

# **NENA Wireless Phase I/II Planning and Implementation Checklist and Modules Operational Information Document (OID)**



NENA Wireless Phase I/II Planning and Implementation Checklist and Modules Document  
NENA 57-502  
May 24, 2004

Prepared by:  
National Emergency Number Association (NENA) Wireless Committee

Published by NENA  
Printed in USA

**NENA  
OPERATIONAL INFORMATION DOCUMENT**

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## ACKNOWLEDGEMENTS

The National Emergency Number Association (NENA) Wireless Committee developed this document.

NENA recognizes the following industry experts and their employers for their contributions in development of this document.

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## 1 **1 Executive Overview**

2 The Wireless E-911 deployment process requires a large amount of coordination and collaboration  
3 to be successful. Expectations need to be set and managed throughout the deployment process to  
4 prevent misunderstandings and unnecessary delays. A systematic approach to deployment as laid  
5 out in this document will help avoid problems and speed deployment since all stakeholders will  
6 know their roles. This document covers that following steps of the deployment process:

- 7 • Deciding whether or when to proceed with Phase I or Phase II deployment
- 8 • The initial contact with the 9-1-1 service provider
- 9 • Proper notifications that need to be made
- 10 • Organizing the initial planning meeting
- 11 • Completing the call routing data sheets and addressing database issues
- 12 • Establishing an ALI delivery standard
- 13 • Establishing a GIS system
- 14 • Testing the initial deployment of the system
- 15 • Post deployment issues

## 16 **2 Introduction**

### 17 **2.1 Purpose and Scope of Document**

18 This document is intended to act as a best practice for the deployment of wireless E-911 Phase I and  
19 Phase II. As such, its primary goal is to set expectations and improve communications among the  
20 many parties involved in the deployment process. Many early deployments were delayed by the lack  
21 of an understood process. The lines of communications are extremely important during the  
22 deployment of Phase I and II service.

23 This document cannot outline all possible or acceptable steps in the deployment of wireless service.  
24 Some variation may be acceptable or appropriate given any particular situation. The goal is to  
25 recognize that it is a variation from the accepted best practice and that it needs to be communicated  
26 to and agreed to by all parties. Without this best practice, it is impossible to distinguish what is best  
27 practice and what is variation. It should be not be assumed that a deviation from this document is not  
28 “the best” practice in all cases. Some location solutions may be “the best” for a particular situation.

29 This document is also not intended to replace other existing best practice documents from NENA  
30 and other organizations. The intent is to support and expand on those other documents.

### 31 **2.2 Reason to Implement**

32 All stakeholders involved in the wireless E-911 deployment process should consider using this OID  
33 to help avoid miscommunications during the deployment process. Only when all parties start from  
34 the same “sheet of music” can the parties remain together as the challenges of deployment are

35 encountered. Even if the checklist is not followed verbatim, this OID can be used as a starting point  
36 for discussions to ensure that all issues are addressed.

### 37 **2.3 Reason for Issue/Reissue**

38 NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in  
39 the table below.

Document Number	Approval Date	Reason For Changes
NENA -57-502	05/24/2004	Initial Document
NENA -57-502.1	07/24/2015	Update Links

### 40 **2.4 Recommendation for Standards Development Work**

41 The establishment of a standard routing data worksheet and ALI data delivery standard are two  
42 additional standards that may be considered for development.

### 43 **2.5 Cost Factors**

44 Not applicable at this time.

### 45 **2.6 Acronyms/Abbreviations**

46 All acronyms/abbreviations used in this document have been included in the master glossary.  
47 Link to the master glossary is located at on the [NENA web site](#).

## 48 **3 Operational Description**

### 49 **3.1 Phase I and II Planning and Implementation Checklist**

#### 50 **3.1.1 Overview**

51 Wireless Phase I or Phase II 9-1-1 deployments can be completed with minimal difficulty when  
52 standard processes are understood and employed. The following are steps required for each category  
53 or module within the deployment flow. By understanding each of the steps required for a successful  
54 Phase I deployment and their relative order within the flow of the deployment, efficient planning can  
55 be put into practice and unexpected surprises can be avoided. The smoothest deployments occur  
56 when strong program management is employed during a Planning and Communications Phase.  
57 There are multiple players involved in a wireless deployment and the completion of each task or  
58 related sub-module is critical to keeping deployment activities on track. The Project Manager's  
59 (PMs) job is to insure that each participant knows what they need to do, why they need to do it, and  
60 the schedule for getting it done.

61 The items in the following sections of the checklist are discussed in greater detail in the module  
62 following the checklist.

63 **3.1.2 Planning and Communications**

64 **3.1.2.1 Deciding to Proceed**

- 65 • Determine the need to just implement Phase I Wireless 9-1-1 Service or total implementation  
66 with Phase II Wireless.
- 67 • Organize a team to be responsible for the deployment of the wireless E-911 service in your  
68 locality.
- 69 • Appoint a project manager from the PSAP to act as the single point of contact for all  
70 stakeholders.

71 **3.1.2.2 Initial 9-1-1 Service Provider Contacts**

- 72 • Schedule a meeting with 9-1-1 service provider marketing and technical representatives to  
73 determine their ability to provide wireless 9-1-1 services and their preferred technology.
- 74 • With the 9-1-1 service provider and other equipment vendors, determine the impact on all 9-  
75 1-1 equipment, current trunk configurations, expansion trunking decisions, ALI display  
76 format, mapping, and computer aided dispatch systems.
- 77 • Determine what options are available for upgrade or replacement.
- 78 • Order the necessary upgrades and obtain a schedule for their implementation.
- 79 • Ensure that upgrades can be completed within six-month.
- 80 • Request a copy of the PSAP's MSAG for use during the routing phase of deployment.

81 **3.1.2.3 Notifications**

- 82 • Determine what WSP's are currently providing service in the PSAP service area.
- 83 • Send the Wireless Service Providers (WSPs) certified letters, requesting wireless Phase I or  
84 Phase II 9-1-1 service. Include with the letters a copy of any upgrade orders and other  
85 documentation showing the PSAP is ready. For Phase II requests, the ESIF PSAP Readiness  
86 Checklist should also be provided with the letters of request ([www.atis.org/ESIF](http://www.atis.org/ESIF)).
- 87 • Copy 9-1-1 service provider and the State 9-1-1 Coordinator (if appropriate) on letters to  
88 Wireless Service Providers (WSPs).
- 89 • Inform all Wireless Service Providers (WSPs) if you have an open document statute or  
90 freedom of information act in your state.
- 91 • Establish a date for the first planning meeting or a conference call with the Wireless Service  
92 Providers (WSPs), the required 9-1-1 service providers, and the Development  
93 Implementation Team allowing at least 30 days notice.
- 94 • Notify all parties, 9-1-1 service provider, WSP, Implementation team of the desire to have a  
95 **MANDATORY** kickoff meeting or conference call.

