

Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R.K. Puram, New Delhi – 110066.

No. 51/4/SP&PA-2009/ 529-538

Date: June 05, 2009

To

1.The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2.The Director (Projects), Power Grid Corp. of India Ltd. “Saudamini”, Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932
3.The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137	4.The Director (Transmission), Karnataka State Power Transmission Corp.Ltd., Cauvery Bhawan, Bangalore 560 009. FAX : 080 -22228367
5.The Member (Transmission), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, P.B. No. 1028, Thiruvananthapuram - 695 004. FAX : 0471-2444738	6. Member (Distribution), Tamil Nadu electricity Board (TNEB), 6 th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28516362
7.The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli , Tamil Nadu – 607 801. FAX : 04142-252650	8.The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. FAX : 0413-2334277/2331556
9. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7, Scope Complex, Lodhi Road, New Delhi-110003. FAX-011-24360912	10. Director (Operations), NPCIL, 12 th Floor, Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai – 400 094. FAX : 022- 25991258

Sub: 28th meeting of the Standing Committee on Power System Planning of Southern Region
- Agenda Note and notice for the meeting.

Sir,

The 28th meeting of the Standing Committee on Power System Planning of Southern Region would be held on **15th June 2009 (Monday)** at 10:00 AM at Orange County, Karadigodu Post, Siddapur, Coorg, Karnataka.

Agenda note for the meeting is available at CEA's website, **www.cea.nic.in**.

Please make it convenient to attend the meeting.

Yours faithfully,

(Ravinder)
Chief Engineer (SP&PA)
(Telephone/FAX No. 011 26102045)

Contact Person and Meeting Venue Details

28th Meeting of Standing Committee on Power System Planning in Southern Region (SCPSPSR)

Meeting Time: 10:00 AM. Date: June 15, 2009 (Monday)

The meeting arrangements are being made by POWERGRID.

Venue:

Orange County, Karadigodu Post, Siddapur, Coorg - 571253, Karnataka

Contact Person:

Mr. A. Naga Raju, CM(Comml),
SRTS-II, POWERGRID, 32, Race Course Road, Bangalore

Telefax: 080-22206201

Mobile Phone: 9449599005

Email: anagaraju123@rediffmail.com

Please Note:

- ⇒ Powergrid has informed that accommodation at the venue has been arranged for 14th A/N to 16th Noon
- ⇒ The participants have to come to Mysore(Railhead) and from there proceed by road to the venue.
- ⇒ Transport would be tied up from Mysore by POWERGRID

**Agenda Note for 28th Meeting of
Standing Committee on Power System Planning in Southern Region (SCPSPSR)**

Time: 10:00 AM. Date: June 15, 2009 (Monday)

Venue: Orange County, Karadigodu Post, Siddapur, Coorg, Karnataka

1.0 Confirmation of the minutes of 27th meeting of the Standing Committee

- 1.1 Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region, held on 03rd March 2009 at Bangalore, were issued vide CEA's letter number 51/4/SP&PA-2009/ 246-255 dated March 17, 2009.
- 1.2 Director(Transmission), KPTCL, vide his letter no KPTCL/CEE(P&C)/KCO-97/9055/2008-09 dated March 20, 2009, has given observation regarding the issues of the Gooty-Yelahanka 400kV line and transmission system for Yeramas/Edlapur projects.(refer para 8.1 and 8.3 of the minutes)
- 1.3 Based on the observation of KPTCL, a corrigendum to the minutes was issued vide CEA letter number 51/4/SP&PA-2009/ 285-294 dated April 02, 2009(enclosed at Appendix-I)
- 1.4 The Minutes as circulated and amended as per above corrigendum may be confirmed.

2.0 Status of Under Construction / Approved Schemes:

- 2.1 POWERGRID may inform the progress of the transmission works that are being implemented by them as part of regional schemes.
- 2.2 State utilities may also inform the progress on their transmission works that are necessary to match with the regional schemes by POWERGRID for effective utilization of the system.

3.0 Transmission System for Evacuation of Power from Yeramaras(2x800 MW)& Edlapur (1x800 MW) Generation projects of KPCL near Raichur in Karnataka:

- 3.1 Further to the discussions in the 27th meeting of the Standing Committee on Power System Planning of Southern Region, system studies were carried out in CEA during 30th March - 2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL for the following transmission systems: **(A copy of the Study Report is given at Annex-II.)**
 - ❖ Evacuation of Yeramaras(2x800 MW)& Edlapur (1x800 MW) of KPCL near Raichur TPS.
 - ❖ Establishing connectivity to proposed 400 kV Yelahanka sub station Additional ISTS In-feed for Bangalore.
 - ❖ Strengthening/Restructuring of Bangalore 400 kV ring arrangement.

These studies were carried out for the time frame of 2014-15. PGCIL informed that they have received new proposals from prospective power producers in Southern Region, mainly in Tamil Nadu and Andhra Pradesh, seeking Long Term Open Access(LTOA) for evacuation and transmission of their power within Southern Region and for export outside the Region. The transmission system for these new generation projects would depend upon the actual commitment by the developers for BPTA, actual progress of the generation project and identification of beneficiaries for the project. During the course of these joint studies and broad transmission corridors were identified for the purpose of LTOA for these projects. These corridors were taken into account while evolving above mentioned transmission systems. The new proposals of IPP generations coming in the Tamilnadu /Andhra Pradesh coastal area generations and their ensuing transmission systems, therefore, were not specifically represented in the present studies. However, outcome of these studies would be dovetailed in the studies being carried out specifically for evolving the transmission system for providing LTOA to these generation projects, which would also be taken up under LTOA Agenda items at the end of this meeting.

3.2 The Edlapur (1x800MW) and Yeramaras (2x800MW) projects of KPCL would be commissioned during 2013-15 time period. The Edlapur (1x800MW) project was being located adjacent to the existing Raichur TPS (RTPS) and the Yeramaras (2x800MW) project about 6 km from the existing RTPS project. Considering the PGCIL's observation during the 27th meeting of SCPSP, studies were revised simulating exact connectivity for RTPS, Raichur (new) 765/400kV and Gooty substation. Results of the studies are given at Exhibit-I(a) (base case) and Exhibit-I(b) through Exhibit-I(e) (outage cases) of the 'Study Report.

3.3 Based on the studies following transmission system was arrived as a transmission system for evacuation of the proposed Yeramaras and Edlapur generation.

- (i) Edlapur(1x800MW), being located adjacent to the RTPS project, will be connected to RTPS switchyard through extended bus arrangement.
- (ii) Yeramaras (2x800MW) – Raichur(New)765/400kV (PGCIL) Sub-station, 400kV Quad D/C line.
- (iii) Basavana Bagewadi 400/220kV 2x315 MVA S/S
- (iv) Yeramaras - Basavana Bagewadi 400 kV Quad D/C line
- (v) Basavana Bagewadi – Narendra 400 kV Twin D/C line

3.4 The above system would be implemented by KPTCL as transmission scheme for evacuation of power from Yeramaras(2x800MW & Edlapur (1x500 MW) generation projects in the time-frame matching with the commissioning schedule of these projects.

3.5 Members may discuss and agree.

4.0 Establishing connectivity to Yelahanka 2X500 MVA, 400/220 kV S/S and Additional ISTS In-feed for Bangalore

4.1 During the 27th meeting of the SCPSP Southern Region, following connectivity for Yelahanka 400/220kV S/S of PGCIL, have been agreed.

- (i) LILO of Nelamangala - Hoody 400kV S/C line at Yelahanka 400/220kV S/S
- (ii) LILO of Somanahalli – Hoody 400 kV S/C line at Yelahanka 400/220kV S/S.

The Yelahanka - Hiriya 400kV D/C is already being taken up by KPTCL as a part of Bellary TPS evacuation system. Regarding the Gooty – Yelahanka 400 kV D/C link and additional in-feed for Bangalore, studies were carried out considering two network configurations. Alternative-I is based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR and Alternative-II based on optimization of configuration considering possible transmission system for providing LTOA to new projects in Tamil Nadu.

4.2 **Alternative-I :**

Based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR. The load flow study results are given at Exhibit-II(a) of ‘Study Report’.

- (i) Gooty-Yelahanka 400kV D/C line – **to be implemented by PGCIL**
- (ii) Hosur – Electronic City 400kV D/C line – **to be implemented by PGCIL**
- (iii) Hiriya - Yelahanka 400kV D/C line – **to be implemented by KPTCL**
- (iv) Jindal TPS – Gooty 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.**(Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-II(b))

4.3 **Alternative-II :**

As, discussed above, during interaction with PGCIL for planning transmission system for evacuation of IPP generation projects coming up in Tamil Nadu and Andhra Pradesh area, it was brought out that a new 765/400kV S/S north of Bangalore and south of Hiriya would be required during 2014-15. Considering this opportunity, the Gooty – Bangalore 400kV link could be planned via new Hiriya, as it would be economical, provide better reliability and fits into future system development plans. The load flow study results are given at Exhibit-III(a) through Exhibit-III(e) of the ‘Study Report’.

- (i) Gooty-Bangalore(New) (proposed new 765/400kV S/S by PGCIL) – **to be implemented by PGCIL.**
- (ii) Hosur – Electronic City 400kV D/C line – to be implemented by PGCIL
- (ii) Bangalore(New) - Yelahanka 400kV D/C Quad line – **to be implemented by KPTCL**
- (iii) Jindal TPS – Gooty 400kV D/C line instead of Jindal TPS-Munirabad 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.** (Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-III(b))

4.4 The Hosur – Electronic City 400kV D/C line could be built using Right of Way of the existing Peenya-Singarapet 220kV line(presently Yerandahally-Hosur line). This RoW could be used by building multi-circuit towers and/or dismantling part of the line depending upon practicability.

4.5 The Alternative-II is recommended and may be agreed by the Members of the Standing Committee. The decision regarding connecting Jindal TPS to either Gooty or Munirabad can be taken up during the LTOA agenda discussions later in this meeting

5.0 **Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement:**

5.1 KPTCL has proposed rearrangement of the 400kV ring around Bangalore to achieve Nelamangala – Yelahanka DC line, Yelahanka – Hoody - Kolar D/C line, Kolar - Electronic City - Somanahalli S/C line and Somanahalli – Bidadi - Nelamangala D/C line.

