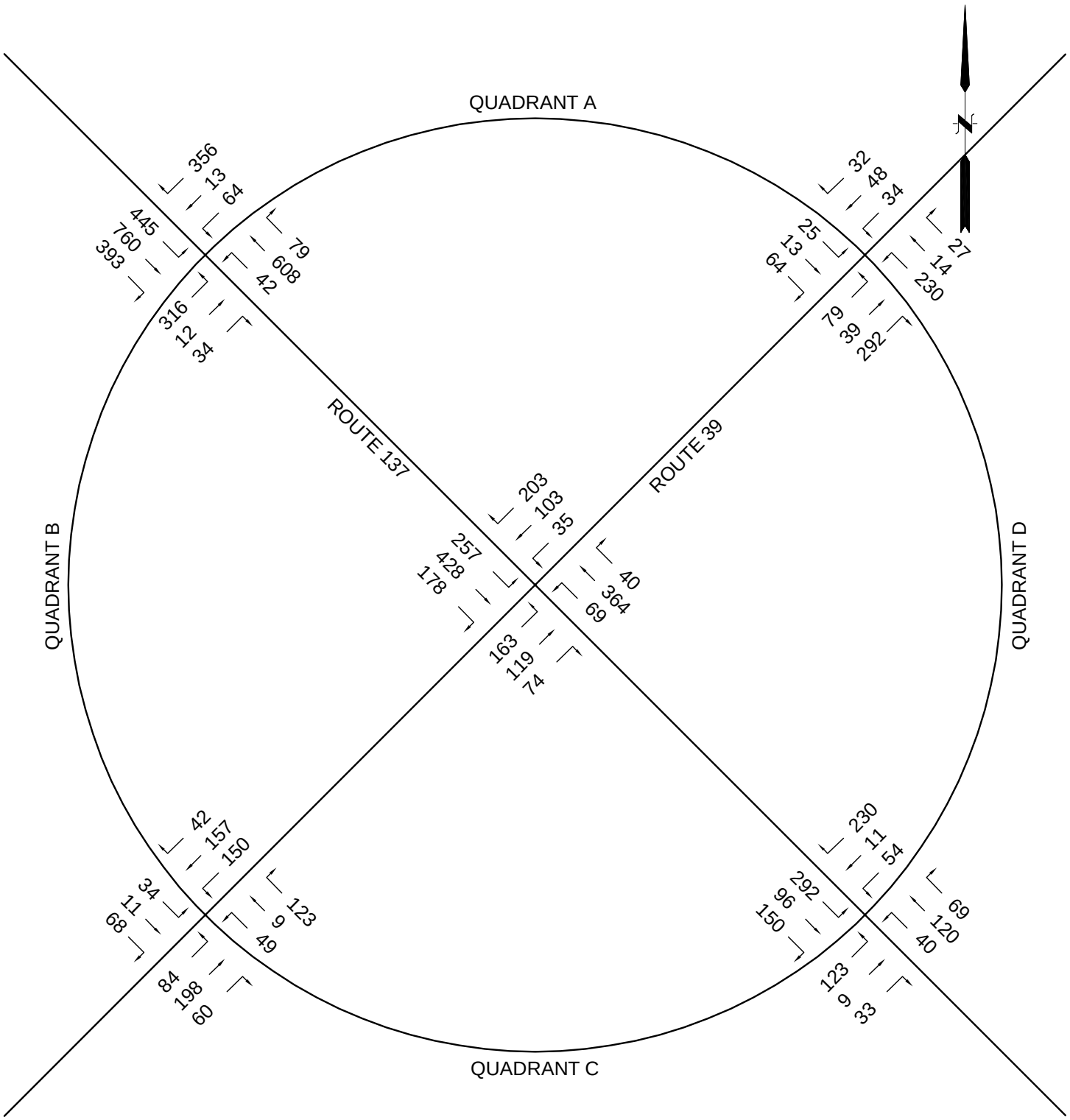
SITE GENERATED TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR (SCENARIO 4)

EAST HARWICH VILLAGE CENTER

HARWICH MASSACHUSETTS

PROJ. No.: 2007-0972.A10
DATE: DECEMBER 2009

FIG. 10



SCALE:
HORZ.: NTS
VERT.:
DATUM:
HORZ.:
VERT.:
0 X X
GRAPHIC SCALE

WWW.FandO.COM
FUSS & O'NEILL
Disciplines to Deliver
317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070