96

97 **3.1.2.4 Planning Meeting**

- 98 • Conduct the meeting or conference call with all of the participants that will be involved in the  
99 implementation process.
- 100 • Indicate to the WSP's that proprietary issues will not be discussed during this meeting.
- 101 • Determine if a service agreement will be necessary between WSP's and the PSAP. If so, the  
102 agreement must be acquired, negotiated and signed.
- 103 • Determine if interconnect agreements between WSP's and 9-1-1 service provider are signed  
104 and in place. If not, inquire as to the expected date of completion and whether the lack of an  
105 agreement will impact the deployment schedule.
- 106 • Attempt to resolve the critical deployment issues at this meeting (listed in the Planning and  
107 Communications module below).

108 **3.1.2.5 Routing Sheet and Associated Database Standard**

- 109 • Request each Wireless Service Provider produce RF coverage area maps and a routing data  
110 sheet for all cell sectors with RF coverage within your PSAP service area.
- 111 • Associate individual cells and sectors with individual PSAPs (ESNs) based on the area  
112 primarily served by that cell sector. The goal is to identify the cells/sectors in each PSAP  
113 service area, in order to establish selective routing assignments.
- 114 • Review all data associated with each cell sector to ensure accuracy and consistency between  
115 the WSP's.
- 116 • Review cell sectors along the jurisdictional borders with the neighboring agency to determine  
117 the most appropriate routing. Regional meetings make this process easier.
- 118 • Determine default routing of calls.
- 119 • Determine alternate routing of calls.

120 **3.1.2.6 ALI Database Delivery Standard**

- 121 • Obtain a copy of the Phase II ALI data format from the ALI database provider.
- 122 • Determine how the ALI fields are to be populated by each Wireless Service Provider (WSP).
- 123 • Ensure that the ALI database provider has updated the MSAG to reflect the cell site  
124 addresses and that ALI records have been built properly.
- 125 • Ensure that the 9-1-1 service provider has assigned an ESRK range to the each wireless ESN  
126 or ESRD to each cell sector and that these have been provisioned in the selective routing  
127 database properly.
- 128 • Ensure that translations are provisioned in the WSP's mobile switching center (MSC).

129 **3.1.2.7 Geographic Information Systems (GIS)**

- 130 • Determine the method of displaying the Phase II data within the PSAP.



- 131 • Determine the source of and acquire the GIS data to be used in the mapping display system.
- 132 • Implement the method of displaying the Phase II data within the PSAP.

### 133 **3.1.2.8 Implementation Testing Standard**

- 134 • Ensure that the PSAP is ready for testing and deployment.
- 135 • Schedule the testing, giving all parties at least five-business days notice.
- 136 • Stagger the testing schedules. Do not attempt to activate Phase I or Phase II with all WSPs
- 137 during the same week.
- 138 • Review and approve the WSP's test plan.
- 139 • Conduct switch level testing documenting any deficiencies for correction.
- 140 • After successful completion of switch level testing, conduct sector level testing leaving cell
- 141 site "live" after each successful test.
- 142 • Ensure that you have received the appropriate documentation of the successful completion of
- 143 the overall test within 7 days of completion.

### 144 **3.1.2.9 Post-Implementation**

- 145 • Ensure that the PSAP is ready for testing and deployment.
- 146 • Schedule the testing, giving all parties at least five-business days notice.
- 147 • Stagger the testing schedules. Do not attempt to activate Phase I or Phase II with all WSPs
- 148 during the same week.
- 149 • Review and approve the WSP's test plan.
- 150 • Conduct switch level testing documenting any deficiencies for correction.
- 151 • After successful completion of switch level testing, conduct sector level testing leaving cell
- 152 site "live" after each successful test.
- 153 • Ensure that you have received the appropriate documentation of the successful completion of
- 154 the overall test within 7 days of completion.

## 155 **3.2 Planning & Communications**

### 156 **3.2.1 Deciding to Proceed**

157 Deciding when and how to proceed with the deployment of wireless E-911 Phase I or Phase II can  
158 seem like a daunting task. For many PSAPs there are many questions (such as how much will it  
159 cost, how many more calls will the PSAP have to handle, etc.) that will need to be answered before a  
160 commitment to the service can be made.

161 To begin to answer some of these questions and to begin to build support for the deployment, the  
162 establishment of a Development Implementation Team may be appropriate. This team should be  
163 charged with carefully considering the costs and the benefits of the deployment of service. Members  
164 of this team may include representatives from County Sheriff's Office, City Police Department(s),

165 Emergency Medical Services, Fire Departments, Ambulance services (if used in your area) and the  
166 Division of Emergency Management.

167 The team should meet to discuss any statutory requirements of Phase I and Phase II and to review  
168 the checklist above. To answer some of the questions, the team may want to talk to other localities  
169 that have deployed the service of similar size and demographics. A state E-911 coordinator or the  
170 president of the local NENA chapter may be able to assist in identifying similar localities.  
171 Additionally, the current recipient of the wireless calls, if not already answered by the PSAP (i.e. the  
172 state police or highway patrol), may be able to provide information about the current call load.

173 The team should determine the political considerations of implementation from fiscal control and  
174 legal personnel (county/city attorney) and make the appropriate meeting take place. Many states  
175 offer funding or cost recovery for the deployment of wireless E-911. All costs and impacts should  
176 be identified before the decision is made to proceed. This will prevent later problems when  
177 unidentified costs and impacts will become apparent.

178 The team should appoint a project manager to act as the single point of contact for all stakeholders at  
179 the locality. While this is often the PSAP manager, the team must ensure that the PSAP manager has  
180 the time to commit to the project. If not, another project manager (such as a consultant) may be  
181 appropriate.

182 Other issues to consider during the team meeting include the following:

- 183 [1] Evaluate operational issues such as trunking, equipment, staffing, the idiosyncrasies of  
184 wireless calls, etc.
- 185 [2] Wireless calls tend to take longer to process than wireline calls, due to the inability of the  
186 caller/phone to give an exact location. This may have an impact on staffing requirements if  
187 the calls are not already being routed to the PSAP.
- 188 [3] Typically, more calls are received from wireless telephones per incident than from  
189 wireline telephones. Review the physical infrastructure in the PSAP to ensure it can handle  
190 such peaks.
- 191 [4] There may be a requirement for additional call takers or answering positions at the primary  
192 PSAPs. Has this growth and change been anticipated?
- 193 [5] Establish some type of call reporting analysis on current trunk groups to determine P.01 and  
194 trunk loading. A review of call data, if available, may help to establish possible trunk and  
195 administrative line upgrade requirements.
- 196 [6] Wireless 9-1-1 calls are growing each year as the number of wireless phones continues to  
197 increase. Additional trunks may be required from the 9-1-1 tandem switch to the primary  
198 PSAPs for the delivery of wireless 9-1-1 calls.
- 199 [7] If dedicated Wireless 9-1-1 trunks are being installed at the PSAP, determine where these  
200 lines will overflow so as not to saturate your wireline trunks. It is not recommended that the  
201 wireless trunks roll over to the wireline trunks because it defeats the reason for separating the  
202 trunks to begin with.
- 203 [8] The PSAP may want to compile a list of all known tower sites in their jurisdiction or  
204 determine if such a list already exists. While there will likely be additional sites identified

205 through the deployment process, compiling a list early will save time later and will also allow  
206 the PSAP to confirm all towers have an assigned address. If towers are identified that have  
207 not been addressed, the PSAP may want to consider assigning an address unique to the tower  
208 site and not shared with any surrounding structure. This will aid in the identification of a  
209 wireless Phase I call.

