TELSTRA CORPORATION LIMITED

SUBMISSION OF TELSTRA CORPORATION LIMITED IN RELATION TO THE CAPACITY OF COMMUNICATION NETWORKS AND EMERGENCY NETWORKS AND EMERGENCY WARNING SYSTEMS TO DEAL WITH EMERGENCIES AND NATURAL DISASTERS.

30 May 2011

SECURITY CLASSIFICATION: Telstra Public

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A. EXECUTIVE SUMMARY

Telstra welcomes the opportunity to provide this submission to the Environment and Communications Reference Committee ("the Committee").

The submission takes the form of the enquiry terms of reference and includes information on how Telstra networks were impacted over the 2010/2011 summer season, the work Telstra undertook to assist affected communities and an assessment of how effectively the company's emergency services processes and systems worked during this time.

KEY ISSUES

1. **Telstra believes that the performance of its networks, its emergency procedures and efforts undertaken by its staff in the wake of the numerous disasters over the 2010/11 summer season were highly effective.** Natural disasters and emergency situations are inevitable. The sheer ferocity of these types of events means that the resultant impacts on a communications network are, in many cases unavoidable and apply regardless of whether such networks have been established for commercial or other community based purposes. However such impacts can be reduced if networks are planned and operated with this inevitability in mind. While Telstra's networks and communications operations did suffer damage as a result of the various disasters during the summer of 2010/11, its fixed, mobile and managed radio service networks and associated disaster recovery operations and processes operated very effectively. Telstra staff worked quickly and effectively and in many cases around the clock to restore services efficiently, once it was safe for our people to access impacted areas. In many cases the existence of multiple networks in affected areas meant that alternative forms of communication were still able to be maintained.
2. **Telstra's standard disaster response processes include a range of measures to help customers to stay in touch with their family and friends when their normal services have been affected.** In assessing the effectiveness of telecommunications networks in disaster situations it is important to understand the additional activities undertaken by providers to facilitate access to communications services during the impacted period. Telstra's response to disasters included the provision of free handsets with SIM cards for use by evacuees, temporary internet kiosks and laptop access in evacuation centre's, free phone cards and switching payphones to provide free local and STD calls in affected areas.

3. **Telstra has worked closely with emergency service organisations (ESOs), regulators and other Government agencies before, during and after these significant disaster events. We have been commended by the Chairman of the Australian Communications and Media Authority (ACMA) and ESOs including the Queensland Police for assistance provided to them during these times.** It is essential that good working relationships exist between telecommunication providers and ESOs. Telstra works closely with ESOs in all phases of the emergency management lifecycle of planning, preparedness, response and recovery. Using these relationships Telstra was able to facilitate a number of innovative solutions to assist ESOs in the field. For example, Telstra relocated the flood threatened National Relay Service and its staff to our Mt Gravatt exchange during the Queensland floods to ensure these essential services were maintained.

4. **Telstra's management of the Emergency Alert systems in these major disaster situations proved to be very effective in enabling individuals to seek assistance from ESOs and for emergency management organisations to issue a range of warning messages.** Telstra believes this system operated very effectively during the summer of 2010/2011 and assisted other jurisdictions in the effective management of the overall impact of the disasters on communities.

5. **Some consideration may need to be given to additional strategies to better preserve the supply of electricity in the event of disasters.** The ferocity of the major disasters during the 2010/11 summer season caused power black outs that impacted on the community at large, including the ability to deliver services over telecommunications networks that need power to operate. While Telstra uses battery backup and generators to try to ensure continuity of service for as long as possible, these have a limited life, and cannot ensure the longer-term availability of telecommunications services in areas where electric power cannot be restored quickly.

6. **It is important that the service characteristics of new NBN network deployments are fully understood so that customers know what to expect in the event of a natural disaster.** As telecommunications fixed access networks evolve from copper to fibre optics it is important to understand the impact on service availability during power outages. All telecommunications networks need power to operate. Fibre optic networks are no exception and, unlike the copper access network, require power to be available at both the switch and the customer ends of the network to remain operative

7. **Telstra considers that new technologies like mobile broadband networks, cloud computing and social media provide significant new opportunities to enhance the activities of ESOs in emergency and disaster scenarios.** These opportunities include increased productivity and capacity, new innovative applications, greater security, increased availability, reduced costs, and increased interoperability between organisations.

8. In summary, Telstra is highly responsive to the needs of the communities in which it operates. The reliability of its networks and its dedicated staff in going beyond the call of duty to restore services in times of emergency are second-to-none. Telstra will continue to work closely with ESOs to ensure that the emergency services and disaster response processes employed remain 'best practice'.

B. THE EFFECTIVENESS OF COMMUNICATION NETWORKS, INCLUDING RADIO, TELEPHONE, INTERNET AND OTHER ALERT SYSTEMS

9. Telstra believes its managed radio, fixed and mobile networks demonstrated their reliability, and generally held up well during the 2010/11 summer season, particularly given the magnitude of the disasters, the extent of the geographic areas impacted and the often volatile nature of the various disasters that unfolded during this time. In particular, Telstra submits that the Emergency Alert Warning System operated effectively, and provided invaluable assistance to persons impacted by the various disasters faced. This section of the submission outlines at a high level:

   a) the network impacts of the various key events over the 2010/11 season, including the Queensland Floods and Cyclone Yasi;

   b) how the Emergency Alert system operates; and

   c) how Telstra approaches natural disasters and works closely with ESOs to ensure that Telstra's networks provide service wherever possible and, where this is not possible, to ensure that work is undertaken to restore those services quickly and efficiently, and to provide alternative solutions to those in need.