5.2 Load flow results are given at Exhibit-IV of the ‘Study Report’. Members may discuss and agree.

6.0 Transmission System associated with Simhadri-II TPS

6.1 For evacuation of power from the Simhadri-II TPS of NTPC, Simhadri-II – Gazuwaka 400 kV D/C line was inter-alia agreed in the 25th meeting of Standing Committee. POWERGRID has informed that due to growth of residential area in the vicinity, right of way problem and various existing 220 kV and 400 kV existing lines in position, termination of proposed Simhadri-II – Gazuwaka 400 kV D/C line at Gazuwaka was extremely difficult. Also, two numbers of adjacent bays for termination of both circuits were not available at Gazuwaka substation hence these have to be terminated at two opposite ends of the switchyard requiring single circuit line approach from two different sides.

6.2 To overcome this difficulty, any of the following existing lines can be LILOed at the Simhadri-II TPS switchyard by drawing 2x400 kV D/C lines on multi-circuit towers.

- Kalpakka(APTRANSCO) – Gazuwaka(POWERGRID) 400 kV D/C line, or
- Kalpakka – Khammam 400kV D/C line, or
- Gazuwaka – Vemagiri 400kV D/C line

This would require 2 numbers of additional 400kV bays at the Simhadri-II switchyard of NTPC, though; the total number of 400 kV bays would remain same as originally proposed.

6.3 Members may discuss and decide accordingly.

7.0 Transmission System Associated with Cheyyur UMPP in Tamil Nadu 4000 MW

7.1 Cheyyur UMPP (TNUMPP) at Cheyyur Taluk, Kanchipuram District, Tamil Nadu is being taken up by Coastal Tamil Nadu Power Ltd, an SPV company of PFC. They have applied to POWERGRID seeking Long Term Open Access for evacuation and transmission of power from the project to its beneficiaries. Following is the allocation of power from this UMPP:

Southern Region (2900 MW):

Tamil Nadu	-	1600 MW
Karnataka	-	800 MW
Andhra Pradesh	-	400 MW
Kerala	-	300 MW

Western Region (400 MW):

Maharashtra	-	400 MW
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Northern Region (500 MW):

Utter Pradesh	-	300 MW
Punjab	-	200 MW

7.2 The project is expected to be commissioned during 2015-17. Transmission system for this project is presently proposed to be implemented by private developer selected through tariff based competitive bidding process.

7.3 POWERGRID has carried out the studies for evolving transmission system for evacuation of power from this project and are included as part of the LTOA agenda circulated by them. The studies were reviewed by CEA and accordingly, following transmission system is proposed for the Cheyyur UMPP:

1. Stepping up of power at TNUMPP to 765kV
2. TNUMPP – Tiruvalam 765kV 2xS/C or D/C line
3. LILO of Cuddalore Pooling Point – Tiruvalam 765kV S/C line at TNUMPP
4. Tiruvalam – Kurnool 765kV S/C line
5. Kurnool – Raichur 765kV 2xS/C or D/C line
6. Cuddalore – Salem 765kV S/C line

7.4 The transmission charges for the above transmission system would be borne by the beneficiaries of the UMPP as per CERC regulations. Members may discuss and agree for the transmission finalised accordingly.

8.0 Issues pertaining to Tamil Nadu Electricity Board:

8.1.0 During the 27th meeting of this Committee, the issue of setting up a 765/400/220kV sub-station by TNEB/POWERGRID came up for discussion while discussing the transmission system for Vallur TPS and NCTPS-II projects. Refer para 5(iv)(d) of the minutes:

Para 5(iv)(d):

“Regarding new 400/220kV S/S at Tiruvalam the final decision could not be taken. TNEB stated that they had extra land at their 220kV Tiruvalam S/S for building their own 400kV S/S. CEA observed that CEA was examining the feasibility of establishment of 765kV S/S at Tiruvalam as part of ATS for TNUMPP and the proposed 400/220 kV S/S could be implemented as part of 765/400/230kV S/S in order to economise the overall cost. **TNEB would study and revert.**”

8.1.1 TNEB vide their letter dated 22-04-2009 have informed following conclusion:

“Since conception of 765kV S/S will take longer time, TNEB could initially establish the 400/230kV S/S to match with the commissioning schedule of the NCTPS-II and Vallur JV projects. Later, the 765kV side could be executed by PGCIL in the same premises in such a way that 400/230kV S/S owned by TNEB will be part of the 765kV S/S. In this connection, as discussed in the standing committee meeting, TNEB has initiated the process of identifying the land at Tiruvalam suitable for establishment of 765/400/230kV S/S”

8.1.2 TNEB may inform about current status of land procurement/identification. Members may discuss and finalise the configuration/ownership of 765/400/230kV S/S(s) at Tiruvalam.

8.2.0 During the 27th meeting of this Committee, following proposals of TNEB, to be executed by them, were taken up for discussion:

- Establishment of 400/230kV S/S at Singarapet with 2x315 MVA ICT.
- Hosur – Singarapet 400kV DC line with twin moose conductor.
- LILO of both the circuits of Pugalur – Ottiampakkam (Sholinganallur) 400kV DC Quad line at Singarapet 400kV S/S with Quad Conductor.

8.2.1 Considering the requirement of transmission system for export of power outside Tamil Nadu, the Hosur-Singarapet 400kV D/C line was not agreed upon. Refer para 7.2(iii) & (iv) of the minutes:

Para 7.2:

- (iii) During the discussions in the 25th meeting, POWERGRID stated that with commissioning of new generation projects TNEB would be surplus in power and would be utilizing ISTS to transfer the surplus to other constituents within and across the Southern region, therefore, TNEB should seek long term open access for utilization of ISTS for new generation projects planned for development under State sector.
- (iv) CEA advised TNEB, that before agreeing to Hosur-Singarapet 400 kV DC line, they should estimate the quantity of surplus power (in consultation with the wind generators) to be injected into the SR grid. Accordingly, they should approach POWERGRID for long-term Open access from Tamil Nadu to SR so that ISTS could be planned for the same. TNEB agreed for the same and the proposal of 400 kV Hosur-Singarapet D/C line would be considered in the next meeting.

8.2.2 TNEB vide their letter dated 22-04-2009 have informed that:

- a) TNEB would execute the above mentioned schemes on its own.
- b) TNEB is in the process of assessing the net quantum of power to be injected into SR grid taking into account of all the proposed power projects in Tamilnadu, allocation of power to Tamilnadu from the up coming projects in other states of SR, proposed capacity addition of wind power and anticipated load growth. TNEB will apply for LTOA with PGCIL on assessment of the above.

8.2.3 Members may discuss.

9.0 LTOA Applications Made to CTU for Projects in Southern Region:

POWERGRID may take up the agenda points related to the transmission system requirements for evacuation of power from generation projects.

Appendix-I

**Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R K Puram, New Delhi – 110066**

No. 51/4/SP&PA-2009/ 285-294

Date: April 02, 2009

To

1.The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2.The Director (Projects), Power Grid Corp. of India Ltd. “Saudamini”, Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932
3.The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137	4.The Director (Transmission), Karnataka State Power Transmission Corp.Ltd., Cauvery Bhawan, Bangalore 560 009. FAX : 080 -22228367
5.The Member (Transmission), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, P.B. No. 1028, Thiruvananthapuram - 695 004. FAX : 0471-2444738	6. Member (Distribution), Tamil Nadu electricity Board (TNEB), 6 th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28516362
7.The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli , Tamil Nadu – 607 801. FAX : 04142-252650	8.The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. FAX : 0413-2334277/2331556
9. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7, Scope Complex, Lodhi Road, New Delhi-110003. FAX-011-24360912	10. Director (Operations), NPCIL, 12 th Floor, Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai – 400 094. FAX : 022- 25991258

Sub: 27th meeting of the Standing Committee on Power System Planning of Southern Region
- Minutes of the meeting – **Issuing of Corrigendum**

Sir,

Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region were issued vide our letter of even number dated 17-03-2009. KPTCL has given their observation regarding the Gooty-Yelahanka 400kV line and transmission system for Yeramas/Edlapur projects. Based on the observation of KPTCL, a corrigendum of the minutes of 27th meeting is enclosed at Annex-I.

Yours faithfully,

Encl: Corrigendum to 27th Minutes

(Pardeep Jindal)
Deputy Director (SP&PA)
(Telephone No. 011 26732325)

Standing Committee on Power System Planning of Southern Region (SCPSP SR)

Corrigendum to Minutes of the 27th Meeting of the Standing Committee on Power System Planning of Southern Region held on March 03, 2009 at Bangalore

Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region were issued vide our letter of even number dated March 17, 2009. Director(Transmission), KPTCL, vide letter no KPTCL/CEE(P&C)/KCO-97/9055/2008-09 dated March 20, 2009, has given observation regarding the issues of the Gooty-Yelahanka 400kV line and transmission system for Yeramas/Edlapur projects..

Based on the observation of KPTCL, following changes are made in the Minutes of 27th meeting of the Standing Committee on Power System Planning of Southern Region:

(1) Para 8.1:

Following new Para 8.1.1 is inserted under Para 8.1:

8.1.1 Regarding the Gooty-Yelahanka 400kV D/C line for giving connectivity for PGCIL's Yelahanka 400kV S/S, KPTCL stated that concentrating more power at Gooty could result in heavy disruption of Bangalore load under the event of a bus-fault at Gooty 400kV S/S. SRLDC also apprehended that a bus fault at Gooty could make grid vulnerable to grid failure. Member(PS), CEA stated that, Planning Criteria envisages a SLG fault cleared and line restored from security angle. Further bus-fault occurring in a breaker-and-half arrangement can only happen in the event of implementing the protection system. Provisions to avoid a bus-fault are to be designed through appropriate protection scheme and operational practices. PGCIL also stated that as per the Planning Criteria bus-fault need not be considered for transmission planning. After further discussions it was decided that revised studies would be jointly conducted by CEA, PGCIL and KPTCL at a mutually convenient date in CEA and thereafter the proposal would be taken up in the next Standing Committee meeting.”