### 210 **3.2.2 Initial 9-1-1 Service Provider Contacts**

211 The project manager should schedule a meeting with 9-1-1 service provider marketing and technical  
212 representatives to determine their ability to provide wireless 9-1-1 services and their preferred  
213 technology. With the 9-1-1 service provider and other equipment vendors, determine the impact on  
214 all 9-1-1 equipment, current trunk configurations, expansion trunking decisions, ALI display format,  
215 mapping, and computer aided dispatch systems. Determine what options are available for upgrade  
216 or replacement.

217 There is no provision, in any legislation, that requires the County to blindly accept the service in the  
218 manner the Wireless Service Providers (WSPs) or 9-1-1 service provider prefer to provide it.  
219 Choices are available and technology requirements are neutral under most State and FCC  
220 regulations. Cost may be the controlling factor.

221 There are generally three technology options for deployment of Phase I (CAS, NCAS and HCAS)  
222 and two for Phase II (NCAS and HCAS). The project manager should survey the WSPs operating in  
223 the locality to determine which technologies they are offering. This will have an impact on the  
224 upgrades that may be necessary. As an example, the CAS solution requires the PSAP equipment to  
225 be able to receive and process a 20-digit ANI. Most equipment is only capable of 8 or 10-digit ANI  
226 unless the equipment is relatively new (since 2000) or has been upgraded.

227 The PSAP project manager must order the necessary upgrades and obtain a schedule for their  
228 implementation from the 9-1-1 service provider. In accordance with the Richardson ruling of the  
229 FCC, the necessary upgrade must be completed within six-months of the PSAP's service request for  
230 the request to be valid. If the upgrades or equipment replacements are scheduled to take longer than  
231 six months, the project manager should wait to make the service requests until the completion is  
232 within six months or can make an early request (recognizing that the six-month timeframe of the  
233 FCC order does not start right away).

234 The project manager should request a copy of the PSAP's MSAG from the 9-1-1 service provider  
235 during this initial contact. The MSAG will be helpful later when completing the routing data sheet.  
236 In some areas, the 9-1-1 service provider will create the MSAG for the wireless deployment. In such  
237 cases, the importance of the MSAG diminishes, but it is still a good idea to obtain a copy of the  
238 MSAG as a reference. Requesting it early ensures that it is available when and if it is needed.

### 239 **3.2.3 Notifications**

240 Once the project manager has determined that the PSAP is ready or will be ready within six months,  
241 the request letter should be sent. The initial communications between the PSAP and WSP can set the  
242 tone for many of their future dealings. It is important that as much information is shared as possible  
243 in the early stages to ensure that problems stemming from miscommunications are avoided.

244 Identifying the WSPs who should receive the request can be difficult. Several Internet resources are  
245 available to assist such as [www.fcc.gov](http://www.fcc.gov) or [www.wirelessadvisor.com](http://www.wirelessadvisor.com)

246 The entire deployment process begins with the request letter being sent by the PSAP to the WSP.  
247 The request letter should be sent certified or by any other means that records the name of the  
248 recipient. This will help avoid future confusion about who and when the request letter was received.  
249 Be sure to send a copy of the request letter sent to the WSPs to the 9-1-1 service provider and state  
250 9-1-1 coordinator, if one exists.

251 To ensure that the PSAP is ready to deploy the service, the request letter should include copies of  
252 upgrade orders and any other documentation showing the PSAP is ready to deploy service. The  
253 ATIS (Alliance for Telecommunications Industry Solutions) Emergency Services Interconnection  
254 Forum (ESIF) has developed a PSAP Readiness Checklist for Phase II, which may provide sufficient  
255 documentation of readiness. The checklist may be downloaded from ESIF's website at  
256 [www.atis.org/ESIF](http://www.atis.org/ESIF) and should be included with any Phase II request letter. While a request without  
257 this information is a valid request, this type of information will be requested later in the process if it  
258 is not provided with the request. Most important of all, the request letter from the PSAP should  
259 identify the single point of contact authorized to work with the WSP on the deployment. This will  
260 be the point of contact for the WSP to ensure that all communications are received and processed  
261 appropriately.

262 After receiving the request for service, the PSAP can expect the WSP to acknowledge the receipt of  
263 the request. It is likely that this correspondence will simply acknowledge the request and indicate  
264 that they have referred the request to their service provider. Most WSPs use a third-party provider to  
265 deploy the wireless enhanced 9-1-1 services. It is also likely at this stage for the third-party provider  
266 to contact the PSAP representative identified in the request letter to introduce him or herself and talk  
267 briefly about how the deployment will be handled. It is at this stage that the WSP or third-party  
268 provider will request the general PSAP information if it was not provided in the survey with the  
269 request.

270 Finally, but probably most importantly, it is the PSAP responsibility to notify the WSP and third-  
271 party provider of changes in their status or the timeline for their readiness. Often the request for  
272 service will be sent before the PSAP is actually ready to receive the service. This is allowable as  
273 long as the PSAP plans to be ready within the 6-month deployment window. If circumstances  
274 change it is important for the PSAP to notify all other parties.

275 Face-to-face kickoff meetings that had been customary in the early stages of wireless E-911  
276 deployment are rarely conducted at this point. In unique situations, a face-to-face meeting may be  
277 appropriate, but in such cases, a regional approach is desirable to maximize the number of PSAPs  
278 able to participate in the meeting. A conference call is an appropriate substitute and should still be  
279 conducted on a regional level, if possible. A separate conference call will likely be necessary for  
280 each of the WSPs since the WSP may need to disclose proprietary information. This initial  
281 conference call is an excellent way to set expectations and make sure everyone is starting from the  
282 same point.

283 The project manager should establish a date for the first planning meeting or conference call with  
284 each WSP, the required 9-1-1 service provider, and the Development Implementation Team allowing

285 at least 30 days notice. All parties should be told that their participation in the call is  
286 MANDATORY.

### 287 **3.2.4 Planning Meeting**

288 The planning meeting or conference call should be conducted with all of the following participants:

- 289 • The Development Implementation Team
- 290 • All Wireless Service Providers (WSPs) (Include any subcontractors they utilize)
- 291 • Local 9-1-1 service provider
- 292 • Possible CAD and/or Premise equipment vendors if required
- 293 • Mapping vendor, County GIS Department

294 The meeting or call should be rescheduled if one or more is unable to make it. If the meeting is held  
295 in person, strong consideration should be given to also allowing participation by conference call.  
296 Travel costs may prohibit some participants from traveling to a meeting especially considering the  
297 number of PSAPs that may request service. Conducting the meeting or call without everyone will  
298 likely lead to the need for another meeting or call. It may be necessary to defer discussions of  
299 proprietary WSP information if more than one WSP is represented at the meeting or on the call. If  
300 the information cannot be discussed specifically, the discussion can focus on when and in what  
301 venue the necessary information can be shared.