TOWN OF HARWICH

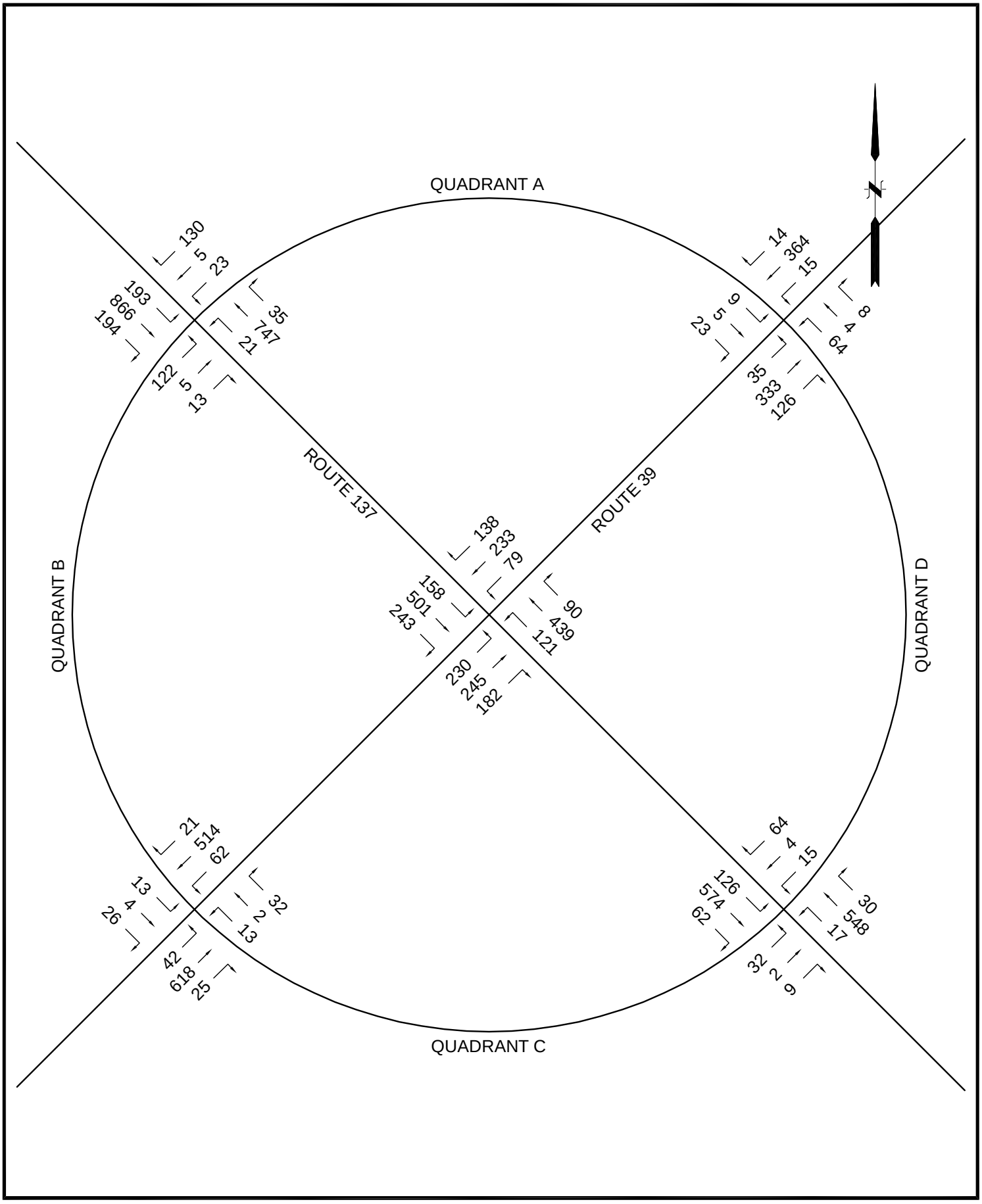
SITE GENERATED TRAFFIC VOLUMES
SATURDAY PEAK HOUR (SCENARIO 4)

