



**MetroGIS – Mn/DOT Collaboration
on Roads and Highways Information**
*MetroGIS Technical Workgroup on Roads and
Highways Business Information Need*



Meeting Summary

Date: November 16, 2004, 10 am

Location: State Transportation Building

Attendees: Denny Brott, *Mn/DOT*; Gordon Chinander, *Metropolitan 911 Board*; Mike Dolbow, *Metropolitan Council*; Joella Givens, *Mn/DOT (MetroGIS Coordinating Committee Liaison)*; John Hoshal, *LMIC*; Matt Kuokol, *Mn/DOT*; Jim Maxwell, *The Lawrence Group*; Dan Ross, *Mn/DOT*; Kent Tupper, *Dakota County*; Ben Verbick, *LOGIS*,

I. Welcome

1. Agenda, Previous Meeting Summary

- Mike Dolbow welcomed everyone to the meeting, and asked for introductions while reiterating the purpose of the meeting: to review issues in developing a metro-wide and statewide solution for street centerlines.
- Mike asked if everyone had received the summary of the previous meeting. (Please contact him if you need copies.)
- Mike asked for an agenda review and approval, noting that some time would be spent on item I-3: E911 efforts throughout the metro.

2. LDM Update, Discussion

- Mike asked Dan Ross for an update on the LDM, its progress and current timelines.
- Dan noted that Mn/DOT is currently testing a recent software update, but they plan to receive a final release on December 31st, and roll out the system in April of '05.
- Some issues with the latest release are how the system handles roads, bridges, and other point events when descriptions are generated on the fly.
- Dan noted that these recent problems have created an item for future discussion within this workgroup: how do street centerline data providers choose their “primary” street name from a list of alternative street designations? (For example, 140th Street NE in Scott County, also designated County Road 42 or Egan Dr.)
- John Hoshal asked Dan how Mn/DOT chose those names. Dan replied that cities and counties provide these names, and Mn/DOT usually uses the E911 standard if available. However, conflicting data appears often, and infrequent updates create further challenges. Dan noted that they document the source of the name (i.e. basemap, photo, etc), and asked if MetroGIS partners needed more specific source information.

3. Metropolitan E911 Efforts

• MetroGIS Overview

- Mike mentioned that several counties and cities (and LOGIS) in the metro area are either:
 - a. creating their own centerlines that currently meet E911 requirements
 - b. attempting to meet E911 requirements with their current centerline databases
 - c. investigating the option of creating their own centerlines to meet E911 requirements
- Mike noted that Jim Maxwell intends to discuss TLG’s potential role in this process at the MetroGIS TAT meeting on 11/18. He asked Gordon Chinander for comments.

• Metropolitan 911 Board Overview

- Gordon explained that his job is to try to find and implement a metropolitan-wide solution for E911. It doesn’t do his agency much good to have 2-3 counties producing their own centerline data when he needs a common solution for all seven counties (which include 26 PSAPs -MD).

He noted that existing street centerline datasets were never intended for E911 purposes, and there is a significant needs gap with most.

- Gordon noted that the Metropolitan 911 Board has discussed creating an MSAG¹-compliant set of street centerlines with The Lawrence Group, and are learning from LOGIS's experience creating such centerlines. He noted that private roads are a significant issue for E911 providers, as emergencies are not confined to public roads!
- **Discussion**
- Dan replied that Mn/DOT hopes to provide some relief in standardization. He noted that Hennepin County has inquired about using the Mn/DOT Basemap as their starting point for building an E911 centerline set. They need to know the fields required by the E911 community. Mn/DOT will not have the capacity to populate those fields, but will provide the framework for local governments to do so, thereby setting the stage for a metrowide and statewide solution.
- Gordon asked how often Mn/DOT was planning on updating their dataset. Dan replied that updates would be provided at a minimum of once a year, but hopefully more frequently, depending on the participation of local government partners. He explained that the agency-wide efforts to synchronize legacy systems into the LDM have resulted in less frequent updates over the past two years.
- Ben Verbick asked if LDM participation by local government is still envisioned through some sort of remote access system. Dan replied that it is still planned, but the delivery mechanism depends on the number of external participants. The program is too "heavy" to deliver over the web. Their current plans would work for 5-10 local government partners, but not hundreds. He said that Mn/DOT sees a great value in sharing the data and gathering input through local partners, but their current focus is on meeting their internal needs.