302 Some WSPs or some localities require the execution of a service agreement. Though not required  
303 (but permitted) under the FCC order, the project manager must determine if a service agreement is  
304 necessary. If so, the proposed agreement must be shared with the parties to the agreement during the  
305 meeting. The proposed agreement may be provided by the WSP or there may be a standard  
306 agreement available from the locality or state.

307 There is significant variance in how much of the deployment process the WSP is willing to complete  
308 prior to these documents being in place. In some cases, the WSP's will require the nondisclosure  
309 document to be signed prior to any deployment activities taking place. Other situations may arise  
310 where the WSP's will require service agreement finalization prior to trunks being ordered. Still other  
311 deployments will be allowed to proceed to pre-production testing, requiring all agreements to be  
312 completed just prior to final test and deployment.

313 Though not a responsibility of the PSAP project manager, interconnection agreements have on  
314 occasion delayed the deployment of service. As a result, it may be beneficial during the planning  
315 meeting to determine if interconnect agreements between WSP's and 9-1-1 service provider are  
316 signed and in place. If not, inquire as to the expected date of completion and whether the lack of an  
317 agreement will impact the deployment schedule.

318 During the planning meeting attempt to resolve the following issues at this meeting:

- 319 • The method of wireless Phase I and Phase II call delivery to be employed. It will be Call  
320 Associated Signaling (CAS), Non-Call Associated Signaling (NCAS w/SCP or NCAS  
321 w/WID) or a Hybrid delivery solution.
- 322 • Discuss how the number of trunks from each WSP to the routing 9-1-1 tandem will be

- 323 installed. In most cases, this is solely a WSP responsibility and there is no cost to the PSAP.  
324 Also, determine the trunking and signaling requirements between WSP's MSC and the 9-1-1  
325 selective router. The PSAP must be careful to not get drawn into any cost recovery  
326 requirements during these discussions.
- 327 • WSP should show a plan for congestion control (management of the volume of calls from  
328 any one area).
  - 329 • Determine the number of separate wireless 9-1-1 trunks necessary from the 9-1-1 tandem to  
330 the primary PSAPs. (Separate wireless trunk groups provide a guard against the blocking of  
331 wireline 9-1-1 calls in the event of a major public incident). Do not simply duplicate the  
332 quantity of wireline trunk groups that are current at each primary PSAP.
  - 333 • Discuss the redundancy and diversity of the WSP's connectivity to the selective router and  
334 the PSAP trunking.
  - 335 • Identify if any of the players are utilizing subcontractors. Understand the role and  
336 responsibilities of the subcontractors, as well as who is accountable for their performance.
  - 337 • Determine any special requirements that may be placed upon the PSAP. Such requirements  
338 could include a special upgrade need to the PSAP's CPE or burdensome testing  
339 requirements.
  - 340 • Determine if any special costs will be incurred by the PSAP. Obtain details of such costs in  
341 writing. One example of this may include when the PSAP has an on-site or standalone ALI  
342 database. A router and special data circuits will be required to allow the receipt of wireless  
343 data.
  - 344 • Establish a mechanism for the Wireless Service Providers (WSPs) to interface with the 9-1-1  
345 service provider so that each understands the others role. They will need to communicate  
346 regarding the ordering of trunks from the MSC to the selective router and database access.  
347 Establish a working relationship and ensure it continues beyond implementation.
  - 348 • Identify the primary contacts for all players in the system so that everyone knows who to  
349 keep in the loop. Identify the specific individuals in each company that will be managing  
350 their portion of the implementation. Obtain telephone numbers, pager numbers and email  
351 addresses.
  - 352 • Identify the NENA company ID and 24 X 7 contact number for each WSP. Ensure this  
353 number is at the PSAP BEFORE the testing starts.
  - 354 • Arrange for individual meetings, if they are deemed necessary, for the discussion of  
355 proprietary information, anticipated workload, cell routing, and subscriber base issues.
  - 356 • Discuss any applicable state or local legislation or regulations. The state public utility  
357 commission regulates local exchange carriers. The Wireless Service Providers (WSPs) are  
358 only regulated at the federal level.
  - 359 • Set time lines to move forward when all information is received. Review a copy of your  
360 Phase I and II letters with each WSP. Ask for the WSP response letter if not received prior to  
361 this meeting.

362 **3.3 Routing Sheet and Associated Database Standard**

363 **3.3.1 Initial establishment of routing**

364 The next interaction between the PSAP and WSP will most likely be to initially establish the proper  
365 routing for each tower. The process begins when the WSP or third-party provider sends the PSAP a  
366 list of all of their wireless communications sites in the PSAP's jurisdiction, often referred to as a  
367 routing data sheet. Accompanying the routing data sheet should be a map that shows the physical  
368 location of each of these sites including the cell sector orientation. Typically, these sites will be  
369 communications towers; however, the sites may also be a water tank, a tall building, a power  
370 transmission structure or any one of a number of other tall structures. One variation on this step in  
371 the process is that before the routing information is sent, the WSP or third-party provider may send  
372 the PSAP a map confirming their jurisdictional boundaries. In either case, the jurisdictional  
373 boundaries of the PSAP must be identified. Additionally, the PSAP should identify any areas that  
374 are currently being annexed that will become part of its jurisdiction during the deployment process.

375 Each site may have an omni-directional antenna (meaning that it receives and transmits 360 degrees  
376 around the site) or a sectored antenna (meaning that it receives and transmits directionally). A  
377 sectored antenna may have two or more sectors with each sector concentrating its wireless coverage  
378 in an area falling to either side of the azimuth of the sector bearing.

379 The routing sheet will list each site including each sector. The orientation of the sector, based on  
380 compass directions, will also be listed (i.e. NW, SSE, WNW, etc.). You will need the radius  
381 information provided on the spreadsheet or from an RF coverage map to determine PSAP routing. If  
382 using the radii supplied on the spreadsheet, it is recommended that you confirm whether or not the  
383 radii listed is default (1 mile) or estimated actual which could be much greater than one mile. This  
384 information has an impact on routing. The routing sheet will also list the address, longitude and  
385 latitude for the site. The map that accompanies the routing sheet will display the location of the site  
386 and will indicate the approximate coverage of each sector either with a "pie wedge" or the actual  
387 predicted coverage of the sector based on a propagation model. It is important to note the third-party  
388 provider is not in the business of producing maps for PSAPs. PSAPs will often request additional  
389 maps from the third-party provider to display in the PSAP or to use as reference. While these are  
390 worthwhile uses, it is not part of the work that the third-party providers perform. As a result, the  
391 PSAP should expect that such requests are refused or are provided at an additional cost.

392 The purpose of the routing sheet and map are to allow the PSAP to determine the appropriate routing  
393 for each site and sector and to confirm the site information (address, latitude and longitude, etc.) that  
394 will be displayed on the ALI when a call is received. The determination of routing may best be  
395 accomplished in a regional approach. It may not be the locality in which the site is located that gets  
396 the calls from that site. The wireless signal does not end at political boundaries. It may be  
397 appropriate to route the site based on the area covered or where the highest density of population  
398 exists. Conducting a regional meeting with several PSAPs will ease the process of determining  
399 routing. This allows each PSAP to discuss the routing and come to agreement in a cooperative  
400 environment.