NETWORK IMPACTS

10. The magnitude of the natural disasters experienced in Australia in the 2010/11 summer season should not be underestimated. In Queensland, an area greater than the size of France and Germany combined was impacted by the floods. The area inundated and otherwise affected was constantly changing as the flood waters moved across the land. Torrential rain and flood impacted not only Queensland, but also New South Wales and Victoria. The multi-State impact stretched resources and created logistical challenges for all communities affected. Unlike many other recent natural disasters, the impact unfolded over a long period with multiple critical impacts on a large number of communities.

11. To illustrate the vast extent of the disasters experienced over the 2010/11 summer season, below is a summary comparing the network impacts of Cyclone Larry in 2006, the Black Saturday Bushfires in Victoria in 2009, the Queensland Floods of 2011 and Cyclone Yasi. It is important to note that while there was extensive damage to Telstra's infrastructure, the redundancy in the networks (such as overlapping cell coverage in the Next G® network) and actions such as the priority recovery of mobile base stations, meant that actual Telstra customer impacts were minimised wherever possible.

SEVERE TROPICAL CYCLONE LARRY '06	**BLACK SATURDAY VICTORIAN BUSHFIRES '09**	**QLD FLOODS '11**	**SEVERE TROPICAL CYCLONE YASI '11**
28,000 PSTN services impacted	8,000 PSTN services impacted	23,200 PSTN services impacted	94,000 PSTN services impacted
40 mobile base stations impacted	27 mobile base stations impacted	159 mobile base stations impacted	159 mobile base stations impacted
3000 ADSL services impacted	2700 ADSL services impacted	13,600 ADSL services impacted	32,000 ADSL services impacted
190 network sites lost mains power	40 network sites lost mains power	375 network sites lost mains power	680 network sites lost mains power
40 portable generators deployed	53 portable generators deployed	70 portable generators deployed	110 portable generators deployed
104 red zones	43 red zones	450 red zones	268 red zones

Figure 1: Summary of recent natural disaster and network impacts

12. The reference to "red zones" is a reference to "no-go" areas for all Telstra staff (and contractors employed by Telstra). Staff may only work in a red zone under exceptional circumstances when authorised to perform emergency priority tasks and when supported/escorted by an ESO officer, e.g. a police escort. A red zone is declared when the entire exchange area is a no-go area. In floods, a key consideration is whether it is safe to access the site by road, or how access can safely be obtained by other means (e.g. helicopter). Telstra also has "amber" and "green" zone classifications. An amber zone is

determined when part of an exchange area is affected by an incident, but work can still safely proceed in other parts of the exchange area if the dispatch of tasks to the field is managed appropriately by the incident staff control centre. A green zone indicates an exchange area that is now safe and can be entered as per normal working conditions.

13. In addition, natural disasters lead to higher than usual traffic being carried by the mobile network in areas not affected by those disasters. During the Queensland floods and Cyclone Yasi, traffic on the mobile network peaked at up to six times normal levels, yet during this time, Telstra was able to maintain satisfactory levels of customer service on the unaffected areas of the network.

EMERGENCY ALERT

14. Emergency Alert is a national telephone warning system that enables State and Territory emergency management agencies to send messages during emergencies to potentially affected individuals and communities. Emergency Alert operates in all States and Territories in Australia, except Western Australia, which uses its own telephone warning system called StateAlert.

15. Emergency Alert is a means of contacting people to provide them with alert messages during an emergency. This part of Telstra's submission sets out what the Emergency Alert system does, and Telstra's role in providing the Emergency Alert System. In Telstra's submission, the Emergency Alert System operated effectively over the 2010/11 summer season. Emergency Alert was used on approximately 200 occasions from 1 December 2010 to 28 February 2011.

16. Emergency Alert commenced operation on 1 December 2009. It can be used for any emergency that threatens public safety, such as bushfires floods, chemical spills or major police incidents. It is one tool that the emergency services management agencies may use to warn the community in the event of an emergency or likely emergency.

17. State and Territory emergency management agencies, not Telstra, determine when messages are sent using Emergency Alert, the content of the messages and the geographic area to which messages are sent.

18. The Commonwealth Government funded the establishment of Emergency Alert. The participating States and Territories are responsible for its ongoing costs, while Telstra was the successful tenderer to provide the service, signing with the State of Victoria on 30 September 2009.

19. The Emergency Alert solution was designed in accordance with the Solution Requirements specified by Victoria in consultation with the participating States and Territories. Telstra provides a managed service and continues to work closely with government agencies to

ensure that Emergency Alert is a fully robust system that meets the operational needs of the users. The system is expected to be continually enhanced as the expertise of users and their requirements increase.

20. Emergency Alert operates by sending Short Message Service (**SMS**) messages to mobile and fixed services, identified by service address, in a specified area. Authorised representatives of government agencies have secure access to the system.