(2) Para 8.3:

Para 8.3 is replaced as given below:

“The proposal of KPTCL for evacuation of power from Yeramas /Edlapur (2x800 + 1x800 MW) and augmentation of power injection to Bangalore main.

The agenda items were discussed and PGCIL representative expressed the concern about de-linking of RTPS-Gooty line for connecting Yeramas with Gooty in view of 400kV connectivity for 765kV Raichur (PGCIL) S/S. Considering PGCIL's opinion and KPTCL's concerns about providing additional connectivity from Gooty as given in Para 8.1.1 above, it was decided that revised studies would be conducted joint by CEA, PGCIL and KPTCL at mutual convenient date in CEA and thereafter the proposal would be taken up in the next Standing Committee meeting.”

**Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R K Puram, New Delhi – 110066**

No. 51/4/SP&PA-2009/ 389-390

Date: April 23, 2009

To

- 1. Director (Transmission)**
Karnataka Power Transmission Corporation Limited,
Kaveri Bhavan,
Bangalore-560009.
- 2. General Manager(Engg-SEF),**
Powergrid Corporation of India Ltd.,
“Saudamini”, Plot No. 2, Sector-29,
Gurgaon – 122001, Haryana.

Subject: Transmission System for additional interconnection to proposed 400 kV sub-station at Yelahanka, evacuation of Power from Generation Projects in Karnataka and Ring Mains around Bangalore.

Sir,

Further to the discussions in the 27th meeting of the Standing Committee on Power System Planning of Southern Region, held on 3rd march 2009. System studies were carried out in CEA during 30th March-2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL, for evolving transmission system for the following items:

1. Transmission System for Evacuation of Power from Yeramara(2x800 MW) and Edlapur (1x800 MW) of KPCL near Raichur TPS.
2. Establishing connectivity to proposed 400 kV Yelahanka sub station. Additional connectivity to 400 kV SS at Electronic City in Bangalore
3. Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement

Yours faithfully,

(Pardeep Jindal)
Director (SP&PA)
(Tel. No. 011 26732325)

REPORT ON STUDIES CARRIED OUT IN CEA FOR STRENGTHENING/ EVOLVING TRANSMISSION SYSTEM REQUIREMENTS IN KARNATAKA

1.0 Scope of Studies:

Further to the discussions in the 27th meeting of the Standing Committee on Power System Planning of Southern Region, system studies were carried out in CEA during 30th March - 2nd April 2009 with participation of officers from CEA, PGCIL and KPTCL for the following transmission systems:

- ❖ Evacuation of Yeramaras(2x800 MW)& Edlapur (1x800 MW) of KPCL near Raichur TPS.
- ❖ Establishing connectivity to proposed 400 kV Yelahanka sub station Additional ISTS In-feed for Bangalore.
- ❖ Strengthening/Restructuring of Bangalore 400 kV ring arrangement.

2.0 Basis for Studies:

The studies were carried out for the time frame of 2014-15. PGCIL informed that they have received new proposals from prospective power producers in Southern Region, mainly in Tamil Nadu and Andhra Pradesh, seeking Long Term Open Access(LTOA) for evacuation and transmission of their power within Southern Region and for export outside the Region. The transmission system for these new generation projects would depend upon the actual commitment by the developers for BPTA, actual progress of the generation project and identification of beneficiaries for the project. A suitable transmission system for these projects is still under planning stage, which was discussed during the course of these joint studies and broad transmission corridors were identified for the purpose of LTOA for these projects. These corridors were taken into account while evolving transmission systems mentioned under 'Scope' above of this report. The new proposals of IPP generations coming in the Tamilnadu /Andhra Pradesh coastal area generations and their ensuing transmission systems, therefore, were not specifically represented in the present studies. However, outcome of the present studies would be dovetailed in the studies being carried out specifically for evolving the transmission system for providing LTOA to these generation projects.

3.0 Transmission System for Evacuation of Power from Yeramaras(2x800 MW)& Edlapur (1x800 MW) Generation projects of KPCL near Raichur in Karnataka:

- 3.1 Considering the PGCIL's observation during the 27th meeting of SCPS, studies were revised simulating exact connectivity for RTPS, Raichur (new) 765/400kV and Gooty substation.
- 3.2 KPTCL informed that these units would be commissioned during 2013-15 time period. Accordingly, studies were carried out for 2014-15 conditions. They also informed that the Edlapur (1x800MW) project was being located adjacent to the existing Raichur TPS (RTPS) and the Yeramaras (2x800MW) project about 6 km from the existing RTPS project.

3.3 Based on the studies following transmission system was arrived as a transmission system for evacuation of the proposed Yeramaras and Edlapur generation.

- (i) Edlapur(1x800MW), being located adjacent to the RTPS project, will be connected to RTPS switchyard through extended bus arrangement.
- (ii) Yeramaras (2x800MW) – Raichur(New)765/400kV (PGCIL) Sub-station, 400kV Quad D/C line.
- (iii) Basavana Bagewadi 400/220kV 2x315 MVA S/S
- (iv) Yeramaras - Basavana Bagewadi 400 kV Quad D/C line
- (v) Basavana Bagewadi – Narendra 400 kV Twin D/C line

3.4 The above system would be implemented by KPTCL as transmission scheme for evacuation of power from Yeramaras(2x800MW & Edlapur (1x500 MW) generation projects in the time-frame matching with the commissioning schedule of these projects.

3.5 Results of the studies are given at Exhibit-I(a) (base case) and Exhibit-I(b) through Exhibit-I(e) (outage cases). Over loading is observed under outage of Raichur-Sholapur 765kV S/C line, which need to be addressed while planning additional inter-regional transmission capacity under LTOA projects.

4.0 Establishing connectivity to Yelahanka 2X500 MVA, 400/220 kV S/S and Additional ISTS In-feed for Bangalore

4.1 During the 27th meeting of the SCPSP Southern Region, following connectivity for Yelahanka 400/220kV S/S of PGCIL, have been agreed.

- (i) LILO of Nelamangala - Hoody 400kV S/C line at Yelahanka 400/220kV S/S
- (ii) LILO of Somanahalli – Hoody 400 kV S/C line at Yelahanka 400/220kV S/S.

4.2 The Yelahanka - Hiriyur 400kV D/C is already being taken up by KPTCL as a part of Bellary TPS evacuation system.

4.3 For the 220kV interconnections of Yelahanka with KPTCL grid, a 220kV Double LILO of Nelamangala – DB Pura line, LILO of Nelamangala – Hoody line and Peenya- Hebbal 220kV S/C line and a 220kV D/C line to proposed DG Plant was considered.

4.4 Regarding the Gooty – Yelahanka 400 kV D/C link and additional in-feed for Bangalore, studies were carried out considering two network configurations. Alternative-I is based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR and Alternative-II based on optimization of configuration considering possible transmission system for providing LTOA to new projects in Tamil Nadu

4.5 Alternative-I :

Based on the system earlier planned/proposed in the 27th meeting of the SCPSP SR. The load flow study results are given at Exhibit-II(a).

- (i) Gooty-Yelahanka 400kV D/C line – **to be implemented by PGCIL**
- (ii) Hosur – Electronic City 400kV D/C line – **to be implemented by PGCIL**
- (iii) Hiriyur - Yelahanka 400kV D/C line – **to be implemented by KPTCL**

- (iv) Jindal TPS – Gooty 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.**(Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-II(b))

4.6 **Alternative-II :**

As, discussed above, during interaction with PGCIL for planning transmission system for evacuation of IPP generation projects coming up in Tamil Nadu and Andhra Pradesh area, it was brought out that a new 765/400kV S/S near Hiriyur would be required during 2014-15. Considering this opportunity the Gooty – Bangalore 400kV link could be planned via new Hiriyur, as it would be economical, provide better reliability and fits into future system development plans. **Accordingly, following network configuration was studied and is recommended in this report.** The load flow study results are given at Exhibit-III(a).

- (i) Gooty-Hiriyur(New) (proposed new 765/400kV S/S by PGCIL) – **to be implemented by PGCIL.**
- (ii) Hosur – Electronic City 400kV D/C line – to be implemented by PGCIL
- (ii) Hiriyur(New) - Yelahanka 400kV D/C Quad line – **to be implemented by KPTCL**
- (iii) Jindal TPS – Gooty 400kV D/C line instead of Jindal TPS-Munirabad 400kV D/C line – **to be implemented by the IPP as Dedicated Transmission line.** (Jindal TPS – Munirabad 400kV D/C option was also studied and results are given at Exhibit-III(b))

4.7 Results of the outage case studies are given at Exhibit-III(c) through Exhibit-III(e).

4.8 The Hosur – Electronic City 400kV D/C line could be built using Right of Way of the existing Peenya-Singarapet 220kV line(presently Yerandahally-Hosur line). This RoW could be used by building multi-circuit towers and/or dismantling part of the line depending upon practicability.

5.0 **Strengthening/Restructuring of Bangalore 400 kV Ring Arrangement:**

5.1 KPTCL has proposed rearrangement of the 400kV ring around Bangalore to achieve Nelamangala – Yelahanka DC line, Yelahanka – Hoody - Kolar D/C line, Kolar - Electronic City - Somanahalli S/C line and Somanahalli – Bidadi - Nelamangala D/C line.

5.2 Load flow results are given at Exhibit-IV.

6.0 **Conclusion:**

The above proposals may be taken up for discussion during next meeting of the Standing Committee on Power System Planning of Southern Region. PGCIL would consider the transmission system identified and recommended above while planning the transmission system for the new generation projects seeking LTOA.