401 The WSP must ensure that the tower address has been obtained from the proper addressing authority  
402 for the jurisdiction that the tower resides in. This is usually done prior to applying for the building

403 permit. It is the PSAP's responsibility to research the correct information for the routing sheet. The  
404 information provided by the WSP or third-party provider is the best information they have though it  
405 may be incorrect. Great care should be taken by the PSAP to ensure that the information returned to  
406 the WSP or third-party provider is complete and accurate. The PSAP must also ensure that updates  
407 are made to their MSAG (and any other system interfaced to the ALI data stream, such as CAD or  
408 mapping) to match the tower addresses. This will ensure that the tower addresses display properly  
409 and will be entered properly in the ALI database.

410 The WSP may also ask for default and overflow routing information on the routing data sheet. If not  
411 on the routing sheet, the WSP will request this information in another manner. Default routing  
412 occurs when there is a failure of the standard routing. There are various levels of default routing. It is  
413 important for the PSAP to understand default routing and provide information to the WSP regarding  
414 where the PSAP would like to route them. Typically a 10-digit line is utilized for the default route,  
415 but care should be taken to ensure that the default line is answer with a similar priority to 9-1-1.  
416 Overflow routing occurs when all of the trunks are busy. There are two places this can occur. The  
417 first is between the MSC and selective router. This overflow routing is controlled by the WSP.  
418 When all trunks are busy, a call may be routed to another line or simply provided a fast busy signal.  
419 A fast busy signal is most common and is recommended in most situations for congestion control.  
420 The second place an overflow situation may occur is on the trunks between the selective router and  
421 the PSAP. The 9-1-1 service provider controls this overflow routing. They, too, can overflow route  
422 to another line or fast busy, but they can also (though it is not recommended) overflow to the  
423 wireline 9-1-1 trunks.

424 Sometimes the transmittal that accompanies the routing sheet and map will indicate that the PSAP  
425 must return the information within a short period of time. Regardless of the amount of time  
426 required, the PSAP may take more time, but needs to notify the WSP or third-party provider of the  
427 delay. Once the information has been verified or corrected, the completed routing sheet must be  
428 returned to the WSP or third-party provider (as indicated on the transmittal).

429 Once the WSP or third party provider makes the changes indicated by the PSAP, the WSP or third-  
430 party provider must send the PSAP a copy of the finalized routing sheets. This "as built" list allows  
431 the PSAP to confirm that all of the requested changes were made. The PSAP should keep a copy of  
432 the final routing sheet for their records and as source of data for mapping display systems.

433 Alternate routing is also an issue that must be address though it does not involve the WSP. Many  
434 PSAPs have a plan in place to reroute 9-1-1 calls to another PSAP or location should an evacuation  
435 of the primary PSAP become necessary. The 9-1-1 service provider typically performs this  
436 rerouting of the 9-1-1 calls. Whatever the arrangement, if alternate routing is provided for wireline  
437 9-1-1, the same accommodations should be made for alternate routing the wireless trunks as well.

### 438 **3.3.2 Data for Mapping Display Systems**

439 Many PSAPs install mapping display systems in order to plot the wireless 9-1-1 calls in Phase II. A  
440 common data layer in these systems is a layer showing the wireless tower sites including sector  
441 coverage. This allows site information to be displayed graphically when a call is being processed  
442 from that site. The problem becomes one of how to obtain the information from the WSP or third-  
443 party provider to have it loaded. Due to the vast number of systems and the vastly different formats



444 in which they utilize the data, it would be unreasonable to expect the WSPs or third-party providers  
445 to produce this data in the multitude of formats that may be required. As a result, this data should be  
446 pulled from the routing sheets provided early in the implementation of Phase I. All of the necessary  
447 data for the mapping display system should be available on the routing sheet. If it is not or if another  
448 format is absolutely necessary, a special request should be made of the WSP or third-party provider  
449 but the PSAP should expect the request to take some time and be at an additional cost.

450 Since the routing data provided to the PSAP was only a snap shot of the sites at the time Phase I was  
451 requested, it is imperative that updates to the data be sent to the PSAP any time changes are made  
452 after the finalized routing sheet is produced. This will ensure that the PSAP has the most up-to-date  
453 information and can load this into their mapping display system.

### 454 **3.4 ALI Database Delivery Standards**

455 The Phase I and Phase II data are provided to the PSAP through the ALI data stream. However, to  
456 accommodate the new information, the existing ALI query response format must be modified.  
457 Contact the ALI database provider to determine if an expanded ALI response format has already  
458 been established. If so, obtain a copy. Also determine whether there is any latitude for modification  
459 of this format. The format should be provided as a data structure that identifies the field name and  
460 length for the entire record. It is important to understand that the format will only contain fields that  
461 exist in the current ALI database and when specific fields do not exist for a data element, the data  
462 may be inserted into another field. The ALI database provider may have little control of how the  
463 data appears within each field. However, the PSAP Authority can have impact on what fields are  
464 used to carry a given data element. NENA has generated recommendations for Wireless ALI field  
465 content standardization, in order to enable consistency of dynamic data provision for wireless E9-1-  
466 1. See NENA Data Standards and Technical Information Documents.

467 Contact each WSP to determine how they will be populating each field within the ALI record. Most  
468 of the fields such as longitude and latitude are straightforward and are populated consistently. The  
469 most common variation among the carriers is the display of cell sector information. Since there is no  
470 specific field for sector information, one WSP may append this information to the street address field  
471 while another may use the community field. Where the sector information appears may affect  
472 whether calls can be routed by sector or just by cell tower, so it is important to understand the  
473 intended methods for this. Understand that this is not something the ALI database provider can  
474 change since they are passing the data by field name and not by its contents.

475 Once the final format is determined, it must be provided to any vendors whose system interfaces  
476 with the ALI data stream. Most often this is primarily the CAD system vendor, but may also include  
477 a mapping vendor, if mapping is not provided through CAD. The response format provided by the  
478 ALI database provider must be forwarded to these vendors and modifications must be made to the  
479 systems to accommodate the new format, and any variations on field data content. Close  
480 coordination of implementing the new format is essential. If the new format is activated before the  
481 system changes, the system interfaces may not perform properly. The same is true if the system  
482 modifications are made before deploying the new format. Both changes should be made and tested  
483 at the same time or as close together as possible.

484 Though the PSAP typically has little involvement in the establishment of the wireless MSAG  
485 records, assignment of ESRK and ESRD ranges and provisioning of the WSP's MSC, the PSAP can  
486 ensure that each of these tasks is being completed. On occasion one of these tasks will be  
487 overlooked and will not be discovered until testing. Of course, this will delay the deployment of  
488 service. This type of delay can be prevented or reduced by a simple question from the project  
489 manager.