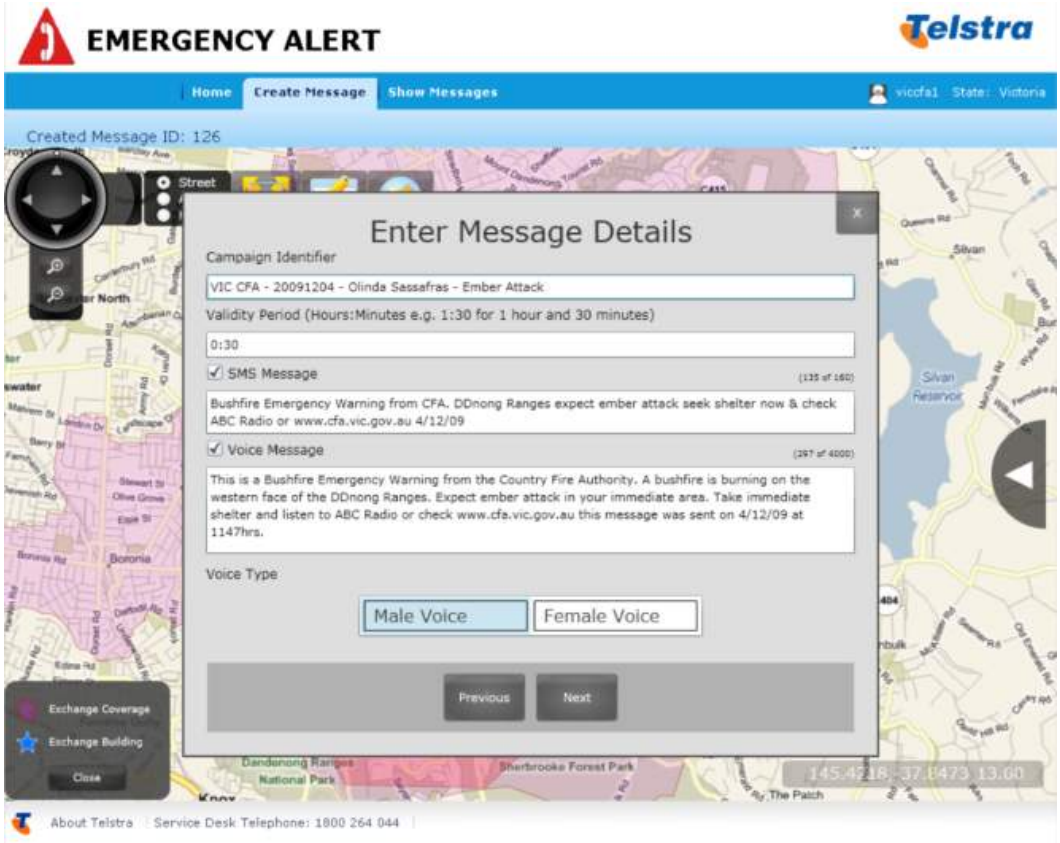

Figure 2: An example of an Emergency Alert message.

21. Emergency Alert can send up to 500 SMS messages per second and up to 1,000 voice messages per minute. The system transmits messages across all telecommunications carrier networks in Australia. The system is able to accommodate multiple message campaigns simultaneously. The system operates 24 hours a day, 365 days of the year.

22. The Integrated Public Number Database (**IPND**), which is controlled by the Commonwealth, contains all listed and unlisted public telephone numbers in Australia. The Location Based Number Store (**LBNS**) is a Commonwealth Government established separate database which uses information from the IPND to enable telephone services to be identified within a specified geographic area. LBNS is the data source for Emergency Alert.

23. Emergency Alert campaigns are generally 'valid' for a short period of time e.g. 60 minutes or 90 minutes. This ensures that communities are provided with up-to-date information. It

should be noted that a person cannot receive an Emergency Alert message if for instance their mobile phone is switched off, or the battery is flat. Similarly, if there is a power blackout, and a person only has a cordless phone (which requires 240v power to operate), no message will be received.

CO-ORDINATION DURING A CRISIS AND RECOVERY

24. Responding to any crisis situation depends not only on the capacity of the communication networks themselves, but equally importantly on the systems and processes different organisations use to ensure co-ordination during and after the crisis. Telstra recognises the importance of working closely with ESOs and is proud of its long history of working effectively with the Government at all levels in responding to natural disasters.

25. Following Cyclone Larry, Telstra developed an Emergency Management Framework to ensure it provided a co-ordinated response in times of emergency. The framework provides the basis for effective incident management, based upon a single incident management structure and uniformly-agreed procedures. The attributes of this system include:

    a) a single national point of backup contact – the Telstra Global Operations Centre (GOC) that operates on a '24 x 7' basis to handle Emergency Communications Support escalations;

    b) a dedicated senior staff member identified as the National Lead to ensure work is properly focused;

    c) adaptable and scalable processes;

    d) defined incident management structure;

    e) clearly defined roles and responsibilities;

    f) clearly defined communication flows using uniform terms;

    g) competency-based approach to filling positions;

    h) a system for review and modification; and

    i) a system that caters for all incidents and events.

Figure 3: Telstra's Global Operation Centre (GOC) coordinates the restoration of service in the event of network outages

26. Key to the effective operation of this model is interaction both within the Telstra organisation and externally, particularly with government and ESOs. The key interface externally is the Telstra Emergency Services Liaison Officer (**ESLO**) who liaises closely with the key emergency management agency in the impacted State or Territory.

27. In addition to the ESLO liaising with ESOs, Telstra's Regional Director of Service Delivery works with the State Disaster Management Group to ensure that there is sufficient information given by Telstra to the appropriate levels of government.

28. The co-ordination of the recovery response is managed via the Regional Emergency Council (**REC**) meetings with support from the Crisis Management team. The purpose of the REC is to implement a structure within the company to coordinate the restoration of Telstra's services. Initial issues addressed by the REC include:

    a) a more comprehensive assessment of the impact of the emergency on Telstra's infrastructure;

    b) the monitoring of the emergency to ensure the safety of our staff;

    c) an assessment of how that infrastructure damage is impacting on the telecommunications services able to be provided to customers;

d) an assessment of which sites are accessible to be immediately attended to, and where access is not possible because the nature of the emergency means it is not safe for our people to enter that area;

e) assessment of weather forecasts;

f) prioritising the allocation of available Telstra staff and equipment to the relief centres and providing support to those needing and those providing assistance;

g) the monitoring of progress to ensure prompt provisioning of DISPLAN services;

h) ensuring Telstra's radio network receives priority if required; and

i) ensuring other critical services, such as Triple Zero and emergency services, are accorded priority in restoration work.