II. Data Synchronization Issues

1. Metro Area Update for LDM, Procedures

- Mike asked Dan for an update on LDM data in the metro area, in the interest of getting a sample with Anchor Segment IDs attached. Dan answered that they have found some problems when test-loading the entire state. However, some metro counties, including Dakota, have been completed with temporary Anchor Segment assignments. Mn/DOT is happy to share Dakota County data for testing purposes, as long as the group knows the Anchor Segment assignments aren't permanent. He hopes that a sample will help the group determine a minimum positional accuracy requirement.
- Mike asked what options were available for submitting changes after reviewing the LDM. Dan said they can accept shapefiles or DGN files, and the partner can submit only changes/updates or their entire dataset. The key is matching intersections (as Anchor Points) between data sets; the networks have to agree topologically in order to line up with one another.
- Dan noted that they had undertaken this process with ROCOG², who submitted 556 issue areas – almost 500 of which were private roads. For submittals from Dakota County, Dan asked Kent Tupper what format they stored their centerline data in.
- Kent replied that they maintained the data in a GIS format, with one centerline for all streets (no divided highway pairs) and Left-Right address range splits for geocoding. A short discussion ensued on why some groups prefer single centerlines and others require divided highways to be split into oneway pairs. It often depends on the user needs. TLG determines these splits by the presence of a physical barrier (as does Mn/DOT), but this rule is only applied during updates, so exceptions currently exist.
- Dan noted that users of the system can set "default" graphic representations for their own use – so if they have graphic reps from more than one provider, they can choose which one they want to use under varying circumstances. His point was that the user must know what they're looking at – what scale the data was developed at and what positional accuracy standard it fits. John noted that this makes the embedded source and accuracy metadata very important and Dan concurred.

2. Assessment of existing Data Efforts

- Dan made the point that they don't know which local governments are maintaining their own street centerline data. Mike replied that this "inventory" could be something for MetroGIS to tackle. John and Ben noted that some cities and counties have contracted with private companies to meet their E911 dispatch needs, relying on proprietary street centerline data that cannot be shared. Mike replied that indeed we have a unique situation in the metro where we license proprietary data like TLG in order to share it. Dan noted that there is obviously a lot of money being spent to develop and maintain this data, and some savings can be gained through sharing and collaborating.

3. Comparison of Dakota County Data

- Mike proposed a 3-way comparison of datasets in Dakota County using Mn/DOT's data, TLG, and Dakota County's internal data. Mike and Kent will do comparisons for the whole county, and TLG will do a comparison for one community of their choice.
- Dan noted that the first issue likely to come up would be that of positional accuracy. The group needs to define minimum standards that determine when a segment should be moved. For automated comparisons, Jim asked Dan how many intersections he expected to fall in the standard search distance of 5.28 feet from an Anchor Point. Dan didn't have specific numbers; for ROCOG, they ended up using Mn/DOT's data for Trunk Highways and local data for the rest.
- Jim asked how those decisions were made for ROCOG and how Mn/DOT envisioned making those decisions in the rest of the state. Dan replied that they want to open up the discussion to as many partners as possible to help make that determination. The group needs to decide if there is a standard to adhere to, or if merely documenting the source of the street's length measurement is enough.
- Dan asked Kent what sources they had for Dakota County data. Kent replied that there are a variety of sources, from plats to stereo photo pairs or orthophotos. Dan noted that with ROCOG, local needs determined the realignment of most platted roads using orthophotos. Ultimately these decisions need to produce a concrete process for determining locations and length. Some tentative rules came out of the ROCOG pilot, but like the private road issue, many remain unresolved.