EXHIBIT I(a)
CASE: ALT I(a)

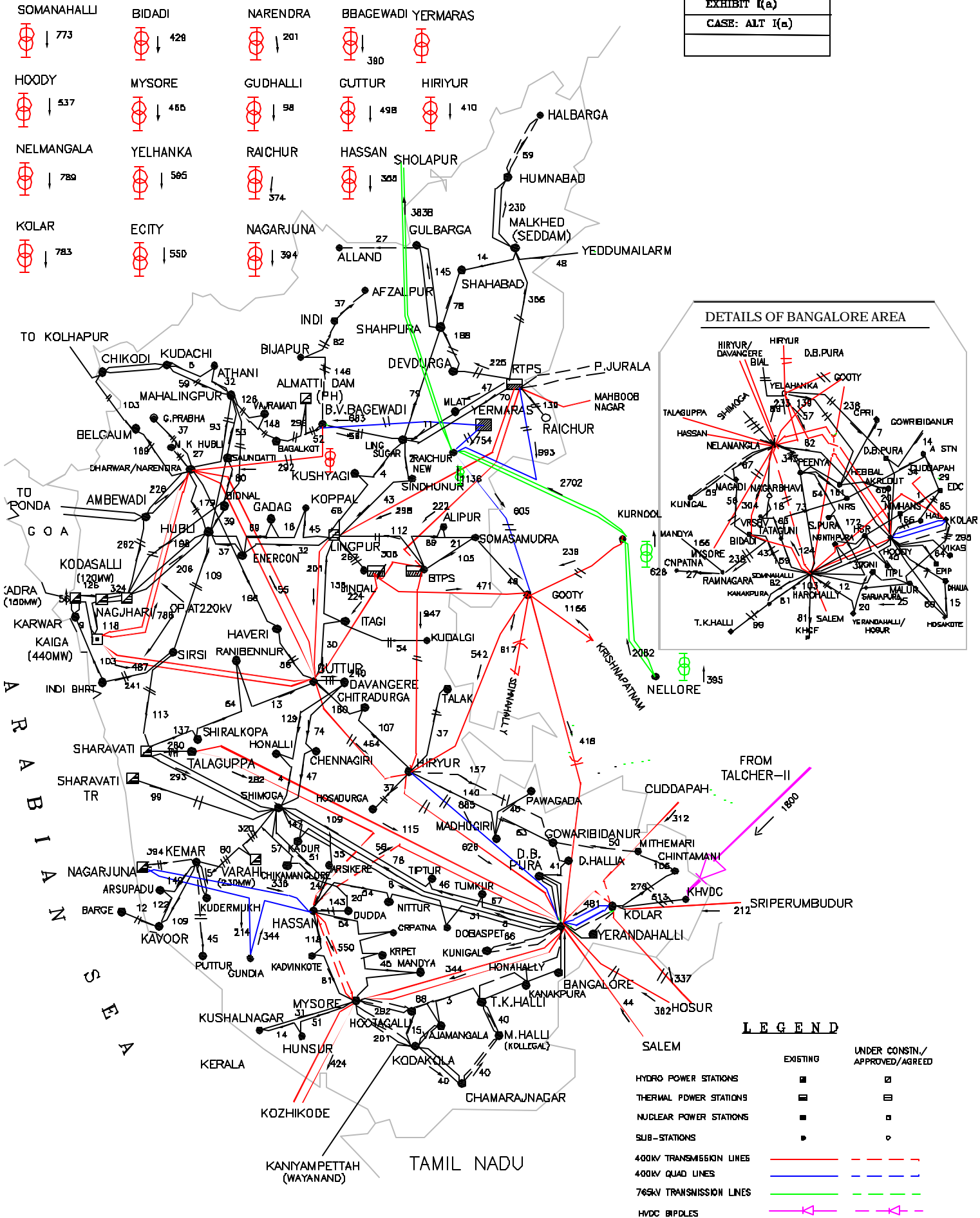


EXHIBIT I(b)
CASE: AIT I
OUTAGE OF YERAMRAS-
B.BAGEWADI S/C

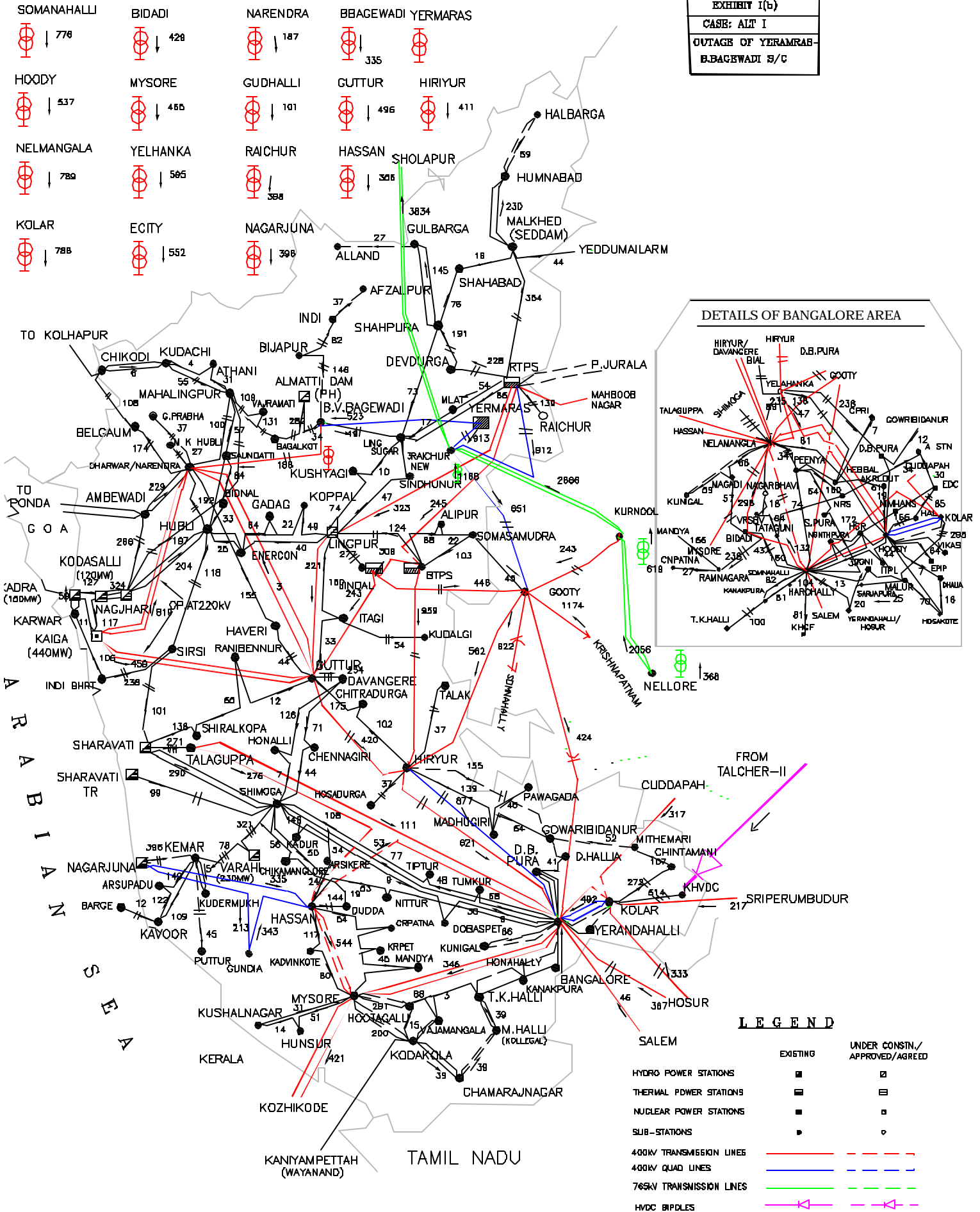


EXHIBIT I(e)
CASE: AIT I
OUTAGE OF RAICHUR-
RAICHUR NEW B/C

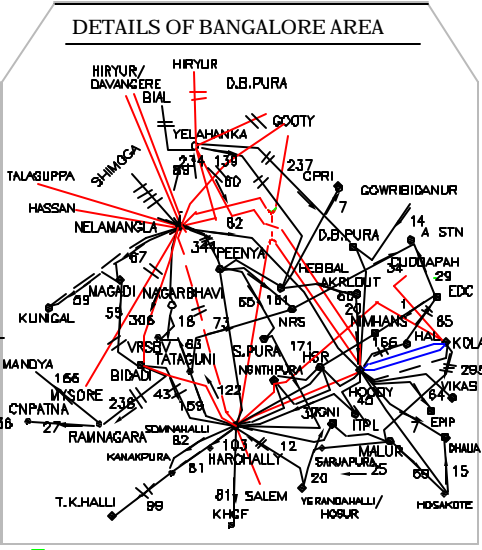
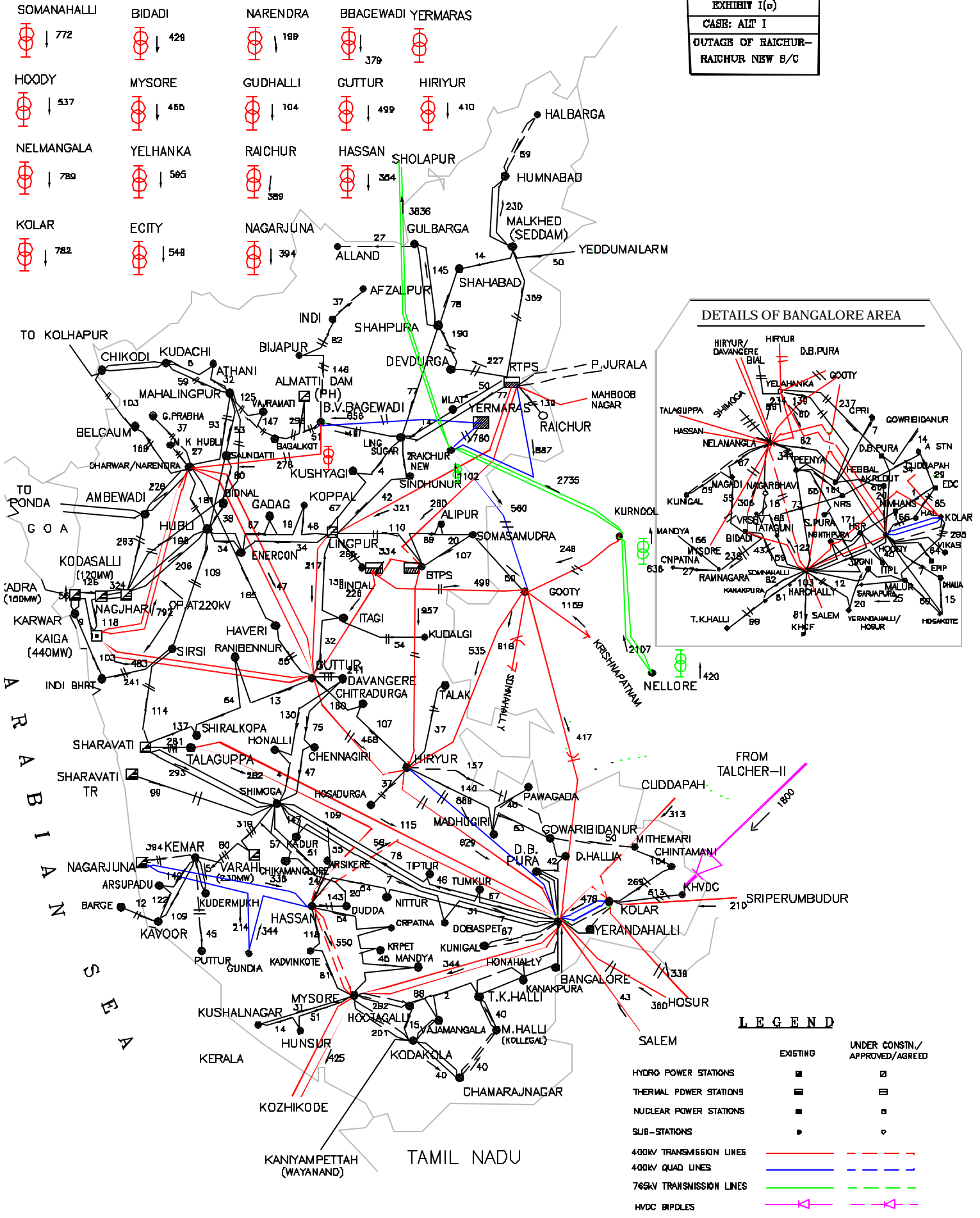