EAST HARWICH VILLAGE CENTER

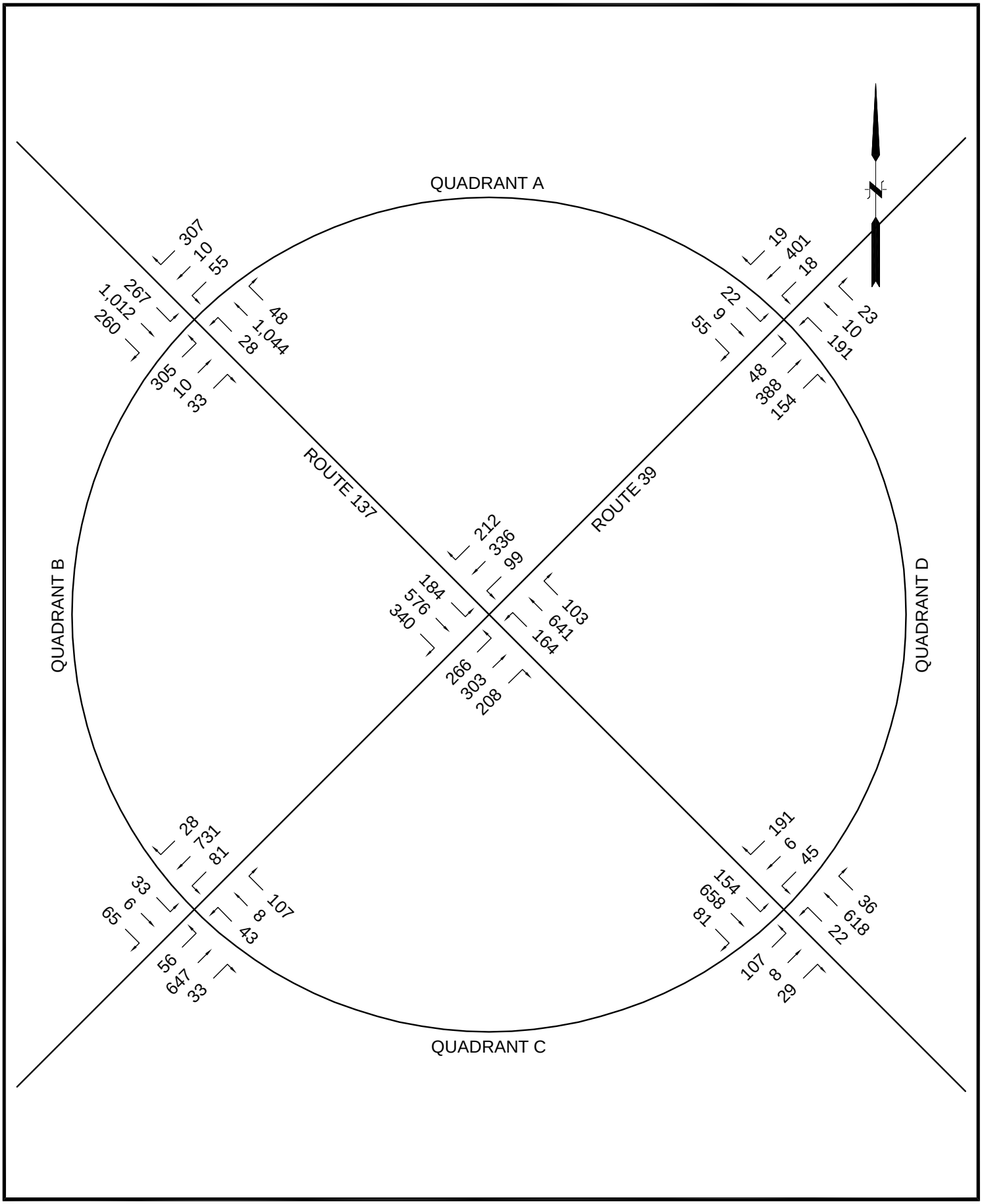
HARWICH MASSACHUSETTS

PROJ. No.: 2007-0972.A10
DATE: DECEMBER 2009

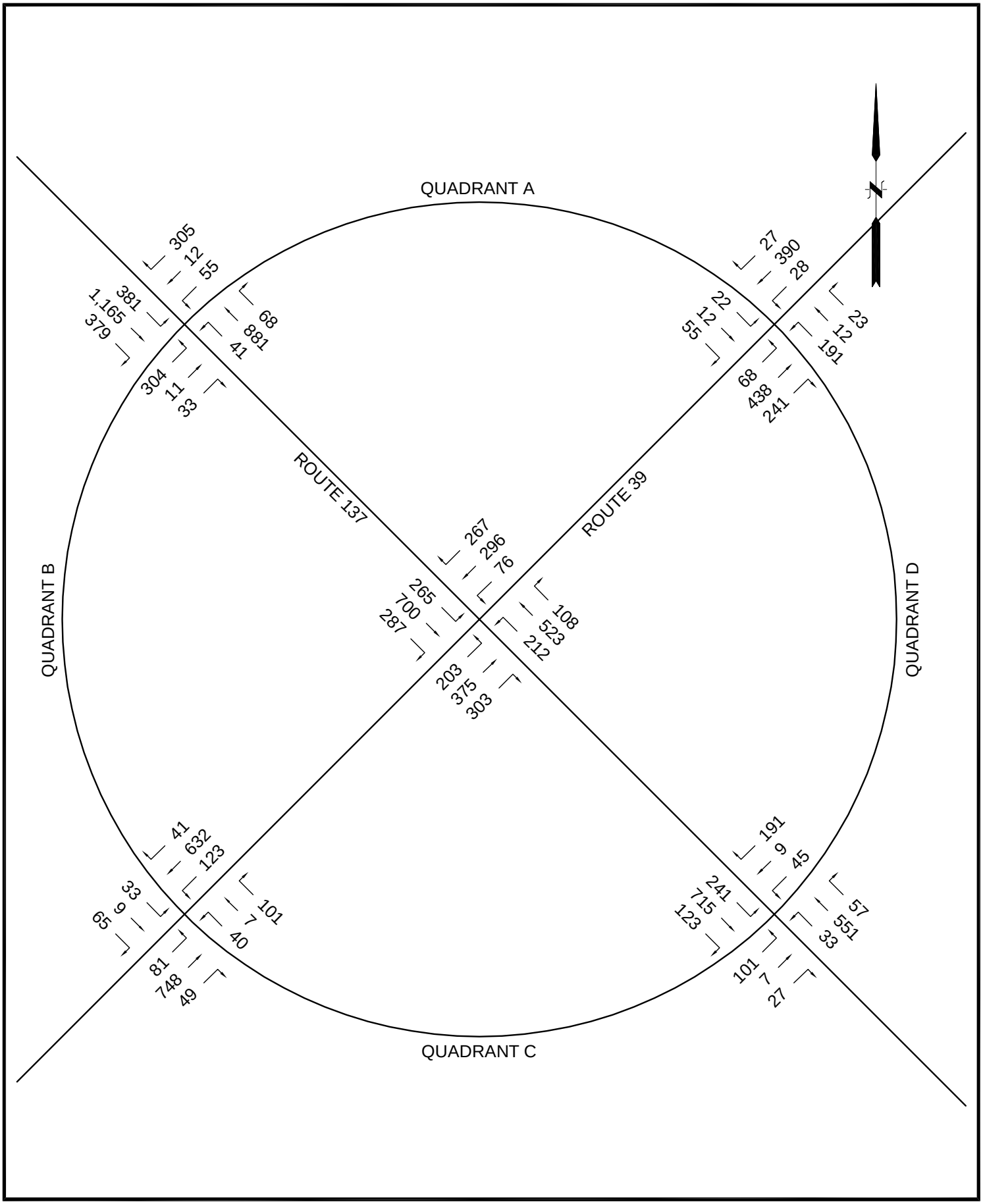
FIG. 11



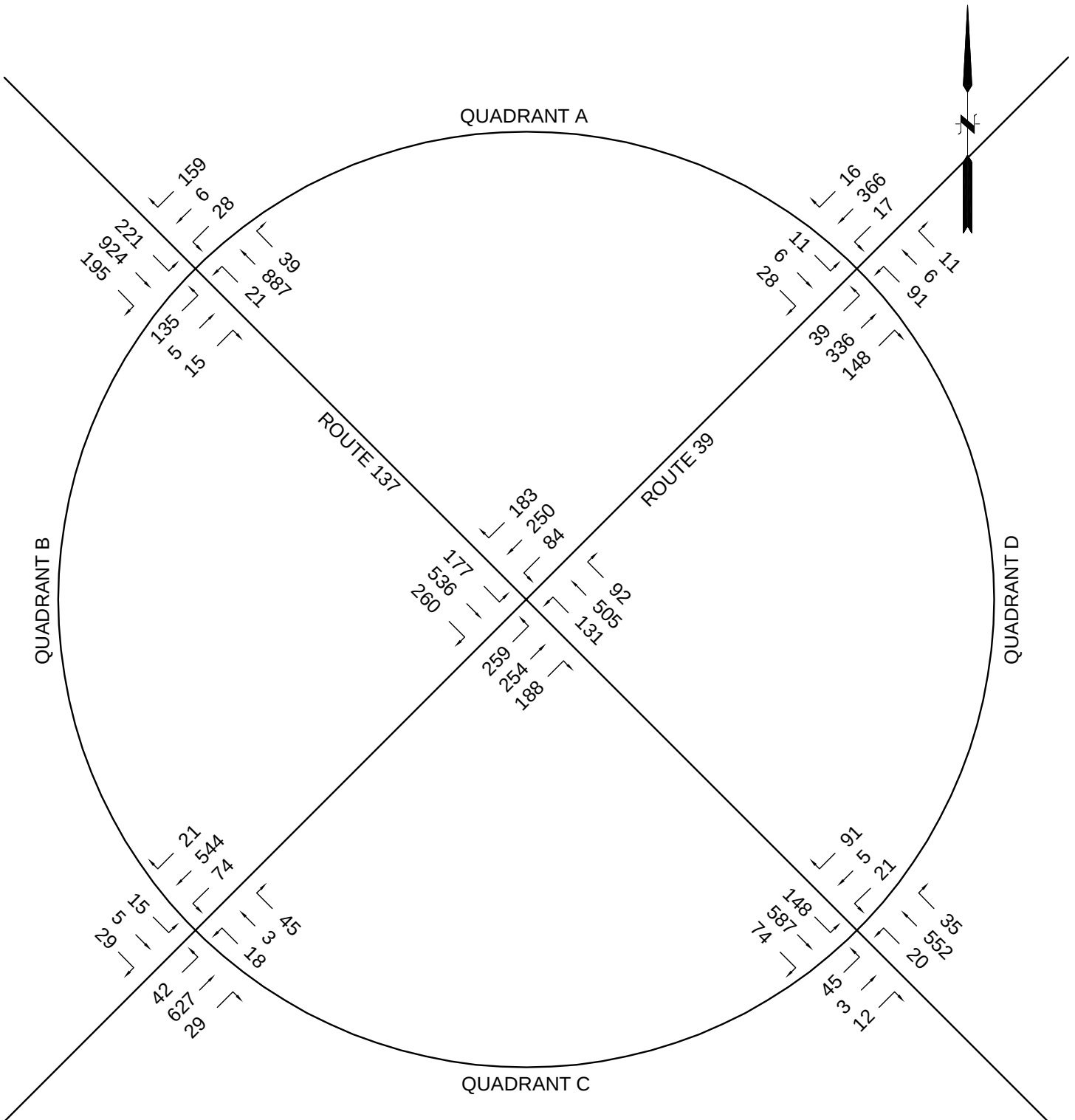
SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH 2018 BUILD CONDITION TRAFFIC VOLUMES WEEKDAY AM PEAK HOUR (SCENARIO 1) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 12



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH 2018 BUILD CONDITION TRAFFIC VOLUMES WEEKDAY PM PEAK HOUR (SCENARIO 1) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 13



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH 2018 BUILD CONDITION TRAFFIC VOLUMES SATURDAY PEAK HOUR (SCENARIO 1) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 14



SCALE:	
HORZ.:	NTS
VERT.:	
DATUM:	
HORZ.:	
VERT.:	
0 X X	
GRAPHIC SCALE	

WWW.FandO.COM
FUSS & O'NEILL
Disciplines to Deliver
317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070