4. Private Roads & E911 Issues

- Mike asked Jim how TLG deals with private roads. Jim responded that they merely designate private roads with a functional class. For determining if a known road is private or not, TLG relies on input from cities and counties. If the city provides a street with a name and address ranges, they assume it's a city road. But other known areas that are maintained privately and have official names (and often addresses) are identified as private roads. It is difficult to find these roads sometimes because not all cities keep track of them. They are often discovered during address matching. Jim speculated that E911 phone records would produce many more private road locations.
- Gordon agreed, but noted that many more problems arise from phone records, such as old PBX phone systems that show only one number for an entire business that actually has several locations. Many private roads, such as those in trailer parks, are particularly difficult to deal with. Jim responded that it is sometimes impossible to address match in trailer parks, as they frequently ignore addressing conventions. Kent replied that they often deal with the trailer address as a Unit #, usually provided by assessors. Gordon added that county parcel records show trailer parks as one parcel. Jim replied that they often get maps of the trailer park, which can be used for addressing. Kent noted that orthophotos help identify trailer parks, but the issue of addressing remains.
- Gordon noted that Carver County's E911 response system uses an address point file as the first level of information to match when a call comes in, which works well for trailer parks. The County's solution then relies on parcel records and centerlines if the address in question doesn't exist in the point database. Mike asked if that was a viable solution for other PSAPs, and Gordon responded that most are not equipped to do that.
- Ben confirmed that LOGIS communities use Motorola's Printrak, an integrated system that requires MSAG-compliant street centerlines. Gordon said that the 911 Board could set a

standard and make a recommendation, but if the recommendation requires a costly upgrade, it is unlikely to be implemented.

- Dan asked if there are common definitions for address ranges that need to be identified for a solution. John asked if this was an issue for the Governor’s Council. Dan reiterated that Mn/DOT is trying to provide a multi-purpose data sharing mechanism, and asked Gordon what GIS format most E911 providers are working with. Gordon replied that most are simply reading shapefiles within the integrated systems. Dan thought that this discussion was opening a “can of worms” and would require a lot of time to resolve. Jim agreed and noted that there are thousands of addresses that aren’t even street-based, such as at the Mall of America or in university dormitories.

5. Additional Discussion on Private Roads

- Dan and Mike distributed copies of Mn/DOT’s definition of what comprises a private road and some images that Mike had compiled into a power point presentation, which is available upon request. A good example of private roads that seriously impact a trunk highway (MN-212) is shown in Eden Prairie near the Hennepin Community Technical College. At 3M, a whole system of private roads exists. Mike used these examples to pose the question if Mn/DOT would be willing to provide at least an Anchor Point at these intersections.



Figure 1. Intersection of private roads with local streets at 3M in Maplewood.

- Dan noted that they would need 12 anchor points to deal with the situation at 3M depicted in the example (Figure 1). Jim noted that this situation would be different for TLG because the local cross street is represented by only a centerline. This problem would also appear frequently for Dakota County’s data. Mike noted that the national standard has a method to deal with these situations, but it is difficult to understand and implement.
- Dan said that Mn/DOT is not *opposed* to adding anchor points for private roads and hosting the data, but more Anchor Points and Segments hurt them in two ways: storage costs go up and performance goes down. Also, local partners must know that Mn/DOT does not want to maintain those segments – the partners would be responsible for adding, subtracting, and updating private road networks.
- Matt Kuokol suggested that Mn/DOT simply carry a “stub” Anchor Segment of a private road, off which local communities could build. Jim noted that if local partners are already maintaining road networks, submitting that data to Mn/DOT needs to produce a benefit, such as access to value-added information. Dan responded that he hopes that will be the case. He also hopes that a “synchronization wizard” will eventually be created to ease the workload on

local partners. The wizard was originally part of the project but has been removed several times from budget cuts.