EXHIBIT I(d)
CASE: AIT I
OUTAGE OF SHOLAPUR-
RAICUR 765KV B/C

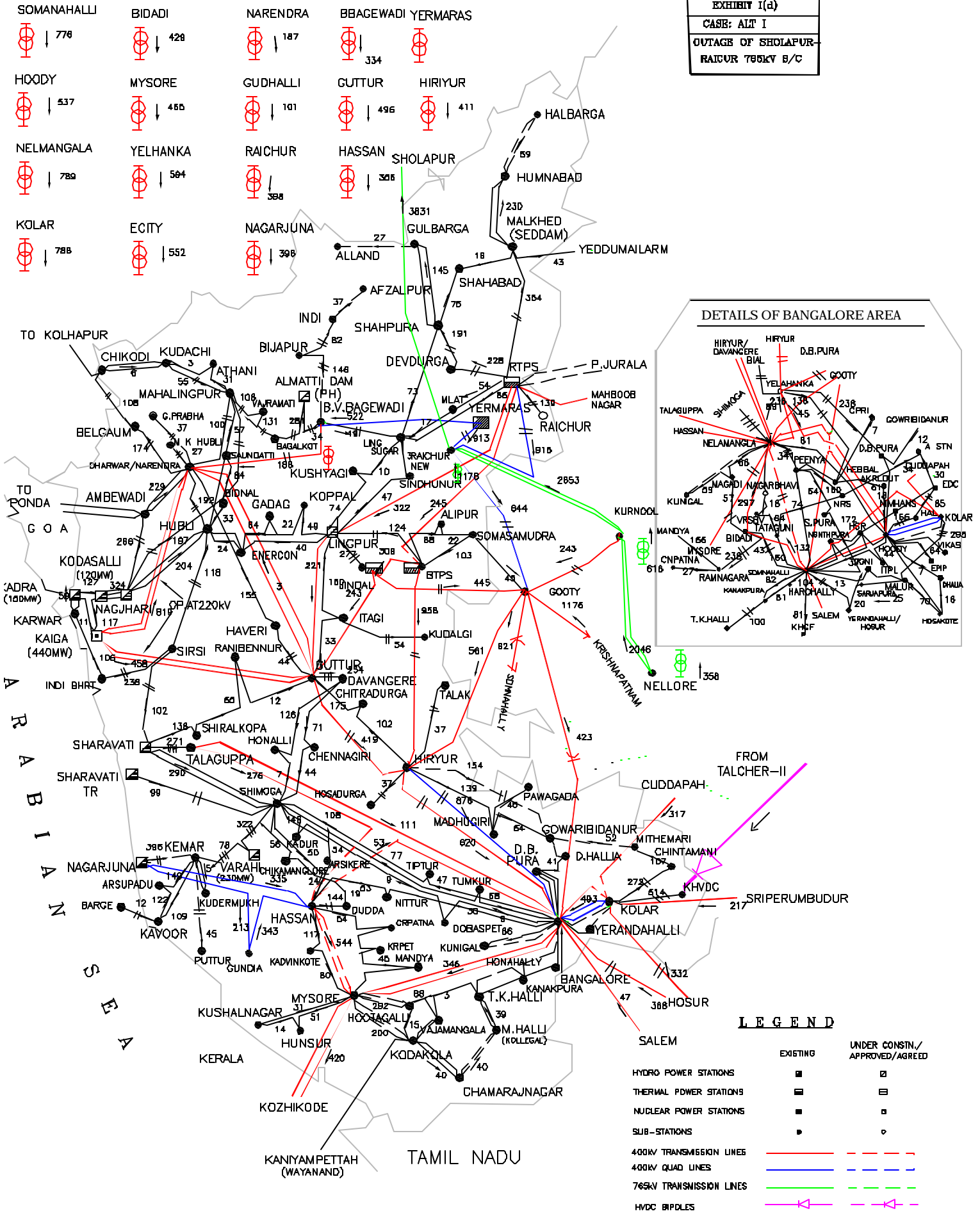


EXHIBIT I(e)
CASE: AIT I
OUTAGE OF RAICHUR-KURNOOL 765KV B/C

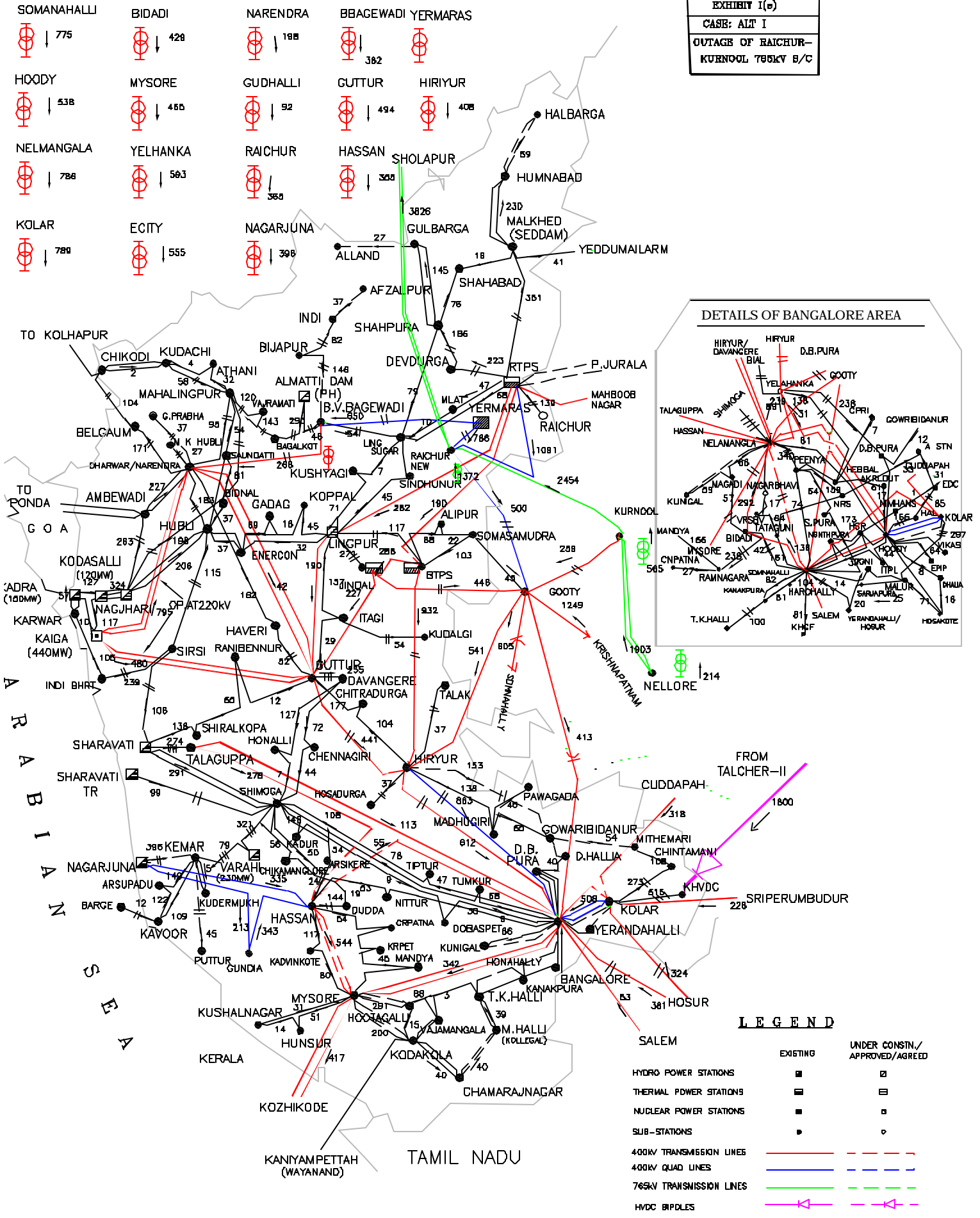


EXHIBIT II(a)

CASE: ALT II(a)