TOWN OF HARWICH

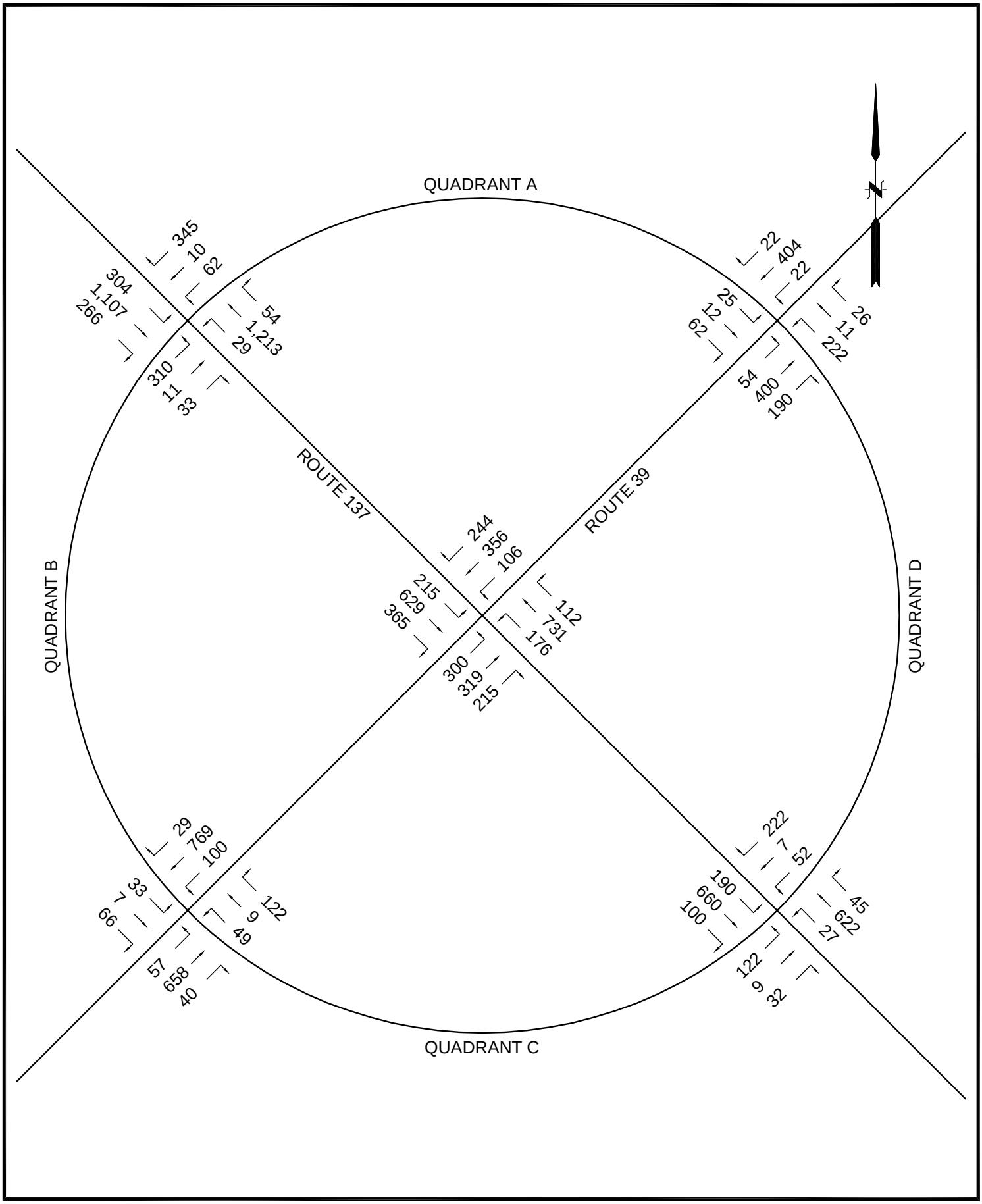
2018 BUILD CONDITION TRAFFIC VOLUMES WEEKDAY AM PEAK HOUR (SCENARIO 4)

EAST HARWICH VILLAGE CENTER

HARWICH MASSACHUSETTS

PROJ. No.: 2007-0972.A10
DATE: DECEMBER 2009

FIG. 15



SCALE:
HORZ.: NTS
VERT.:
DATUM:
HORZ.:
VERT.:
0 X X
GRAPHIC SCALE

WWW.FandO.COM
FUSS & O'NEILL
Disciplines to Deliver
317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070