- Jim reiterated that while it would be nice to have private roads in the system, the effort by local partners would have to be justified by the benefits. Dan noted that for ROCOG, the benefit was having just one system to rely on, and ROCOG actually committed to doing much of the work on local roads up to the Trunk Highway system.
- Denny Brott suggested that private roads shouldn't be that big of a deal for Mn/DOT to host – storage space is getting cheaper, and the performance drag shouldn't be significant. He noted that it might be worth it because Mn/DOT's crash and traffic units would want to see those elements. Matt reiterated the “stub” idea, noting that local communities could even put the whole private road network into the LDM – *if* they understood that it was up to them to maintain those features. Dan concurred, but reminded the group that if local partners don't populate the data, it won't be there. One benefit the partner would see from the effort is that changes are automatically rolled forward with every new intersection or realignment within the LDM.
- Matt said that while that is an advantage for using the LDM, outside data sets then need to be synched up, which may be cumbersome for some partners. Dan opined that if they go down this path, it's best to get Anchor Points for all private roads: it's all or nothing. Matt concurred, but suggested the “stub” method is still a viable option, even if it's not the best. Dan replied that the key is a consistent definition of a private road to determine whether or not to add one. Matt suggested divided highways are a bigger issue to resolve.
- Jim and Mike briefly discussed the need for mall parking lots as private roads. Mike noted that the Council needs some system to route buses through mall parking lots accurately; treating these as private roads would be ideal. The Council can maintain the network, but they need an anchor point to hook into the system. Jim expressed the concern that there would have to be some mechanism to prevent routing other inappropriate traffic through the mall lot. John asked how Mn/DOT's traffic division dealt with mall entrances. Dan and Denny replied that it was handled as an event using a “Point of Interest” marker, measured at a certain distance along the adjoining segment. (Note: David Vessel of the Met Council, who could not attend the meeting, is concerned with this aspect. In potentially migrating a traffic model to the LDM, they would need to deal with traffic generating elements, such as the “theoretical” segments that TAZ population and employment characteristics are attached to.)
- In conclusion, Dan asked for time to pass the private roads question through Mn/DOT management. His guess is that Mn/DOT could host Anchor Points and Segments, but they will only be as good as the data supplied by local partners: a garbage-in, garbage-out scenario. However, assuming that MetroGIS and local government partners have a role in the system, this makes sense. He is only concerned with impacts on the system and ensuring that Mn/DOT avoids a slippery slope of maintaining everything under the sun. Mike replied that this makes sense to MetroGIS, and he wants to encourage local governments to participate and take partial ownership of this system.

6. LDM Data Delivery & Update Frequency

- To return to the issue of data delivery and local government participation, Gordon asked Dan about Internet distribution and expected performance. Dan replied that the LDM system cannot be delivered on a browser, and cannot be hooked directly to an E911 dispatch system. However, any agency would be able to download the data from the Internet and then load it into their own systems. Gordon again asked about updates to the data and Dan replied again that it depended on the updates provided by local governments.
- Denny explained that currently the Basemap is only updated yearly: update requests are sent to cities and counties after December 1st, assumed to be the end of construction season. Those requests are compiled for about a month and incorporated into the system as soon as possible after the New Year.
- Gordon asked if the data can be downloaded in portions, and Dan replied that download templates are built in for all the counties and some cities, and Mn/DOT districts. They are unsure if more templates will be built in (such as the 7-county metro, one county smaller than Mn/DOT's Metro District), but there will be no ability to define an ad-hoc area for download.

- Mike replied that those templates would likely be sufficient for most users. Matt added that filtering or segmenting the data by characteristic is also an option. Denny noted that as the system is currently proposed, a city can notify Mn/DOT when platted roads are ready for traffic to “activate” them in the system – in other words, it can handle “future” segments. (This is also important to traffic models. –MD)

7. Construction Information in the LDM

- Gordon asked if construction – current and planned – would be distributed as a characteristic in the system. It has obvious uses for E911 and many other purposes. Dan asked Joella Givens to offer her notes on the subject, as she has been involved in some related metro-area work. Joella replied that they have been working on a system of better notification for construction events along Mn/DOT’s facilities. The data is currently set up to identify a segment as “under construction” when the contract is signed, which does not correlate directly to actual work. Similarly, segments are considered finished once all payments are made on the contract, which may be long after the work is completed. They are investigating how to deal with that problem.
- Dan noted that the resulting data could be used to plot construction area on the LDM, but each district is developing and handling it independently. He understands that this is a frequent request, and several attendees noted the need to see parallel construction efforts – especially ahead of time. Imagine only “digging once” for several projects! Mike noted that the utility companies would be very interested in this, and they need to be at the table. Al Laumeier from Minnegasco is part of this group and receives the minutes – hopefully he can push the utility’s interests in this aspect.
- Dan asked Mike for a final clarification on private roads, and Mike repeated back his notes on the subject.

