



## Vermont's Road Centerline Data FAQ

Author: VT Center for Geographic Information

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**Overview:** The master road centerline data layer (TransRoad\_RDS) contains all town and state highways, as well as private roads. The centerlines were originally developed under contract by Greenhorne and O'Mara under the guidance of VCGI (1992). VCGI has been the steward of the master road centerline data since 1992. Updates have been performed over the years by VCGI, RPCs, and VTrans. The VT Agency of Transportation has taken over the update and maintenance of the road centerline data layer and has revised the layer to match "official" Town Highway Maps.

TransRoad\_RDS meets the requirements articulated in the VGIS Road Centerline Data Standard (<http://www.vcgi.org/techres/standards/>). VTrans data is the only reliable source for road classification (AOTCLASS), route numbers (RTNAME, HWYSIGN, LR\_ETE), and functional classification (FUNCL). However, this layer may not include every private road. Road names may not match E911 road names in every instance, and it does not include address range information.

An alternative layer is the EmergencyE911\_RDS road centerline layer maintained by VT's E911 Board. It was originally derived from TransRoad\_RDS, and is therefore very similar. It includes all private roads and generally has more reliable road name information. However, it is not a reliable source for road classification (CLASS) information. The address range information isn't very reliable (users are encouraged to use EmergencyE911\_ESITE for geocoding).

Note: The U.S. Census Bureau maintains its own road centerline data within the TIGER database. The data is available from VCGI, and is called TransRoad\_RDSTIGER. Historically the spatial accuracy of this data has been poor; originally derived from 1:100,000 scale sources. However, between 2004 and 2007 the U.S. Census Bureau hired Harris Corporation to recapture Vermont's road centerline data using vehicle-based GPS collection methods. This revised TIGER data meets the Census Bureau's "modernization" standards, which calls for +/- 5 meter accuracy. The TIGER roads data also includes road names and address range information (including ZIP code). The quality and accuracy of the road name and address range information hasn't been evaluated by VCGI, however, this dataset may be useful for those who want to geocode against road-based address range information (instead of address points such as ESITE). However, VCGI encourages users to geocode against ESITE first, then consider geocoding against other address data sources such as E911 RDS and/or RDSTIGER.



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### In a nutshell

Which road centerline dataset is better in terms of newness, accuracy, and completeness<sup>1</sup>?

- **Newness?**
  - VCGI gets E911 RDS updates every 2 months or so.
  - VTrans provides updates annually.
  - E911 is focused on all roads (private and public), whereas VTrans is focused on public roads (even though they make an attempt to integrate private roads from E911).
- **Accuracy?**
  - **Spatial accuracy:** Generally speaking both datasets have comparable spatial accuracy (refer to Attachment A for more info). One key difference is that VTrans is actively reviewing all road centerlines against the 5K orthophotos and making corrections as needed. This has allowed VTrans to correct errors inherited from the original RDS dataset. E911 corrects spatial errors if they stumble into them, however, they do not have a business process to go back and review all existing road centerlines.
  - **Attribute accuracy:** Attribute accuracy varies from one attribute to the next. VTrans data is the only reliable source for "official" road classification (AOTCLASS), route numbers (RTNAME, HWYSIGN, LR\_ETE), and functional classification (FUNCL). The E911 data is the only reliable source for road names (address range is still questionable). Surface type is questionable in both datasets.
- **Completeness?**
  - The datasets vary in terms of spatial completeness (ex: E911 includes all roads whereas VTrans does not).
  - The datasets vary in term of attribute completeness. VTrans has more complete classification information. E911 has more complete road name information.
  - VTrans data will most likely become more spatially accurate than E911 since VTrans is actively reviewing all existing road centerlines.

As you can see it isn't a simple question of which one is better. The user must take the time to understand the pros/cons of each dataset (by reading the metadata and this FAQ), and then use whichever dataset is appropriate for the application at hand. For cartographic purposes VCGI uses a combination of E911 and VTrans road centerline data. We filter the VTrans data down to public roads and the E911 data down to private roads and include them on the same map (you end up with two roads layers in the legend... "roads public" and "roads private"). All road name labeling is done using the E911 roads. It isn't perfect, but it works pretty well.

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<sup>1</sup> The following review does not take RDSTIGER into consideration.



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## Frequently Asked Questions

VCGI asked VTrans and E911 to respond to the following questions.

### Questions posed to VTrans (regarding TransRoad\_RDS)

1. **Q:** Does VTrans have a schedule for reviewing and updating the TransRoad\_RDS data against digital 5K orthophotos? Do you have a status map of which towns you've completed thus far?

**A:** "VTrans is working to improve the spatial accuracy of the road centerline data, matching the arcs to the most recent 1:1,250 or 1:5,000 orthophotos. Currently, all of Addison County and a portion of Bennington County are complete. There are 48 towns statewide that have been matched to the orthophotos. VTrans will continue the process of updating the RDS to match the orthophotos and can provide status of which towns have been completed." *Johnathan Croft, VT Agency of Transportation, 2004*

2. **Q:** VTrans has conflated RDNAME/RDFLNAME values from E911 roads data in the past. What are your future plans? What is your match rate?

**A:** "VTrans has conflated the RDNAME information from the E911 roads data to the RDS, the match was not 100% perfect and with an estimated 85% of the records matched. VTrans has undertaken a systematic review of all the roads and road names and is currently conflating the most recent E911 RDNAME to the RDS data layer. This process has been in part automated, but does require user review and input to assure accuracy. VTrans is employing a process to review changes in the versions of the E911 RDS to identify changes in road name and new or altered roads alignments. VTrans is using the RDNAME code directly from E911 and loading the RDFLNAME field with the NAME from E911." *Johnathan Croft, VT Agency of Transportation, 2004*

3. **Q:** Does VTrans integrate new "private" roads into the master centerline file as E911 adds them? Have you gone back and added missing private roads?