### 490 **3.5 Geographical Information Systems (GIS)**

#### 491 **3.5.1 Mapping Display System**

492 The PSAP must determine how the longitude and latitude will be located in their jurisdiction. While  
493 there is no regulatory requirement that a PSAP have an automated mapping system it is highly  
494 recommended depending on the number of calls received by the PSAP. In lieu of an automated  
495 mapping system, a PSAP could use paper USGS maps to plot the longitude and latitude, but this is a  
496 very time consuming process and will require extensive training of the PSAP staff.

497 There are several options for mapping display systems, but they generally fit into one of four  
498 categories.

##### 499 **3.5.1.1 CAD Based Mapping**

500 With a CAD based system, the same vendor that provides the CAD system provides the mapping  
501 display. This solution often provides the mapping solution with the greatest functionality since many  
502 CAD based mapping system provide CAD features in the map in addition to the typical mapping  
503 features. As an example, the user may be able to change status of units through the mapping display  
504 as well as display incident detail information. It may also allow the PSAP to procure the mapping  
505 system more easily since existing contracts may be in place that can simply be modified or  
506 expanded.

##### 507 **3.5.1.2 CPE Based Mapping**

508 Many of the current CPE vendors offer integrated mapping solutions. These solutions offer tight  
509 integration with the telephone system and often have hooks to allow some interface to other systems  
510 such as CAD.

##### 511 **3.5.1.3 Third Party Mapping**

512 Other mapping systems are available specifically design for use in a PSAP. Several of these systems  
513 are provided by companies that perform mapping and addressing functions for initial deployment of  
514 E-911. These systems may also provide hooks to interface to CAD or other systems. In fact, some  
515 CAD and CPE vendors actually market mapping display systems from these vendors as part of their  
516 system.

##### 517 **3.5.1.4 Commercial Off the Shelf (COTS) Mapping**

518 Though not specifically designed for a PSAP, there are several software mapping applications  
519 available commercially. They tend to be very inexpensive (under \$100) and the quality varies  
520 greatly. Since these applications would not interface with any other systems (thus requiring manual  
521 entry of the longitude and latitude information), it would likely not be a good choice for a busy

522 PSAP. The accuracy and age of the data provided with the system may also impact its usefulness in  
523 some areas. However, for a small PSAP that just needs to be able to plot a longitude and latitude on  
524 a few calls, it may perform well enough to satisfy the need. A COTS solution would definitely be  
525 superior to a paper solution.

### 526 **3.5.2 GIS Data**

527 With the exception of the COTS solution, which is typically provided with data, no matter which  
528 mapping display solution is selected, GIS data will need to be provided to drive the map. There is a  
529 wide variety of option available for GIS data both in format and content. Work closely with the  
530 selected mapping display system vendor to determine the data requirements of the specific system.  
531 Try not to reinvent the wheel by determining if data is available from another source in the  
532 jurisdiction. There may also be a state GIS program that can provide some of the required data. The  
533 important message is that the PSAP should not look at this data as being solely for the PSAP. Other  
534 users of GIS data may already have data or be able to share the cost of its acquisition. If no data is  
535 available from a public sector agency, GIS data may be available from a commercial source. There  
536 are several companies that provide mapping data commercially for other applications like web-based  
537 mapping sites, etc. The accuracy and age of the data varies in different areas of the country so the  
538 quality of the data must be evaluated. Refer to NENA's "A Public Safety Answering Point  
539 Managers' Guide to Geographic Information Technology" (available on the NENA website) for  
540 more information about GIS system and data.

## 541 **3.6 Implementation Testing Standard**

### 542 **3.6.1 Phase I Testing**

#### 543 **3.6.1.1 Scheduling**

544 As a general rule, Phase I testing should be scheduled with all parties on the testing team by the  
545 WSP or third-party provider at least five (5) business days prior to performing the testing. The  
546 testing team must include at least the WSP, third-party provider, PSAP and 9-1-1 service provider.  
547 The initial request for testing shall indicate who will be responsible for coordinating the testing (the  
548 testing coordinator). The testing coordinator will be responsible for notifying the PSAP and 9-1-1  
549 service provider of the general plan for the testing to include the following information:

- 550 • Who will be involved with the testing;
- 551 • How many drive testers will be conducting test calls;
- 552 • How many test calls will likely be made and over what period of time; and
- 553 • Will a conference bridge be utilized during the testing.

554 The PSAP should not agree to conduct Phase I testing until they are actually ready to deploy the  
555 service (training conducted, etc.). It is not recommended that testing be conducted well in advance of  
556 deployment. It is best to deploy the service as soon as successful testing is completed. As a result,  
557 the PSAP should conduct any necessary telecommunicator training before testing is conducted. The  
558 content of the training is beyond the scope of this document, but it is important to remember the  
559 training must be conducted prior to Phase I being implemented. Additionally, standard operating

560 procedure for processing wireless calls should also be developed including how and when to obtain  
561 subscriber information and the procedure for processing wireless 9-1-1 hang-ups.

562 Since the testing schedule is predicated on completion of testing at other PSAPs, the schedule may  
563 slip or may be accelerated (if another PSAP cancels) as the testing date approaches. It is the  
564 responsibility of the testing coordinator to communicate any changes to the schedule to all parties on  
565 the testing team. Any member of the testing team may request a change to the schedule, if  
566 necessary. Additionally, during the testing, the PSAP or any other party may request a temporary  
567 stoppage or a cancellation of testing should conditions in the PSAP change or the situation warrants  
568 it.

### 569 **3.6.1.2 Switch Level Testing**

570 There are two levels of Phase I testing, switch level and sector level. The switch level testing,  
571 sometimes referred to as profile testing, ensures that the switch is able to process calls from different  
572 types of handsets and during different types of failure situations. It is not necessary to test these  
573 conditions with every site. Even though a single test performed on each MSC is likely sufficient,  
574 switch level testing should be performed at each PSAP to ensure correct performance and to allow  
575 the PSAP to experience each type of failure.

576 Additionally, connectivity testing must also be performed on the trunks between the MSC and the  
577 selective router. While this may or may not result in a few calls being routed to the PSAP, it is  
578 essential that this testing be accomplished before any other testing is attempted. This testing is often  
579 performed when the WSP's trunks are installed which may be as much as 30-days prior to system  
580 testing. The PSAP trunks also need to be tested. This testing should also be performed by the 9-1-1  
581 service provider and PSAP prior to any other testing.

### 582 **3.6.1.3 Handset Test**

583 Each WSP can provide wireless service through multiple handset types (typically between 3 and 5  
584 different types). Examples of different types of handsets include:

- 585 • Home – analog
- 586 • Home – digital
- 587 • Roamer
- 588 • Uninitialized (out of box and deactivated)
- 589 • International

590 At least one test call must be placed from each type of handset that is available to the general public.  
591 Not all WSPs will need to test all handset types. A WSP with an all-digital network does not offer  
592 analog service and therefore could not test an analog handset.

593 The actual ALI display within the PSAP will vary based on the WSP but generally each call should  
594 provide the appropriate Phase I information with the exception of the uninitialized handset. Since  
595 the handset is uninitialized, no call back number is available. The PSAP should take note of what is  
596 displayed as the call back number for the uninitialized handset. The call back number for such  
597 handsets is handled differently depending on the WSP. The number sent may be the last number

598 assigned to that handset, the MIN of the handset or a unique number to identify it as an uninitialized  
599 handset (i.e. 911-123-4567).