29. This model ensures that Telstra works effectively with ESOs to support them in their communication needs and to ensure that communication networks are restored as quickly as possible, where most needed.

30. Following the Queensland floods in January 2011 ESOs operating in the Murphy's Creek area requested additional Next G coverage to support the Command and Control Centre located at the Murphy's Creek Hotel. The additional coverage was provided by Telstra by means of a temporary mobile base station, where additional equipment was located in the Murphy's Creek exchange, and what Telstra colloquially calls a 'Thunderbird' (a truck, with a mobile antenna). The additional coverage has been provided since 20 January 2011

31. Telstra's experience with disasters has led to the development of innovative technology solutions, such as Cells on Wheels (**COWs)**, Satellite Cells on Wheels (**SatCOWs)** and Mobile Exchanges on Wheels (**MEOW)**. These solutions help restore services quickly to disaster impacted communities, and assist in the overall recovery effort.

32. A COW is a temporary mobile base station that provides temporary coverage if a mobile site is lost; alternatively it can provide a temporary expansion of mobile coverage.

Figure 4: A Cell On Wheels (COW) on the move to a new location. These portable cell sites can be rapidly deployed in an emergency event to provide supplementary mobile coverage to ESOs and the local community.

33. A SatCOW is ideal for locations where there is no terrestrial backhaul network or power is available – it provides Telstra Next GM network coverage. It is highly portable, being able to be transported in a standard 4WD or light aircraft or helicopter, and can be set up within 1.5 hours. In the aftermath of Cyclone Yasi a SatCOW was deployed to Palm Island, restoring communications in 24 hours.

34. A COW and a MEOW can operate using generators, batteries or mains power to enable the quick installation of temporary communication solutions, especially for those communities hardest hit by the disaster. A SatCOW has the benefit of being able to operate even if there is no transmission or power.

35. Preparation is the key to responding to an emergency situation. This year in the lead up to the 2010/11 summer season Telstra participated in a combined emergency services exercise with hundreds of emergency services workers and volunteers. This exercise involved members from a range of teams across Telstra, including fixed, mobile and managed radio services. The exercise was the largest test of Victoria's bushfire preparation and emergency management since the Black Saturday Bushfires and was designed to test communication and collaboration between all organisations that play a role during an emergency. This included the Metropolitan Fire Brigade, the Country Fire Authority, the Victorian State

Emergency Service, Victoria Police and the Department of Sustainability and Environment staff and volunteers. Involvement in such exercises is a key part of Telstra's seasonal preparation for bushfires as well as other emergencies such as floods and cyclones. Involvement strengthens Telstra's relationships with ESOs and allows critical communication plans and processes to be tested and refined, ahead of an actual emergency situation.

C. TELSTRA RESPONSE TO 2010/2011 DISASTER SITUATIONS

36. Telstra and its staff experienced many of the impacts due to the range of natural disasters experienced throughout Australia during the 2010/11 summer season: from the Queensland floods in December 2010 and January 2011, the floods in NSW, Victoria and Tasmania, devastating cyclones in Far North Queensland and across the top end to the bushfires in WA. These events had an inevitable impact on the performance of our networks and our ability to provide services to customers.

37. Following each event and as soon as it was safe to do so, Telstra staff were in the field restoring services, assisting customers and supporting communities. Our immediate focus was on ensuring our network infrastructure and services were preserved wherever possible and, when they were interrupted, ensuring that service was restored as quickly as possible. During the course of the natural disasters, numerous Telstra exchanges and mobile base stations were impacted and many customers were left without fixed and/or mobile services for a period of time, while our staff undertook significant efforts to restore services to those in need.

38. Telstra also assisted communities and the various levels of Government in the disaster relief effort. This assistance included the establishment of communications services in evacuation centres; providing phone cards and handsets; distributing satellite handsets and enabling payphones to provide free calls in affected areas. Telstra also established a dedicated call centre at no cost to the Queensland Government to support the Queensland Government flood relief effort. We also put in place assistance packages for our customers impacted by natural disasters.

39. The Australian Communications & Media Authority (ACMA) has publicly acknowledged Telstra's assistance in quickly responding to its request to relocate the Brisbane based National Relay Service (NRS) about to be evacuated due to anticipated flooding. This critical service is industry funded and managed by the Australian Communications Exchange company under contract to the ACMA. The NRS receives messages (made by teletypewriter) from people who are deaf or have profound speech or hearing impairments and who want to

contact ESOs. In these situations the NRS fulfils the same role as the triple zero service managed by Telstra.

40. Telstra was able to arrange for the NRS and its call centre staff to be moved to our Mt Gravatt exchange in less than 24 hours, including the physical relocation of telecommunications equipment and the redirection of all NRS call traffic to this temporary location. We are particularly proud of the efforts of our staff in ensuring this critical community service was able to be maintained without any interruption to public access arrangements.

41. During the Queensland floods Telstra provided:

    a) Over 100 payphones switched to free local and STD calls for people without telecommunications to connect to their family and friends in areas including Bundaberg, Chinchilla, Dalby, Emerald, Parkhurst, Wowan, St George, Tent Hill, Ma Ma Creek, Maryborough, Gympie, Mackay, Condamine, Theodore, Brisbane evacuation centres, Gatton and Ipswich;

    b) Communication services in evacuation centres including temporary internet kiosks with laptops;

    c) Free handsets with SIM cards for use by evacuees;

    d) Free phone cards;

    e) A Wireless Gateway for internet access;

    f) A modem for the Red Cross and the provision of chargers for people to recharge phone handsets;

    g) Satellite kits to emergency services organisations and some isolated communities;

    h) Loan handsets to many locations outside the designated Evacuation Centres; and

    i) An additional 200 pre-paid mobile handsets, 2000 $30 recharge cards and 1600 $10 PhoneAway cards to assist people in flood affected areas.