**A:** "VTrans does realize the RDS should contain all the roads that are within the E911 data layer. VTrans has undertaken an effort to add the missing roads and make this layer as complete as possible. As new roads are added to the E911 layer, these roads are added to the RDS and coded appropriately. VTrans is implementing a process to identify new roads or changed alignments between versions of E911 to streamline revisions to RDS." *Johnathan Croft VT Agency of Transportation, 2004*



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4. **Q:** How is the SURFACE attribute maintained?

**A:** "Surface type attributes are maintained through several sources. VTrans produces the General (Town) Highway Maps which are distributed to municipalities within Vermont. The municipalities are requested to review the maps and provide feedback regarding any changes to the highway system, including surface. VTrans also submits a copy of maps to the District Office and the Regional Planning Commission. VTrans receives information regarding surface changes from the Towns, the Districts or RPC's, as well as VTrans Pavement Management and other sources on a voluntary basis. Any changes identified are made within the data layer. VTrans also does make note of any changes seen in the field and updates the RDS accordingly." *Johnathan Croft, VT Agency of Transportation, 2004*

### **Questions posed to E911** (Regarding EmergencyE911\_RDS)

1. **Q:** Does E911 have a schedule for reviewing and updating existing E911 road centerlines against VT's 5K orthophotos?

**A:** "There is no set schedule for reviewing E9-1-1 road centerline data. This is updated randomly as the towns submit changes. All road changes are overlaid with the orthophotos. If a centerline discrepancy is noticed, the roads are updated to reflect the orthophoto. On average, I make 296 rdshape and 120 Rdname updates a month" *Jeremy McMullen, VT E911 Board, April 4, 2004*

2. **Q:** How is the RTNO attribute maintained in the E911 roads data?

**A:** "The RTNO attribute is rarely changed. This is only updated if the towns submit the route numbers in the GIS updates." *Jeremy McMullen, VT E911 Board, April 4, 2004*

3. **Q:** How is the CLASS attribute maintained in the E9-1-1 roads data?

**A:** "The CLASS attribute is updated when the towns submit new GIS edits with the associated class info. Almost all of the new roads submitted since June of 2000 have been submitted with the associated road class. Every year when the towns do their yearly review of their atlas, we send them a letter urging them to review all road class info. Many towns perform this review, but some do not." *Jeremy McMullen, VT E911 Board, April 4, 2004*

4. **Q:** How is the SURFACE attribute maintained in the E9-1-1 roads data?



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- A:** “The surface attribute is updated when I verify new roads submitted by the towns. The surface data is only updated on new roads. The surface attribute updates are outlined in the field6 definition of the “Enhanced 9-1-1 Deliverable Specifications and Quality Control Procedures”. This attribute was not maintained prior to June of 2000.” *Jeremy McMullen, VT E911 Board, April 4, 2004*
5. **Q:** How are new roads added to the E911 road centerline data? Does E911 track the method used to capture the feature (ex: GPS vs on-screen dig)?
- A:** “When a new road needs to be added, the Town submits to the E9-1-1 board a paper map of its location. I add all roads digitally using the paper map as a reference. This adds the road in the general location. All road centerlines are then verified using GPS. It may take up to six months to get to all of these roads verified from the time we receive the updates from the towns. If I notice an existing road center line is wrong at any point during this process, I will update those roads as well.” *Jeremy McMullen, VT E911 Board, April 4, 2004*
6. **Q:** How is the road address range information maintained?
- A:** “The maintenance of the road ranges have changed since the map display has gone on line. For all towns that have a set and defined increment, the map display works most effectively with the minimum and maximum ranges populated (ranges that include all possible addresses). If a 9-1-1 call comes into the map display for one of these towns and the site and address has not been added into the GIS data, the map display will automatically geocode and move the map to that location. All 9-1-1 calls come in with an ALI string that includes the locatable address. That address is what drives the map display.
- Grandfathered towns (or towns that are partially grandfathered), are treated differently because there has not been an agreed upon addressing increment. I populate the grandfathered towns with the actual road range information. Actual road ranges are based upon the addresses that exist along each road arc.
- Updating these entire road range attributes have been a work in progress. I am hoping to complete the min\max and actual road range updates for the entire State by the end of this year.” *Jeremy McMullen, VT E911 Board, April 4, 2004*
7. **Q:** Which parts of the state have reliable road address range information? Is there a list by town?
- A:** “All of Chittenden County has reliable road ranges not including the grandfathered Towns. I continue to update the min/max and actual road range information as time permits. The remainder of the state will hopefully be



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completed by the end of this year.” *Jeremy McMullen, VT E911 Board, April 4, 2004*

### **Additional Resources**

- [http://www.aot.state.vt.us/Planning/Documents/Mapping/Publications/Town\\_Highway\\_Mapping.pdf](http://www.aot.state.vt.us/Planning/Documents/Mapping/Publications/Town_Highway_Mapping.pdf)
- [http://www.aot.state.vt.us/Planning/Documents/Mapping/Publications/TransRoad\\_RDS\\_Questions.pdf](http://www.aot.state.vt.us/Planning/Documents/Mapping/Publications/TransRoad_RDS_Questions.pdf)

## Attachment A

### Spatial Comparison of EmergencyE911\_RDS vs TransRoad\_RDS



**Figure 1 - Example of E911 data being better than VTrans (TransRoad\_RDS is yellow)**

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Figure 2 - **Example of VTrans data being better than E911 (TransRoad\_RDS is yellow)**