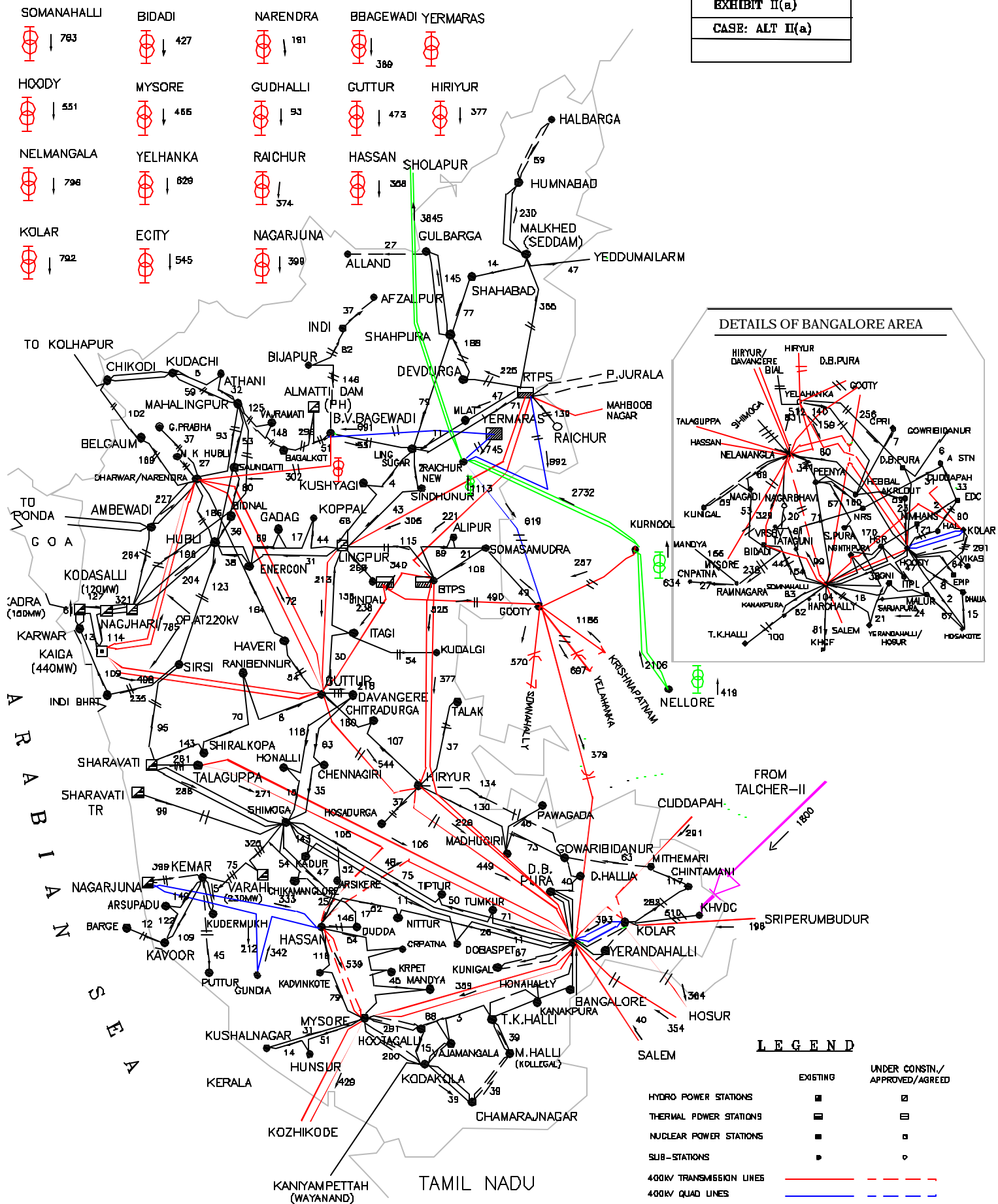
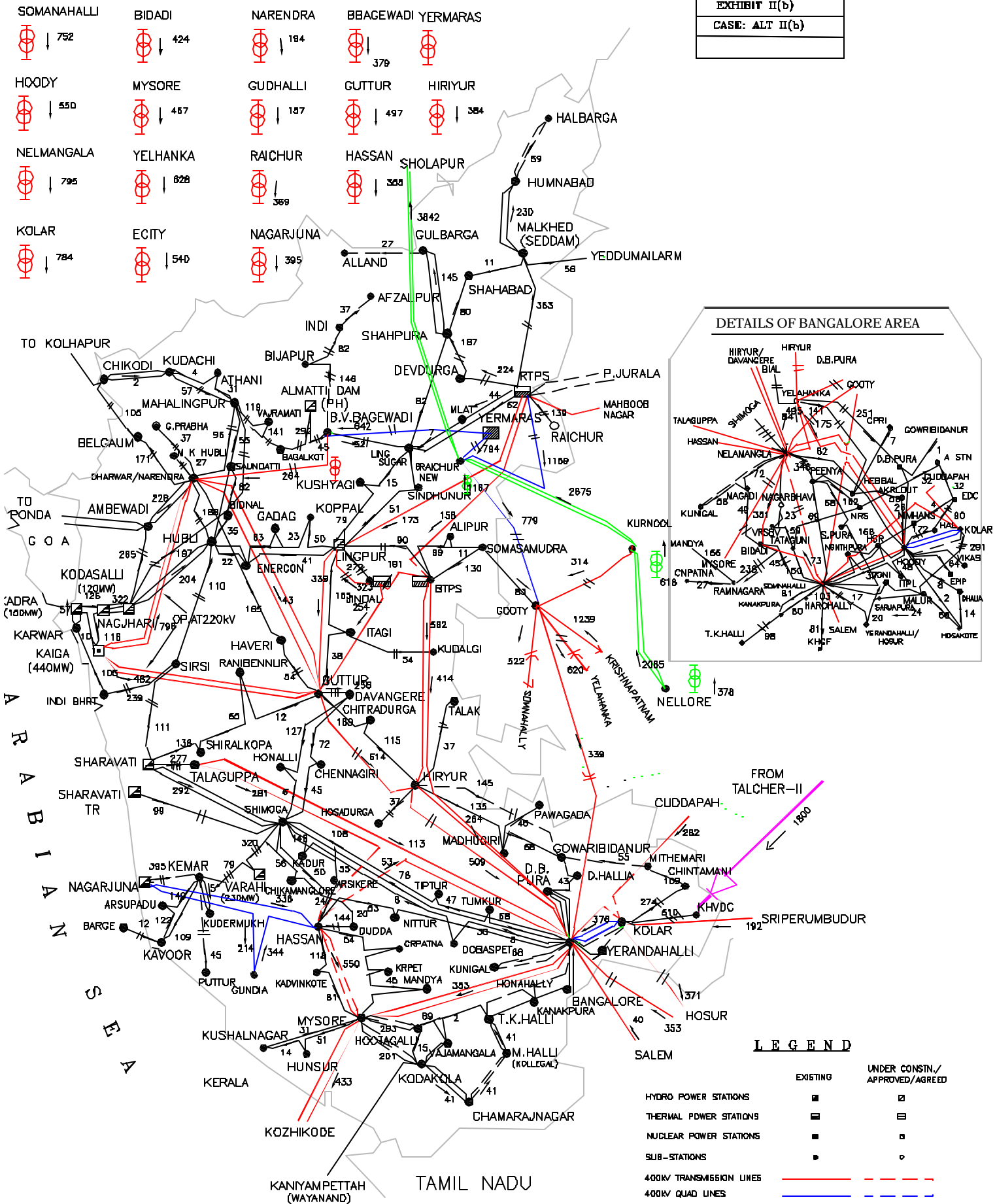


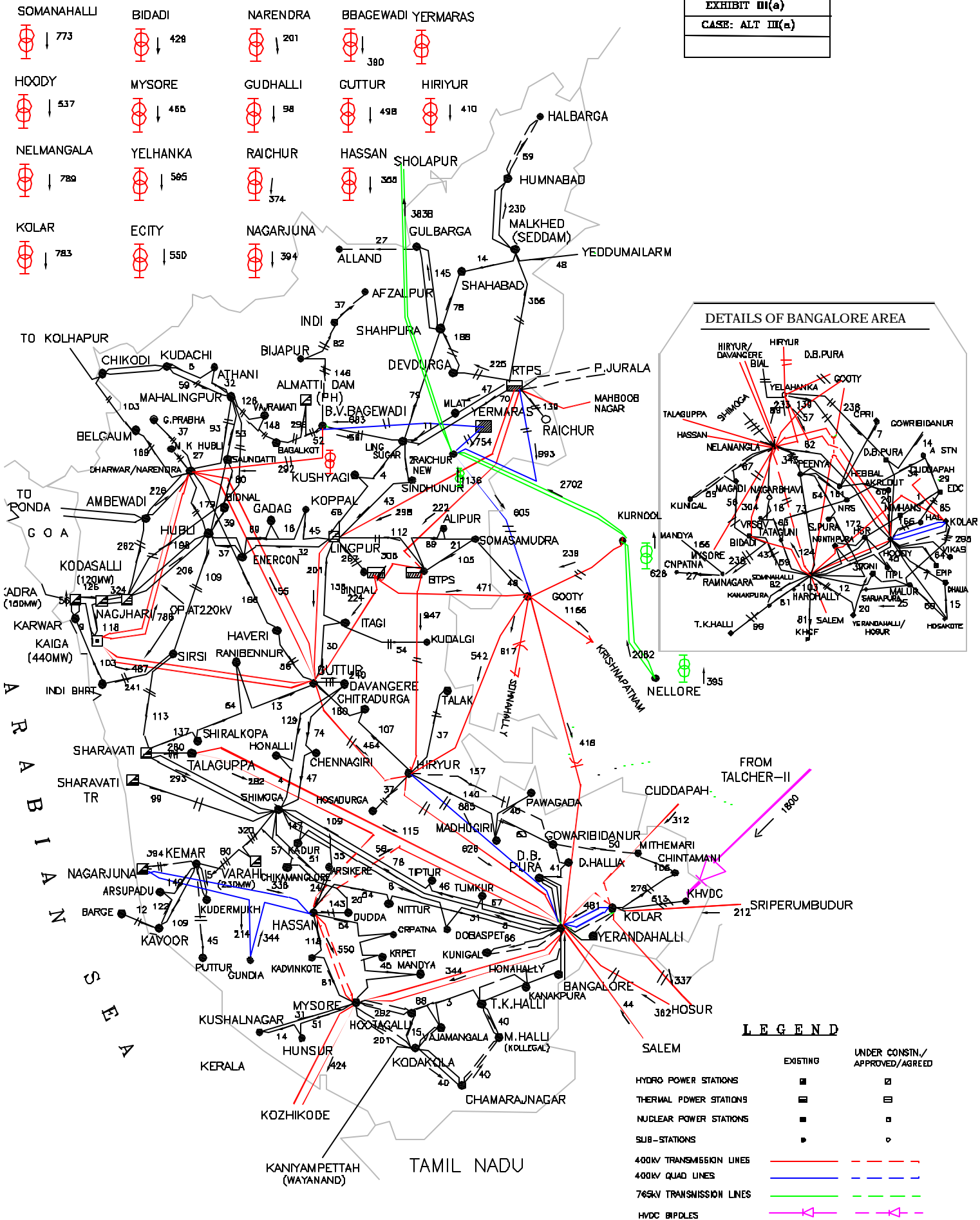
EXHIBIT II(b)
CASE: ALT II(b)