42. We have not concluded our final assessment of the costs of the events of the summer of 2010/2011. However, it is clear that the cost of these disasters to Telstra is in the many tens of millions of dollars.

D.POWER ISSUES

43. All telecommunications networks need power to operate. Power loss is a very significant issue confronted by Telstra in maintaining the operation of its networks during extreme weather events, including fires, flooding and cyclones.

44. Key elements of Telstra's networks rely on a continuous supply of power. These include exchanges and mobile base stations. If the power supply is disrupted, functionality may be lost to that equipment, and to the services supported by that equipment. In recognition of this dependency, these network elements are powered by batteries to ensure continuity of service during mains power interruptions. Mains power is used to constantly charge the batteries. In this way, the telecommunications equipment will continue to operate for a time (typically around 8 hours) after mains power is interrupted without any manual intervention until the batteries expire. Telstra has a regime of regularly checking and replacing these batteries to maintain the effectiveness of the services in the event of a disaster.

45. Generators can also be used to supply the power at exchanges if mains power is lost. Some exchanges have onsite generators that will automatically start if mains power is lost, and supply power for as long as the generator has fuel. Where a facility does not have an onsite generator, a mobile generator may be deployed at the site if required and if the site is accessible. Silcar, a Telstra Contractor, has at its disposal a range of generators ranging from smaller petrol generators to larger 50kva diesel mobile generators coupled with 4000 litre long range fuel tanks. These generators are available for use during power outages and Silcar is able to install them at sites nominated by Telstra at short notice, subject to access being available. If the fuel in a generator is depleted, battery power cannot be maintained. Under normal conditions, power is restored before battery power runs out. Where mains power is interrupted for a prolonged period and access is not able to be secured to the site, because it is unsafe (for example, where roads have been washed away), the battery power will eventually fail and the network element will cease operating.

46. If mains power to an exchange or mobile base station is lost, a network alarm will alert Silcar staff at Telstra's GOC. This ordinarily prompts Telstra to arrange a service person to visit the site to attend to the power loss or to recharge the batteries. In an ongoing flood situation, it is often not possible to immediately attend the site, and the site may eventually lose power and cease operating. Loss of functionality at an exchange will normally mean that services connected to that exchange will cease to operate.

47. If power is lost at the customer premises, or access point, service may be impacted depending on the type of phone used by the customer. A standard landline phone draws the power it needs from the wires that connect the phone to the network. Therefore, a loss of power at the customer access point will not ordinarily impact service. It is important to note that if a customer is using a telephone that requires its own source of electricity, such as a cordless phone, service will be impacted during a power outage. In this case, no calls can be made, including calls to emergency services.

E. IMPLICATIONS FOR FUTURE TECHNOLOGIES

48. Future communication technologies, such as the National Broadband Network (NBN), have the potential to influence how emergencies and natural disasters are managed. Much will depend on the network design which impacts the resilience of the network in the face of natural disasters.

49. While no network will be able to withstand the full force of intense and prolonged natural disasters, a critical consideration in network design is the location of cables. In Telstra's experience, underground cables are generally more resilient in the face of natural disasters. By way of example the severity of heat levels experienced in the Victorian Black Saturday bushfires was such that there was some (albeit limited) direct fire damage to optical fibre located within pits. While the vast majority of the network withstood the intensity of those fires, some 18 pits were impacted. Aerial cabling is also particularly vulnerable in cyclones and high winds. In flood situations, poles may be washed away, leading to aerial cabling across creeks and rivers being severed.

50. Telecommunications network architecture is normally designed to deliver traffic from individual premises to be collected and transported back up into higher levels of the network. The design rules used in developing such network architecture will determine the degree of resilience and survivability against fibre cuts, damaging weather events, and optical equipment failures. In all network implementations, final design decisions that determine the level of resilience need to be balanced against how the application of these rules will affect network performance and costs.

51. As telecommunications fixed access networks evolve from copper to fibre optics it is important to understand the impact on service availability during power outages. As stated above, all telecommunications networks need power to operate. Fibre optic networks are no exception and require power to be available at both the switch and the customer ends of the network to remain operative. This is different to the existing Telstra copper network design where a standard landline phone draws the power it needs from the wires that connect the phone to the network. Therefore, unless the customer is using a cordless phone, a loss of power at the customer access point will not ordinarily impact service. With the NBN, Telstra understands the Government's stated policy is that the NBN Co supplied Optical Network Termination (ONT) device will be supplied with a back up battery supply unit with a life of around 4 – 5 hours. We also understand customers will be responsible for maintaining the batteries on the ONT.