8. LDM Data Exchange Discussion

- Jim said that he has always seen the LDM as a “datum” to exchange information, such as traffic counts, between different centerline data sets. Dan replied that this is true; maintaining data within the LDM or linking it with Anchor Section IDs is the best way to share data. Unfortunately, there currently is no automated batch process to link up disparate centerline sets. Jim noted the need for address ranges; the TLG data set would have to be related to the datum in order to share these attributes. He noted that this linkage would constitute quite a bit of work on someone’s part. Dan revised his earlier statement by saying they have a draft automation program in ArcView 3.2, but they need a standard process or wizard that can be shared and distributed to partners.
- Jim wondered if the time a partner spends linking their data set would be justified by the benefits, especially if they are taking responsibility for private roads. Is the information gleaned from the LDM worth those efforts? TLG hopes to answer this question with a pilot project. Dan noted that TLG would also have to determine who would have access to any of their proprietary elements when linked to the LDM. Jim replied that that would depend on how much interest there was – for example, would clients want to use TLG centerlines or Mn/DOT’s for routing? Dan agreed that users would need to see a benefit in order to subscribe to this system. Would they see the value added by the collaboration of multiple data sources? Jim repeated the need for a pilot project.
- Dan noted that they still need to determine the community’s positional accuracy standards. They have some idea from their pilot with ROCOG, but need more information. Jim said that they are more concerned with relating multiple TLG segments that correspond with one Anchor Segment in the LDM. This will probably happen often with changing address ranges, requiring relational tables to create an accurate link. Dan replied that address ranges could be stored in the LDM as a linear event.
- Gordon asked if it was possible to put an Anchor Point at each address range change, and Dan replied that this did not follow the standards of the datum. The LDM specifications require that Anchor Points only be placed at road intersections. Otherwise, each non-intersection Anchor Point would require manual maintenance after system changes. Jim asked if this were true for other attributes, such as pavement characteristics. Dan answered that their

segmentation engine handles this, allowing dynamic splits of features based on the desired attributes.

- Jim asked how percentages were assigned to characteristics, or how TLG should assign percentage correlations between their centerlines and Anchor Segments. If the graphic representations are significantly different, then it will be difficult to decide which length measurement should be used in determining percentages. Dan replied that this is the reason they need the best possible initial measurement of an Anchor Segment's length, as well as the source of that measurement. If that measurement is fairly accurate, then percentage assignments of other attributes will be relatively accurate as well. Then, separate length measurements can be tied to each graphic representation.
- Jim noted that most likely 80% of segments between disparate data sets will line up easily in an automated procedure, but the remaining 20% would require a tremendous amount of time to complete. Mike asked if it would be useful to Mn/DOT to get an assessment of which segments are problematic on positional accuracy and/or completeness, and Dan replied that it would. Denny noted that Mn/DOT's 1:24,000 scale data is no *worse* than that standard – several elements have been developed at a better scale and accuracy.

9. Adjourn

- The meeting was adjourned due to another meeting's use of the room. Mike promised a summary to participants and outside interests, and to follow up on efforts to compare Dakota County's data to Mn/DOT's and TLG's version of that county.

¹ **MSAG** -- Master Street Address Guide. A listing of all streets in a 9-1-1 service area and the house number ranges for each Emergency Service Number. It is controlled by the 9-1-1 coordinator. The primary functions of the MSAG database are to validate subscriber addresses and assign an ESN to each customer telephone record number.

- Intrado, Qwest's 911 database services vendor)

² Rochester-Olmstead Council of Governments