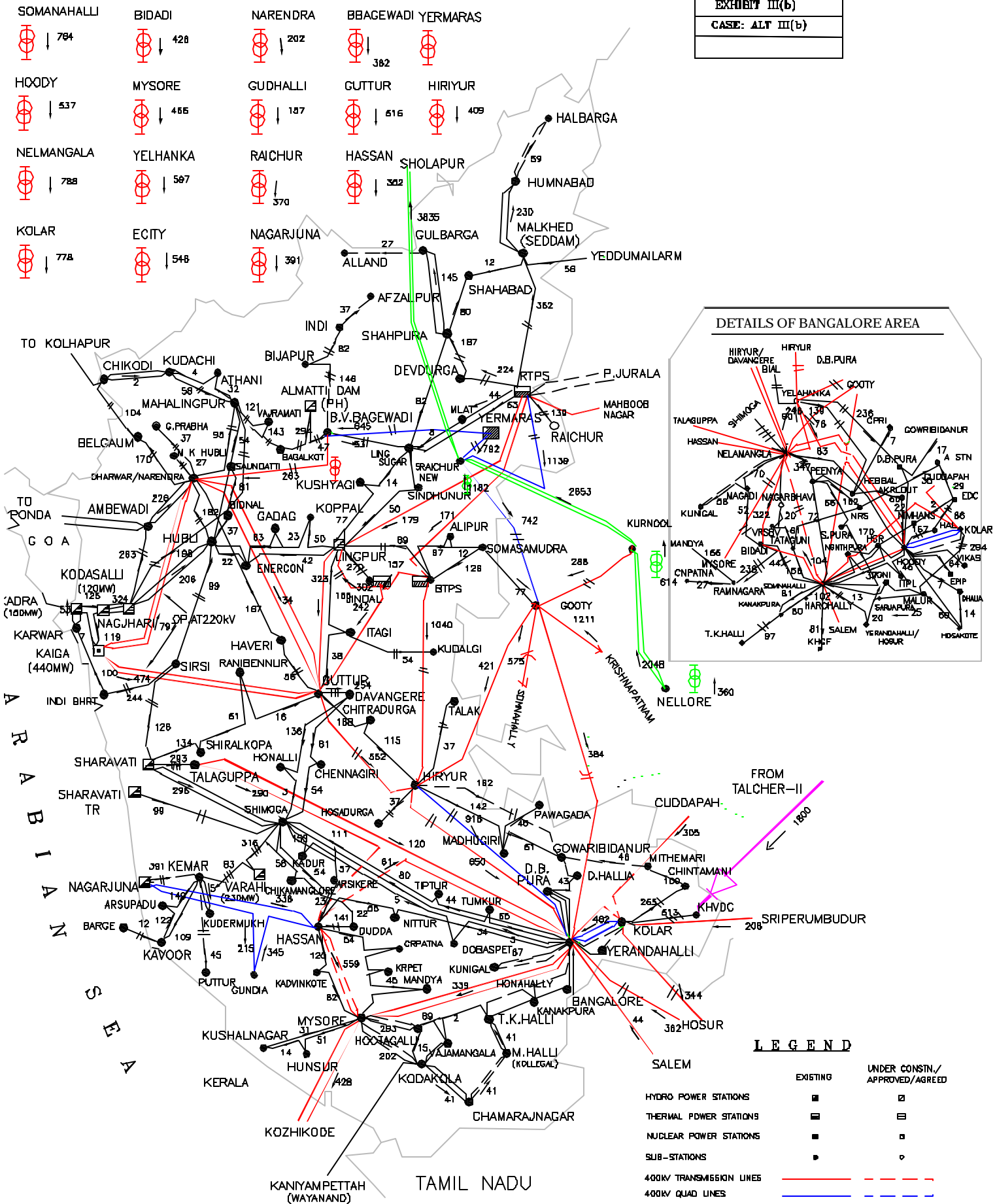


LEGEND

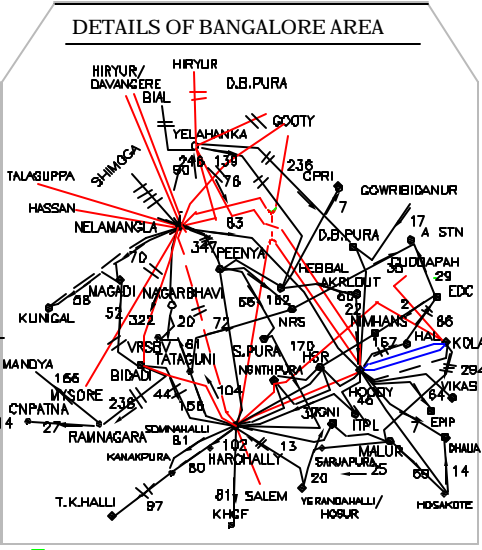
	EXISTING	UNDER CONST./ APPROVED/AGREED
HYDRO POWER STATIONS	■	□
THERMAL POWER STATIONS	■	□
NUCLEAR POWER STATIONS	■	□
SUB-STATIONS	●	○
400KV TRANSMISSION LINES	— (Red)	- - - (Red)
400KV QUAD LINES	— (Blue)	- - - (Blue)
765KV TRANSMISSION LINES	— (Green)	- - - (Green)
HVDC BIPOLARS	— (Magenta)	- - - (Magenta)

EXHIBIT III(a)
CASE: ALT III(a)





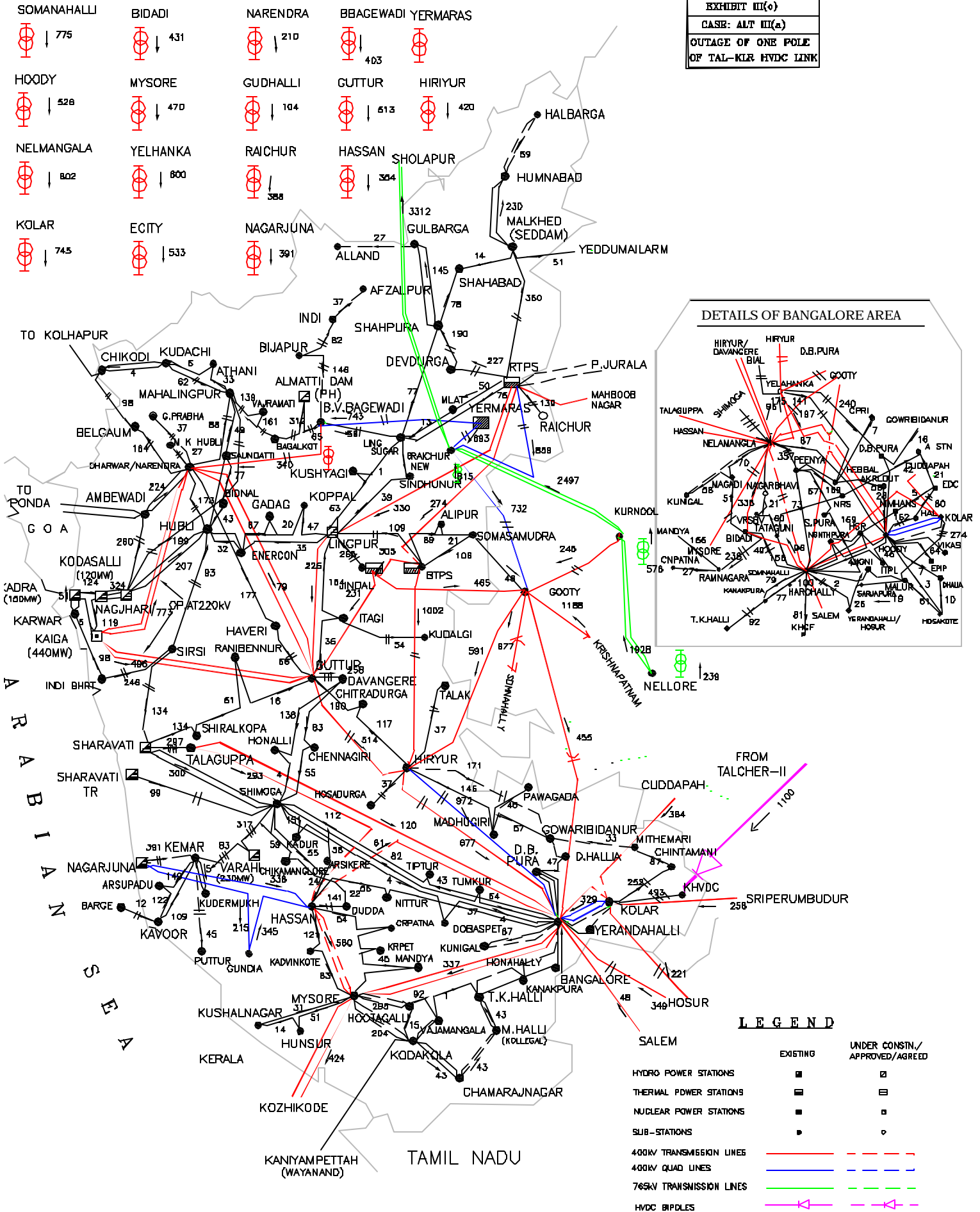
SOMANAHALLI 784	BIDADI 428	NARENDRA 202	BBAGEWADI 382	YERMARAS
HOODY 537	MYSORE 465	GUDHALLI 187	GUTTUR 516	HIRIYUR 409
NELMANGALA 788	YELHANKA 587	RAICHUR 370	HASSAN 302	SHOLAPUR
KOLAR 778	ECITY 548	NAGARJUNA 391	ALLAND 27	GULBARGA 145