F. EDUCATING PEOPLE IN HIGH RISK COMMUNITIES

52. Following the Black Saturday bushfires, Telstra released its top 10 tips to prepare for summer emergencies. The tips were developed in response to customer enquiries about ways to optimise their telephone services in emergency situations such as bushfires, cyclones and floods. The tips are:

    a) ***Think about a Blue Tick mobile phone*** *– different mobile phones have different capabilities. Telstra's Blue Tick accreditation program identifies Next G™ handsets that offer superior handheld coverage performance in country areas.*

    b) ***Consider a standard fixed phone*** *- power failures will affect cordless PSTN phones and VoIP (Voice over Internet Protocol) services that require 240V power to operate. Customers using VoIP should check with their service providers.*

    c) ***Have a spare mobile battery*** *– it's advisable to have a spare, fully charged battery on stand-by.*

    d) ***Carry additional mobile phone chargers*** *– an in-car and a separate AC mains charger are essential in case of evacuation.*

    e) ***Upgrade your 2G SIM*** *– it's important that customers upgrade their 2G SIM card when purchasing a Telstra Next G™ mobile handset to receive the benefits of Telstra's extensive 3G network coverage.*

    f) ***Keep essential numbers close by*** *– have a list of essential contact numbers close at hand, including local Police, Fire, SES and Telstra's fault line - 132203.*

    g) ***Use Triple Zero (000) appropriately*** *– only call Triple Zero in life threatening emergencies. If your situation is not time critical but requires the attention of an emergency services organisation, you should call alternate emergency services' numbers.*

    h) ***Keep calls to a minimum*** *– although Telstra monitors the network closely in times of emergency to avoid congestion, it's advisable to keep calls to a minimum during natural disasters to allow people to call emergency service organisations.*

    i) ***Gauge the benefits of a satellite phone*** *– if living or travelling in isolated areas, consider purchasing a satellite phone for continuous phone coverage.*

    j) ***Consider a Yagi antenna*** *– having one of these antennas maximises mobile phone reception from your home or vehicle.*

53. Telstra's experience in responding to natural disasters over the years has shown that each summer it is important for members of the community to ensure their telecommunications are in good working order. This approach will assist in overcoming potential problems with contacting emergency services if they are affected by a natural disaster.

G. NEW AND EMERGING TECHNOLOGIES

54. This section sets out Telstra's views on three key emerging technologies – mobile broadband, cloud computing services and new social media - that offer improvements in the way that Australians can prepare for, respond to and recover from emergency or natural disaster situations. The focus of the section is on the benefits that these technologies bring to ESOs but many of them are also equally applicable to other non-ESO organisations and the wider public.

MOBILE BROADBAND

55. Modern mobile broadband networks are based on the existing 3rd Generation (3G) and the emerging 4th Generation (4G) LTE[1] cellular technologies. Such networks can deliver a combination of voice, video and internet applications to each connected device.

56. Mobile broadband networks provide significant new opportunities to enhance the communications within and between ESO organisations. These opportunities include new applications, greater security, increased availability, reduced costs, and increased interoperability – so that ESOs are better informed and able to respond more quickly and effectively in the event of an emergency or natural disaster.

Figure 5: Telstra's mobile broadband network is used by a wide range of ESOs throughout Australia

[1] LTE (Long Term Evolution) is the technology that Telstra and most mobile operators are planning to adopt for the delivery of 4G services.

H. NEW APPLICATIONS

57. The increased capacity and speed of modern mobile broadband networks means that visual information like photographic images, maps, video footage can now be transmitted in real time when responding to incidents. Such visual information allows ESOs to more quickly communicate and assess emergency situations enhancing the overall awareness of ESO personnel. The combination of Global Positioning System and mapping images also can also allow ESOs to track their officers, people and vehicles in near real-time to improve the safety of personnel and response times to emergency situations.

Figure 6: Video images can be sent across mobile broadband networks to improve the awareness of emergency situations for ESOs.

A LIST OF SOME OF THE KEY BENEFITS OFFERED BY NEWER TECHNOLOGIES IS SET OUT BELOW.

Enhanced Security

58. Modern mobile broadband networks are based on the use of IP (Internet Protocol) data and such data is easily encrypted (to whatever level of security is desired) at source. Further, virtual private networks can be created within a single mobile broadband network, allowing different users to share the same network infrastructure in a private manner.

59. Telstra has already implemented these capabilities into its current mobile broadband networks. Police today are able to access information ranging from criminal histories, finger prints for identity checks to real time video for overt or covert operations in the full knowledge that this information is fully secure over the mobile broadband network. Ambulance and fire officers are also assured that patient information and related material is secure including the privacy of an individual's information.

INCREASED AVAILABILITY

60. Emergency Services traffic within a virtual private network can be granted higher priority so that vital communications are not disrupted in situations where the network is at risk of being overloaded.

61. Telstra is already providing access priority for government voice communications over its 2G mobile voice network, (known as the Wireless Priority System2) , in collaboration with the Commonwealth Attorney-General's Department. This feature will be applied to Telstra's 3G mobile broadband network during 2012.

62. The availability of commercial mobile broadband networks can also be increased by building additional redundancy and back-up options into the infrastructure. Telstra's fleet of mobile Cells on Wheels (CoWs) is one example of a back-up option.

REDUCED COSTS

63. The enhanced security and availability features of mobile broadband networks means that ESOs no longer need dedicated infrastructure to ensure that communications are available in a disaster situation. Telstra considers that ESOs can now realistically share the same network infrastructure that is used by other commercial and non-commercial users.

64. Such sharing of infrastructure can lead to significant savings through the sharing of the capital and operating costs required to build and operate a network. These costs are in the order of billions of dollars for a mobile broadband network that covers the majority of Australia's population (please see further discussion on resources below).

GREATER INTEROPERABILITY

65. The use of shared mobile broadband infrastructure on a nationwide scale will facilitate interoperability between ESOs through the use of the common network standards and equipment. However, to take full advantage of this benefit, ESOs must still address other 'non-technical' aspects of interoperability like common operating procedures and information systems.