600 The results of each test call should be documented. While only one call is necessary to test each  
601 handset, additional test calls may be necessary if errors are found.

#### 602 **3.6.1.4 All Trunks Busy (Overflow)**

603 There are two places that all trunks can be busy, between the MSC and the 9-1-1 selective router and  
604 between the selective router and the PSAP. Both locations must be tested for an all trunks busy  
605 condition; however, not all of this testing can be repeated with each provider.

#### 606 **3.6.1.5 MSC to 9-1-1 Selective Router**

607 To test the trunks between the MSC and selective router, all trunks within the trunk group must be  
608 placed in a busy status. When all trunks are busy, a test call 9-1-1 is placed. The call should route as  
609 requested by the PSAP in the initial survey. When the test is completed, the trunks must be made  
610 available once again.

611 This test can only be performed once for each trunk group. If the trunk group is shared among two  
612 or more PSAPs, only the first PSAP can perform this test since live calls may be on the trunks and  
613 busying the trunks could block an actual 9-1-1 call. If the trunk group is shared, the first PSAP must  
614 perform the test and report the results to all of the other PSAPs served by that trunk group.

#### 615 **3.6.1.6 9-1-1 Selective Router to PSAP**

616 To test the trunks between the selective router and the PSAP, all trunks within the trunk group must  
617 be placed in a busy status. When all trunks are busy, a test 9-1-1 call is placed. The call should route  
618 as requested by the PSAP in the initial survey. When the test is completed, the trunks must be made  
619 available once again.

620 This test can only be performed with the first WSP and only if the trunks are not shared between  
621 wireline and wireless E-911. If the trunk group is shared between wireline and wireless E-911,  
622 busying the trunks could block an actual 9-1-1 call. If the trunk group is not shared, after the first  
623 WSP has deployed, performing this test could again block calls.

#### 624 **3.6.1.7 Alternate Routing**

625 If the PSAP has an alternate routing capability (the ability to forward 9-1-1 calls to somewhere other  
626 than the PSAP) for use during evacuation scenarios, the PSAP must test this capability for wireless  
627 9-1-1 calls. Though this is beyond the control of the WSP and third-party provider, the switch level  
628 testing provides an excellent opportunity to test this capability with the 9-1-1 service provider. This  
629 test can only be performed with the first WSP and only if the trunks are not shared between wireline  
630 and wireless E-911. If the trunk group is shared between wireline and wireless E-911, alternate  
631 routing for wireless should work the same as wireline and need not be tested beyond the routine  
632 testing of wireline alternate routing. If the trunk group is not shared, after the first WSP has  
633 deployed, performing this test could send live calls to the alternate location.

634

635 **3.6.1.8 Default Routing**

636 There are two conditions that can result in a wireless 9-1-1 call routing based on default parameters.  
637 The first is that the tower does not have routing information assigned to it or for some other reason  
638 does not provide it. In this scenario the MSC knows which tower has received the call, but does not  
639 know where to send the call based on that tower. In such cases, the call is sent to the default route for  
640 the MSC. If the PSAP being tested is not the default route for the MSC this type of default routing  
641 does not need to be tested, but the PSAP must be told which PSAP will receive their default routed  
642 calls in this scenario.

643 The second type of default routing is when the MSC does not provide correct routing information to  
644 the selective router. In this scenario the selective router will route the call based on the trunk group  
645 on which the call was received. If the PSAP is the only one served by that trunk group then the call  
646 will still route to the appropriate PSAP. If a single trunk group serves multiple PSAPs, then the call  
647 will route to the default for that trunks group. A call testing the default route should be made  
648 regardless of whether the PSAP being tested is the default route, but the test must be coordinated  
649 with the PSAP that is the default route.

650 **3.6.1.9 Transfer Testing**

651 The routing of wireless E-911 calls is much less accurate than the routing of wireline calls. As a  
652 result, a PSAP may be required to transfer calls to an area larger than they had to in the past. The  
653 transfer process must be tested to ensure calls will be completed an ALI data is transferred (if  
654 appropriate). ALI information will only be received in the transferred PSAP if it served by the same  
655 selective router as the original PSAP or if inter-tandem trunking is available between tandems.  
656 Where the call is transferred to a PSAP on a different, unlinked selective router, the call will be  
657 received on a ten-digit number and will lack ALI data. A PSAP should consider expanding their  
658 transfer list as a result of the implementation for wireless E-911. This will speed the transfer of calls  
659 after deployment.

660 **3.6.1.10 Sector Level**

661 As the name implies, sector level testing is performed at each site and on each sector at a site. The  
662 process involves a person, the drive tester, driving from area to area within the PSAP's jurisdiction  
663 making calls on each site and sector. The tests must be performed through an actual drive test. It is  
664 possible to simulate test calls from each sector at the MSC, but this practice **is not** an adequate test  
665 of the system and is therefore **not recommended**.

666 As a general rule of thumb, only one test call is necessary for each sector to ensure that the call is  
667 routing correctly and displays the correct information in the PSAP (on the ALI display). Additional  
668 calls will be necessary should the first test fail. It is the responsibility of the WSP or third-party  
669 provider to ensure that all sites and sectors pass the test, but the PSAP is encouraged to also monitor  
670 the testing to ensure that the displayed information matches the data the PSAP provided on the  
671 routing sheet. This will also ensure that the PSAP has been kept up-to-date on the routing  
672 information since the final routing sheet was provided.

673 Often a conference call bridge will be established for larger deployments. A conference bridge is  
674 recommended during any testing that involves more than one drive tester. The conference bridge  
675 provides a conduit for all parties to identify and resolve problems and for the testing to be suspended

676 should that be necessary. With only one drive tester, activities can be coordinated through the test  
677 calls themselves. If the PSAP needs to suspend the testing, they need only tell the driver tester the  
678 next time he/she calls.

679 As each site and sector is tested, it is recommended that the site be left as a live Phase I deployment.  
680 While it is possible to disable Phase I at each site after testing and deploy all sites at the same time at  
681 the conclusion of testing, this adds a possible point of failure that will not be tested again until a live  
682 9-1-1 call is received. It is best to consider the site completed and left as Phase I deployed.

### 683 **3.6.1.11 Documentation of Testing**

684 The WSP shall be responsible for documenting the completion of testing with a letter to the PSAP  
685 (copying the other stakeholders) within seven (7) days of deployment. The documentation should  
686 note any outstanding issues that are still to be resolved by the WSP or third-party provider with a  
687 schedule for the resolution of those items. If requested by the PSAP, the WSP or third-party  
688 provider should provide the PSAP with a copy of the actual test results. While this should usually  
689 not be necessary, the PSAP may need the information to ensure testing was completed properly.

### 690 **3.6.2 Phase II Testing**

691 Phase II testing shall follow the same guidelines as testing for Phase I except that for a handset based  
692 solution a location capable handset must be added to the switch level test and must be used by the  
693 drive tester for the sector level test. Like with Phase I testing only one test call is required, additional  
694 calls may be considered if all parties agree there is a value to be gained.