K A R N A T A K A

TAMIL NADU

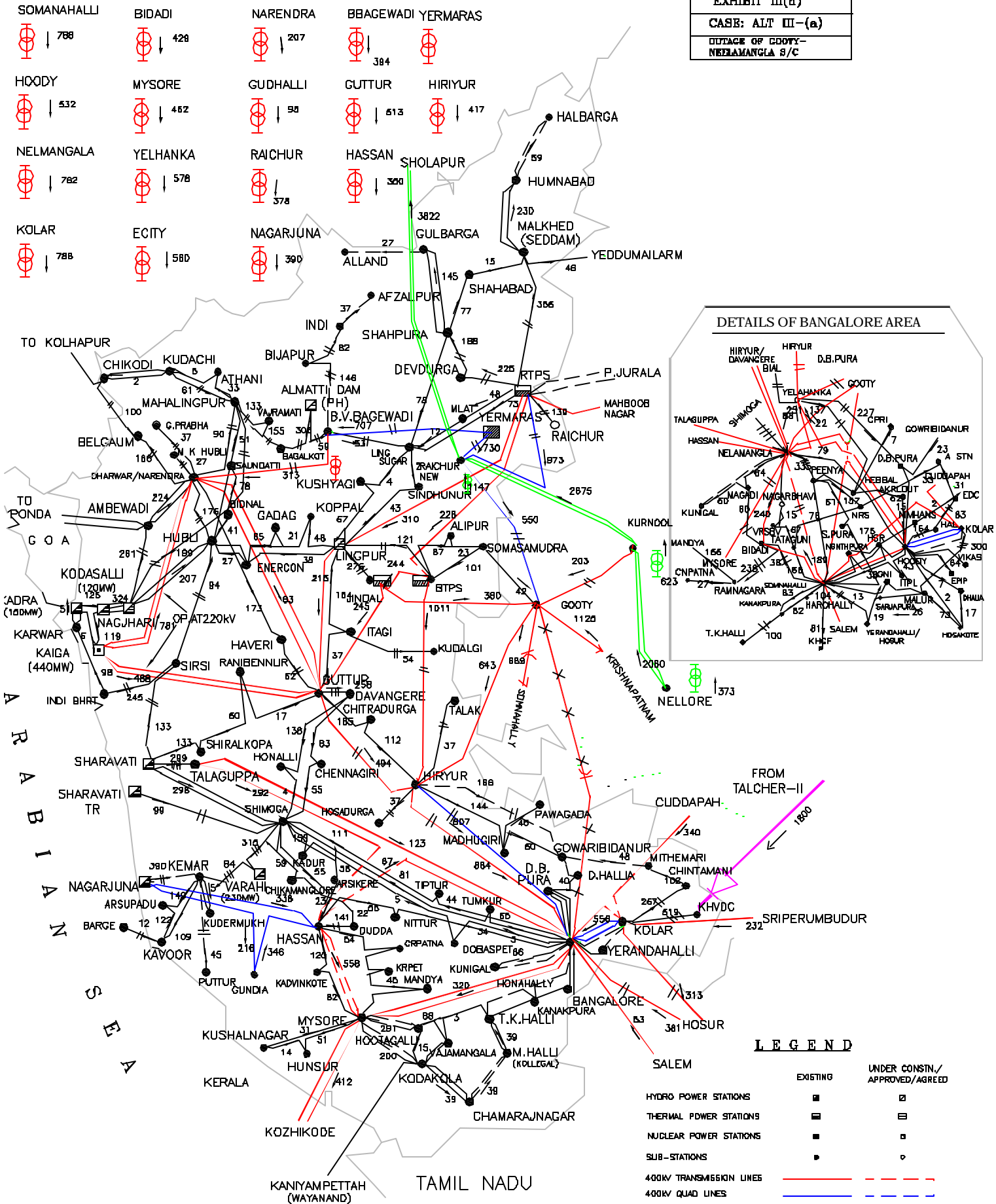
EXHIBIT III(e)
CASE: ALT III(a)
OUTAGE OF ONE POLE
OF TAL-KLR HVDC LINK



LEGEND

	EXISTING	UNDER CONST./ APPROVED/AGREED
HYDRO POWER STATIONS	■	□
THERMAL POWER STATIONS	■	□
NUCLEAR POWER STATIONS	■	□
SUB-STATIONS	●	○
400KV TRANSMISSION LINES	— (Red)	- - - (Red)
400KV QUAD LINES	— (Blue)	- - - (Blue)
765KV TRANSMISSION LINES	— (Green)	- - - (Green)
HVDC PIPES	— (Pink)	- - - (Pink)

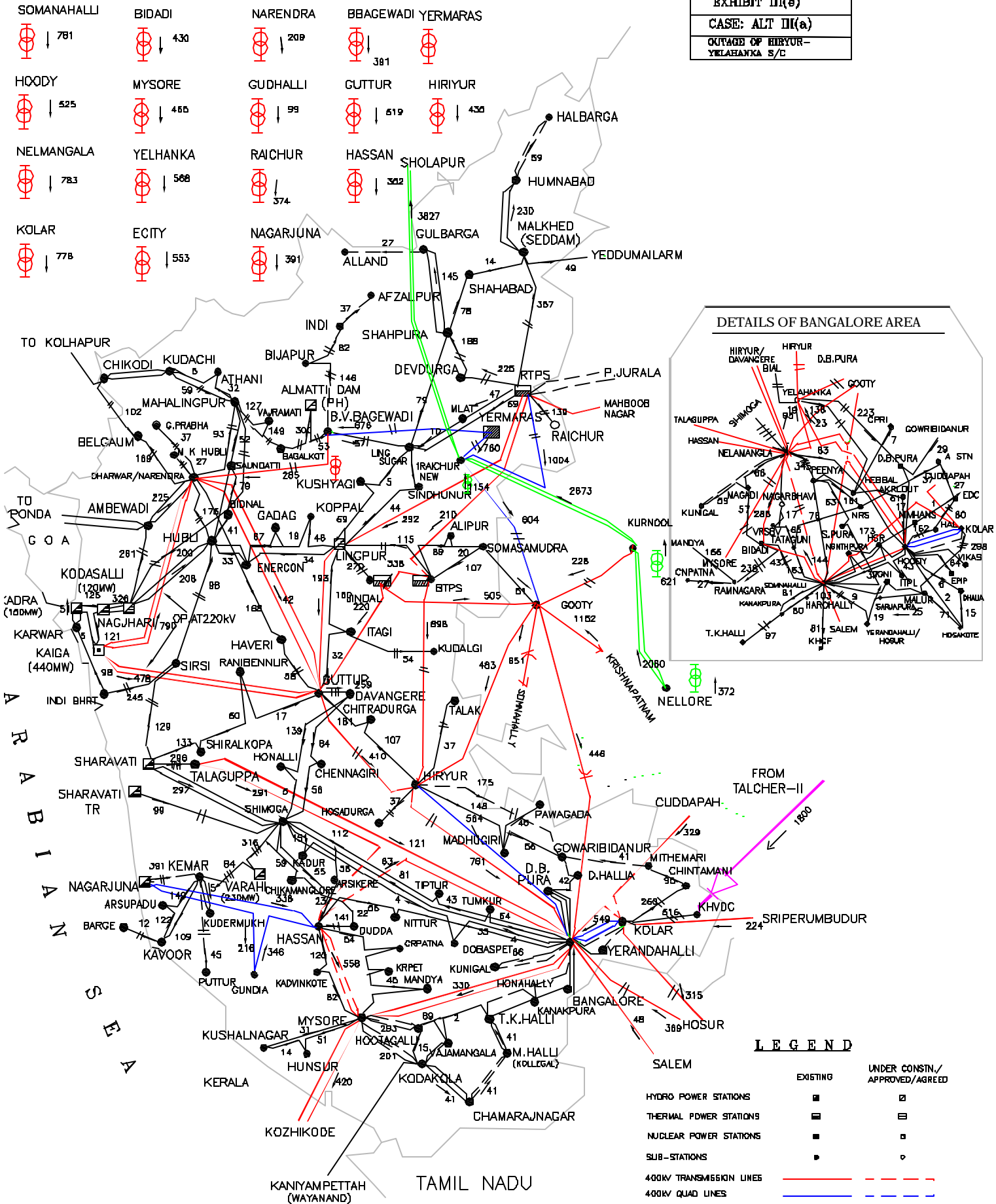
EXHIBIT III(d)
 CASE: ALT III-(a)
 OUTAGE OF GOOTY-
 NERAMANGLA S/C



LEGEND

	EXISTING	UNDER CONST./ APPROVED/AGREED
HYDRO POWER STATIONS	○	◐
THERMAL POWER STATIONS	■	◑
NUCLEAR POWER STATIONS	▲	◒
SUB-STATIONS	●	◌
400kV TRANSMISSION LINES	—	- - -
400kV QUAD LINES	—	- - -
765kV TRANSMISSION LINES	—	- - -
HVDC BIPOLARS	↔	↔

EXHIBIT III(e)
CASE: ALT III(a)
OUTAGE OF HIRYUR-
YELAHANKA S/C



A
R
A
B
I
A
N
S
A

EXHIBIT IV
CASE : BASE CASE
BANGALORE RING STUDIES