WHY A SEPARATE ESO NETWORK IS NOT REQUIRED

66. In recent times, there has been debate about whether a separate mobile network should be owned and operated by ESOs to assist in the provision of emergency services in times of

disaster. As explained below, Telstra believes that this approach is not the best way of achieving the desired outcome. Instead, it would be more economic and effective to incorporate the ESO requirements into existing commercial mobile networks. Telstra believes that the building of a new mobile network is unnecessary and would be unduly costly.

67. The key resources for building new mobile broadband infrastructure can be classified into the following categories:

    a) Finance
    b) Spectrum
    c) Labour

Finance

68. Mobile broadband networks are becoming increasingly expensive to build and operate, due to the large number of cell sites required to meet customer expectations for coverage and capacity and within a limited quantity of spectrum. Telstra's investment in its 3G High Speed Packet Access (HSPA) Next G® network is in the order of 2 billion dollars with an ongoing yearly capital investment in the order of hundreds of millions of dollars.

69. The cost of building a new 4G network from scratch (not one that is being upgraded) with such an expansive coverage footprint, high availability, fast upload and download data speeds, and the necessary infrastructure diversity, runs into many billions of dollars. Furthermore, to maintain and operate such a network requires significant annual operating expenses with site leases, repair and maintenance activities, and contracts with utilities.

70. Considering the size of these expenses, and noting that the number of existing commercial networks has already consolidated from 4 to 3 (through the merger of Hutchinson and Vodafone), it seems very unlikely that Australia could justify the business case for building a 4th standalone mobile broadband network for use by ESOs.

71. The sharing of 4G infrastructure provided by commercial providers is a significantly more cost effective solution, due to the sharing of costs and the ability to leverage from existing infrastructure. Commercial networks can be customised to provide different levels of prioritised access for voice and data in a more cost effective manner than that possible with a standalone network. They can also be delivered more quickly due to much of the network infrastructure already being in place. If necessary, commercial providers could supply interim 3G network solutions while longer term 4G solutions are being developed.

Spectrum

72. The spectrum for building public mobile broadband networks is a scarce and essential resource. So it is important that this spectrum is allocated in a way that maximises its value to Australia.

73. Where possible, the frequencies used for a particular application in Australia should be aligned with those allocated for similar uses in other countries. Such alignment is essential if Australia is to take advantage of reduced technology costs through global economies of scale. Alignment is also critical for facilitating international roaming and interoperability.

74. The global alignment (or harmonisation) of radio spectrum frequencies is coordinated by the International Telecommunications Union (ITU), an inter-government United Nations organisation. Regional coordination within the Asia-Pacific area (including Australia) is conducted by the Asia Pacific Telecommunity (APT) - another intergovernmental organisation of which Australia is a member.

75. The ITU, in conjunction with the APT, has planned a range of different frequency bands for international mobile telecommunications (IMT) networks, including those for 3G and 4G mobile broadband networks.

76. An important new frequency band that has been identified by the ITU for 4G networks is the digital dividend spectrum that will be freed up after analogue television is switched off. In the Asia-Pacific region the digital dividend spectrum spans the frequency range from 694 MHz to 806 MHz. This spectrum is important because of its good coverage characteristics which will allow commercial mobile broadband network operators to cost effectively roll out 4G services. Economic studies estimate that the value of such use to the Australian economy could be as high as $10 billion over a 20 year period.[2]

77. ESOs have previously stated that they require 20 MHz of the digital dividend spectrum to be reserved for the building of a stand-alone emergency services broadband network.

78. Telstra strongly opposes such a reservation for the following reasons:

79. Firstly, it would inhibit the ability of the commercial operators to deliver the full economic potential of the digital dividend spectrum, and the country would incur an economic loss that is estimated to be in excess of $1 billion. [3]

80. Secondly, due to the high costs involved, and in the absence of a Government business plan and commitment to fund the roll out of a standalone network, there is a high risk that the spectrum would remain largely unused. This would not represent the efficient use of a highly valuable national resource.

[2] *Getting the most of the Digital Dividend in Australia, Spectrum Value Partners, April 2009*
[3] *Ibid*

81. Thirdly, such a reservation would be unique to Australia and not harmonised with the frequencies that have been identified by the ITU for Public Protection and Disaster Relief (PPDR) use across the Asia-Pacific region. The ITU has identified other frequencies for PPDR use in the region, including those in the 806-824 MHz and 851-869 MHz ranges. Figure 2.3 below shows the arrangement of the various frequencies. If it is absolutely critical to build a stand-alone network, and Government is committed to funding such a network, then steps should be taken to reserve spectrum within these ranges. Telstra notes that spectrum in the range from 806 MHz to 820 MHz could easily be reserved for ESO use as it has already been identified for release as part of the Australian digital dividend spectrum and is unlikely to be sought by other users.