TOWN OF HARWICH

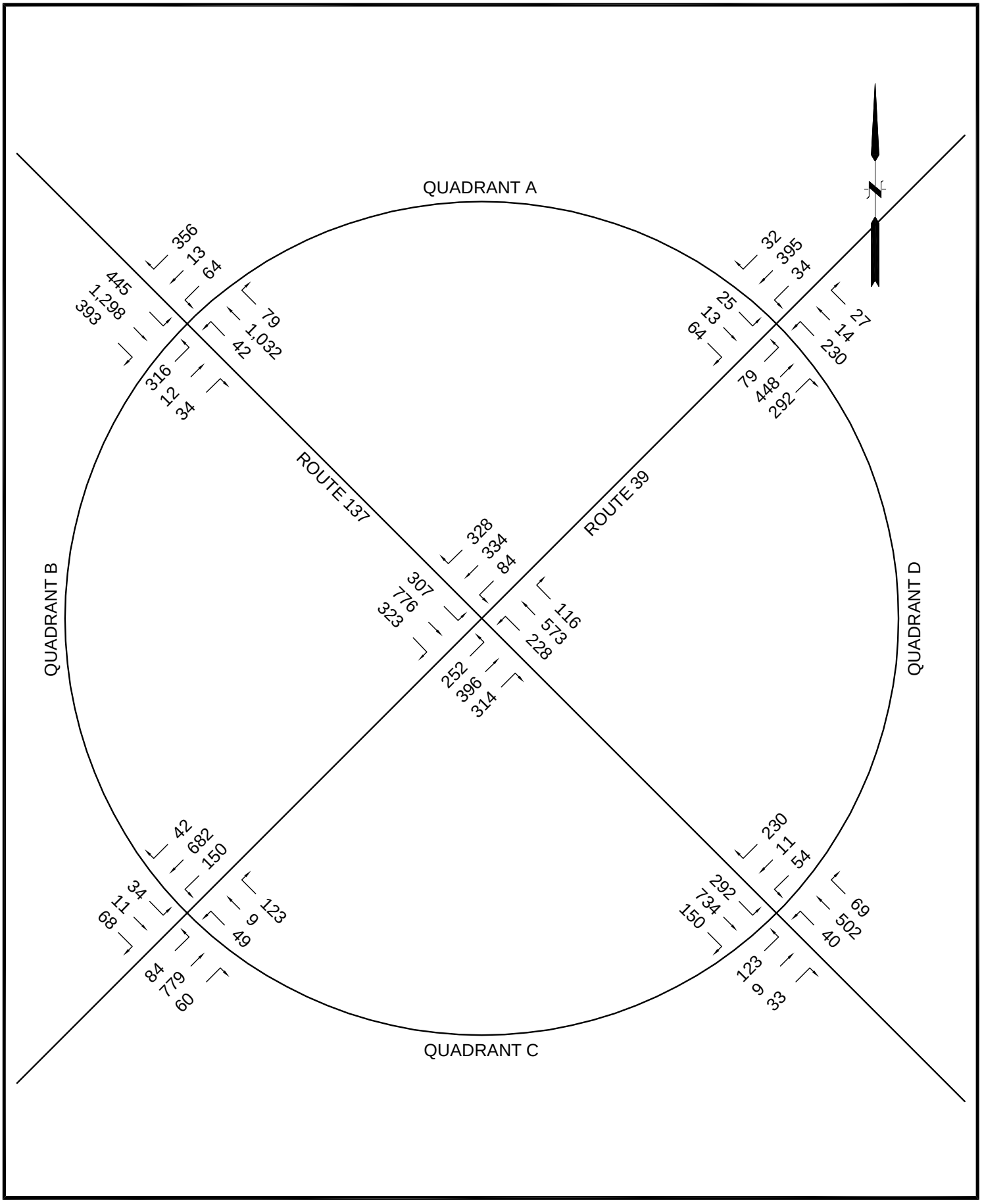
2018 BUILD CONDITION TRAFFIC VOLUMES WEEKDAY PM PEAK HOUR (SCENARIO 4)

EAST HARWICH VILLAGE CENTER

HARWICH MASSACHUSETTS

PROJ. No.: 2007-0972.A10
DATE: DECEMBER 2009

FIG. 16



SCALE: HORZ.: NTS VERT.: DATUM: HORZ.: VERT.: 0 X X GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 317 IRON HORSE WAY SUITE 204 PROVIDENCE RI 02908 401.861.3070	TOWN OF HARWICH 2018 BUILD CONDITION TRAFFIC VOLUMES SATURDAY PEAK HOUR (SCENARIO 4) EAST HARWICH VILLAGE CENTER HARWICH MASSACHUSETTS	PROJ. No.: 2007-0972.A10 DATE: DECEMBER 2009 FIG. 17