695 Prior to the start of Phase II testing, ensure that the Third Party Database Provider and the WSP have  
696 verified the Cross-Over-Tables in the MPC. That the ESRKs for each PSAP being tested have been  
697 verified as properly assigned to the specific PSAP being tested and that the proper NPA has been  
698 assigned for that region to ensure inter-state misroutes are kept to a minimum. All of this should be  
699 certified in an advance copy email to all parties involved in the testing. Also, remember, a No  
700 Record Found (NRF) during testing means that the format being sent to the MPC has some type of  
701 format programming error and must be resolved by the vendors, NOT THE PSAP.

702 It will also be necessary for the PSAP to rebid the ALI database for each test call received. It is  
703 therefore imperative the PSAP tests their rebid capability prior to beginning Phase II testing. The 9-  
704 1-1 service provider can assist the PSAP with this test. Some customer premise equipment (CPE)  
705 may appear to have a rebid capability, but the feature may not cause a new query to the 9-1-1  
706 database and may only redisplay the ALI record from the ALI controller. The CPE must be capable  
707 of querying the ALI database a second time to display the Phase II data.

708 The WSP should also test the position determining entity (PDE) prior to conducting the testing with  
709 the PSAP. This will allow the WSP to ensure that the PDE is calibrated and providing accurate  
710 location information prior to involving the PSAP in actual testing. This testing is conducted  
711 internally by the WSP and does not involve the PSAP receiving calls.

712 When the call is received in the PSAP, the call taker should ask the drive tester for their location. If  
713 the PSAP has a mapping display system, the location provided on the ALI display should be plotted  
714 and compared to the location provided by the drive tester. If the PSAP does not have a mapping  
715 display system readily available, the location provided by the drive tester and the latitude and

716 longitude provided on the ALI display should be compared at a later time. Testing should not be  
717 delayed by making this determination.

718 It is important to note, however, that this testing is not to test the accuracy of the system, but rather is  
719 intended to test the infrastructure's ability to process the call. Testing for the compliance of the  
720 Phase II system with the FCC order requires a larger number of test points to be statistically valid  
721 and usually requires an area larger than a single PSAP to be accomplished. Compliance testing is  
722 beyond the scope of this document.

### 723 **3.7 Post Deployment Issues**

#### 724 **3.7.1 New or Re-Homed Switches/Sectors**

725 From time to time after initial deployment of Phase I, a WSP may add a new site/sector or may move  
726 a site from one MSC to another (a process called re-homing). All new or re-homed sites and sectors  
727 must be retested in the same manner they were for Phase I or Phase II. The WSP must notify a  
728 PSAP of any new sites in their jurisdiction using the same format as the original routing sheet. From  
729 data preparation to testing, new sites should be processed with the same care and detail as sites were  
730 for the original Phase I implementation. This will ensure that the PSAP is aware of all new sites and  
731 that they may load information about the site into their mapping display system.

#### 732 **3.7.2 24-Hours Contact Information**

733 It will be necessary from time-to-time for the PSAP to contact the WSP after hours because of a  
734 need for additional information or to report a problem with the system. While a few WSPs have  
735 integrated these functions into a single telephone line, generally, there will be different contact  
736 number for each of these functions. Often requests for additional information (subscriber  
737 information, site information, etc.) will be processed through the WSP's legal compliance office.  
738 Trouble reporting is often processed through the third-party provider. It is critical that the PSAP  
739 obtain this contact information early in the deployment process so that procedures within the PSAP  
740 can be developed and appropriate training can be provided. The WSP or third-party provider should  
741 provide this to the PSAP when or before the routing sheets are distributed. The PSAP should enact  
742 any procedures in time for the telecommunicator training sessions, but must have them in place  
743 before testing.

#### 744 **3.7.3 "Planned" Outages, Upgrades, etc.**

745 While not all outages are planned, preventive maintenance, upgrades and other issues may require  
746 that the Phase I network be disabled for a period of time. The WSP or third-party provider shall  
747 notify all affected PSAPs and 9-1-1 service providers prior to the any planned outages or upgrades.  
748 The notification should indicate to all parties the duration of the outage and what level of service  
749 should be expected during the outage or upgrade.

#### 750 **3.7.4 Audit of routing data (after initial)**

751 PSAPs on occasion have expressed an interest in auditing the routing data periodically (usually  
752 annually) after deployment. While this sounds like a simple request, the sheer number of PSAPs  
753 nationally prevents this from being common practice. The amount of time necessary to audit every  
754 existing deployment would likely prevent new deployments from occurring. However, if a



755 widespread problem is identified, a PSAP may need to request an audit. The WSP or third-party will  
756 keep the PSAP up-to-date with any changes to the initial routing sheet. If the PSAP begins to see  
757 calls where the ALI displays something different than what has been provided, the PSAP should  
758 bring this to the attention of the WSP or third-party provider. While some errors such as this can be  
759 expected, when they become widespread, it may be necessary to look at routing again.

### 760 **3.7.5 Ongoing Testing**

761 Post deployment testing is the responsibility of the PSAP. It is recommended that the PSAP conduct  
762 period tests to ensure that all calls are still being processed properly. This is especially important in  
763 areas where the call volume from wireless is not that high and normal activity does not test the entire  
764 network.

765 It is also recommended that each PSAP evaluate the established routing periodically based on actual  
766 call load. Routing decisions were initially made on based on maps that depicted the likely coverage  
767 area of each site and sector. Once the PSAP has some historical data available, it is wise to revisit  
768 these routing decisions to determine if the optimal routing is being achieved. In other words,  
769 analysis of the actual call data may show that a high percentage (over 50%) of calls being received  
770 from one sector are being transferred to a neighboring PSAP. In this case, it may make sense to  
771 reroute that sector to the other PSAP, thus minimizing the number of transfers needing to take place.

### 772 **3.7.6 Information Management**

773 It is important for PSAP managers to monitor the performance metrics of their center. Because of  
774 the volume of calls that typically come from wireless E-911, it is important to especially monitor  
775 wireless 9-1-1 call load and performance. A management information system, which can be  
776 configured to monitor ALL PSAP activity that is generated and is within the PSAP's monetary  
777 reach, it is a highly recommended management tool. Some of the equipment within the PSAP, such  
778 as the CPE, CAD system (but remember not every call generates a CAD incident), voice logging  
779 system, etc., may be able to provide call load information. Additionally, the PSAP manager should  
780 try to obtain usage data from WSPs for MSC to tandem trunks and from the 9-1-1 service providers  
781 for tandem to PSAP trunks. Tracking this information will allow the PSAP manager to determine  
782 ongoing trunking requirements. Original trunking calculations are often based on estimated call load  
783 and must be verified against actual data. It may be necessary to add additional trunks. It is also  
784 important to monitor the call load on the wireline E-911 trunks to determine the impact of the  
785 implementation of wireless E-911 on wireline. Information regarding an increase in blocked calls or  
786 abandoned calls may signal a problem requiring additional investigation.

## 787 **4 References**

788 "A Public Safety Answering Point [Managers' Guide](#) to Geographic Information Technology"  
789