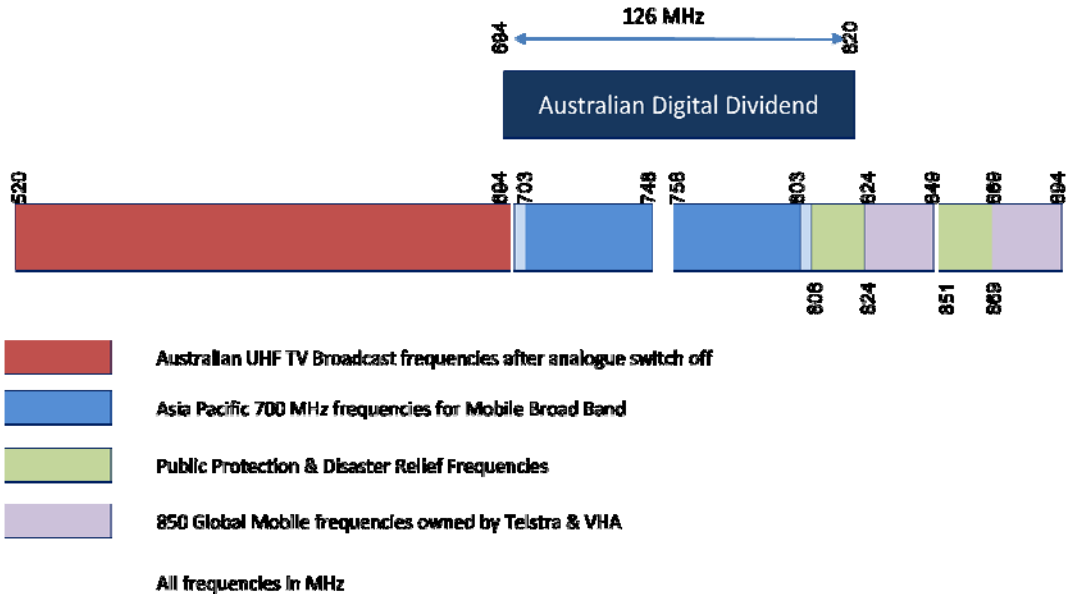

Figure 7: Australian spectrum allocations in the 520-894 MHz Range

Labour

82. Australia is likely to face a scarcity of specialist labour resources required to build and operate new telecommunications networks over the coming years. Resources will be severely stretched to meet the requirements of the three commercial mobile operators for the building of 4G networks, as well as the building of the NBN. Any plans to build a standalone ESO mobile broadband network would further stretch these resources and risk delaying all of the projects.

83. The building and operation of broadband networks is not a core business activity for ESOs - but it is for the mobile network operators. Telstra considers it would be more efficient and effective for ESOs to acquire their mobile broadband network requirements from the

commercial operators allowing ESOs to focus their attention and resources on the delivery of front line emergency services.

I. OTHER NEW TECHNOLOGIES

Telstra also believes that the introduction of new technologies creates greater opportunity for the provision of services to ESOs and the management of telecommunications services in emergency situations. Some of the new technologies that provide this opportunity are outlined below.

CLOUD COMPUTING

84. Cloud computing services provide on-demand access to a shared pool of configurable computing resources such as networks, servers, storage, applications, and services that can be rapidly provisioned and released with minimal administrative effort. Such services present a new opportunity for ESOs to reduce costs, increase operational efficiencies and improve collaboration.

85. Some of the key benefits of cloud computing services to organisations are as follows:

    a) they can quickly access the technology they need as requirements change over time;
    b) costs are reduced, due to the infrastructure being outsourced and shared across multiple users, and also because the centralised delivery of applications means that they are easier to develop and maintain;
    c) services can be accessed from anywhere and with any type of broadband device, including mobile ones; and
    d) the use of multiple redundant sites within the cloud can make cloud services highly reliable.

TELSTRA'S GOVERNMENT CLOUD SERVICE OFFERING

86. Telstra offers cloud computing services for Government that are delivered across Australia's most secure and far-reaching networks. Telstra has local data centres with data management that complies with Australian information management legislation and standards. Government data remains fully auditable under Australian law, making it easier to comply with governance and privacy legislation.

87. Telstra appreciates that data security is a critical issue for Government organisations, especially those involved in law enforcement. Telstra's Cloud services are protected with firewalls, intrusion protection, identity management, content security and content filtering. Telstra offers security options, from business-critical right up to T-4 certified government-grade private clouds for highly sensitive information. Telstra is one of only a few organisations whose infrastructure and security processes are certified to ISO27001 certification and the AS/NZS 31000:2009 Risk Management Standard.

SOCIAL MEDIA

88. New social media like Twitter and Facebook have a great propensity to disseminate information quickly and can be a powerful communication channel during a crisis. However, the sources of information are numerous and therefore both correct information and misconceptions, untruths and myths can abound. The position Telstra takes to emergency communications via social media is to:

    a) first communicate with those in need;
    b) correct any misinformation for the benefit of those in need;
    c) create a single source of information;
    d) be as transparent as possible in relation to timing, infrastructure and the nature of both the cause and the solution; and
    e) join in the spirit of the discussion and play our part in the broader community.

89. During the recent cycle of natural disasters, Telstra was extremely active on social media as part of a coordinated Emergency Communication effort. Telstra communicated up-to-the-minute information via media statements, advertising, internal staff messaging and also online via blogs, the Telstra.com website, Twitter and Facebook.

90. Telstra would encourage ESOs to embrace and use social media as part of a coordinated emergency communication program. The efficacy of efforts relies on internal communication channels being clear, for there to be a central coordinator of information and for the frontline staff that use Twitter and Facebook to be empowered to communicate quickly. In the case of the recent Queensland floods the organisations (including Telstra and the Queensland Police Service) who participated in the online conversation were able to use social media to quickly convey information to the affected communities with mobile or internet access in their time of need.

CONCLUSION

As outlined in this submission, Telstra suffered significant damage to its networks and infrastructure during the 2010/11 summer season as a result of the numerous natural disasters it encountered. However, Telstra and its staff worked around the clock to restore services wherever possible, to protect its infrastructure from further damage, and worked with the affected communities and ESOs to provide alternative communications, free services and advice and warnings to those in need. Telstra's efforts have been commended publicly by others, and were second-to-none. Telstra believes that this demonstrates the effectiveness of its existing emergency processes and the benefits of having close relationships with ESOs to promote the key role telecommunications services provide in these times. Telstra believes, however, that new technologies provide both opportunities and additional risks to emergency service operations in the future. These risks and opportunities need to be understood, communicated and managed, so that benefits to communities can be maximised.