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**Economic Commission for Europe****Inland Transport Committee****Working Party on Inland Water Transport****Fifty-sixth session**

Geneva, 10–12 February 2012

Item 4 (c) of the provisional agenda

**Development of the European inland waterway network:****Inventory of Most Important Bottlenecks****and Missing Links in the E Waterway Network (Resolution No. 49)****Revision of Resolution No. 49****Note by the secretariat****I. Introduction and mandate**

1. It is recalled that the Working Party on Inland Water Transport, at its fifty-fifth session, took note of the general overview of its infrastructure related activities reflected in document ECE/TRANS/SC.3/2011/4 “Strategic development of inland waterway infrastructure”. The proposal, contained in paragraph 18 of the document, to focus in the next biennium on maintenance of pan-European instruments on the coordinated development of the network of E waterways and ports was approved. SC.3 agreed that one of indicators of achievement for 2012–2013 would be promoting the second edition of the Inventory of Main Standards and Parameters of the E Waterway Network (“Blue Book”) and updating the European Agreement on Main Inland Waterways of International Importance (AGN) and, if needed, other relevant UNECE instruments based on the information received for the latest revision of the Blue Book (ECE/TRANS/SC.3/191, para. 20).

2. The Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3), accordingly, at its forty-first session, requested the secretariat to prepare a revised list of most important bottlenecks and missing links, as set out in the annex to Resolution No. 49 (TRANS/SC.3/159 and Corr.1), with due regard to the second revised edition of the Blue Book, and transmit it to SC.3 for consideration and adoption (ECE/TRANS/SC.3/WP.3/82, para. 17).

3. The Working Party on Inland Water Transport is invited to consider and adopt a draft resolution on amendment of Resolution No. 49 (Part II) and its annex (Part III) comprising the list of most important bottlenecks and missing links.

4. The list has been prepared by the secretariat conforming to the criteria formulated by SC.3 at its forty-sixth session, i.e.: (i) the list should be based on the complete list of missing links and bottlenecks as indicated in the Blue Book; (ii) it should not mention any “strategic bottlenecks” with the exception of those relating to trunk waterways (E waterways whose numbers are multiple of 10); and (iii) the list should not mention “basic bottlenecks” which represent branches of branches (for example: River Bega E 80–01–02) as being of secondary importance for international transport (TRANS/SC.3/153, para. 14). In the draft list that follows, the secretariat made a few exceptions however to the criterion (ii) above and retained in the list the most important strategic bottlenecks purposely proposed by the Governments of Belgium and the Netherlands at the time of drafting Resolution No. 49. It is also proposed to include in the list the most important strategic bottlenecks of Finland (E 60–11) and Italy (E 91) as they are major water arteries of these two countries.

5. The Working Party may wish to note the progress made on the elimination of bottlenecks and completion of missing links since the last revision of Resolution No. 49 in 2005. To this effect the modifications to the existing text of Resolution No. 49 are marked in bold for new or strikethrough for deleted characters.

## II. Draft resolution on amendment of Resolution No. 49

### Resolution No. ...

(adopted on ... October 2012 by the Working Party on Inland Water Transport)

*The Working Party on Inland Water Transport,*

*Duly taking into account* the strategic objective set up by the Pan-European Conference on Inland Water Transport (Bucharest, 13–14 September 2006) to accelerate the development of inland waterway transport and to better integrate it into multimodal transport chains by ensuring, in particular, its reliability through harmonized fairway depths for interlinked waterway networks and respecting the need for environmental protection in the development of inland waterways (ECE/TRANS/SC.3/2006/11);

*Responding* to the policy Recommendation No. 1 of the UNECE White Paper on Efficient and Sustainable Inland Water Transport in Europe to make full use of pan-European mechanisms to coordinate the development of the E waterway network;

*Recalling* the European Agreement on Main Inland Waterways of International Importance (AGN) and the Protocol on Combined Transport on Inland Waterways to the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC);

*Considering* Resolution No. 49 “Inventory of Most Important Bottlenecks and Missing Links in the E Waterway Network”, of 24 October 2002 (TRANS/SC.3/159 and Corr.1);

*Taking into account* the second revised edition of the Inventory of Main Standards and Parameters of the E Waterway Network (“Blue Book”, ECE/TRANS/SC.3/144/Rev.2);

*Bearing in mind* the overall objective to develop an efficient, balanced and flexible transport system which meets the economic, social, environmental and safety requirements of ECE member Governments;

*Being aware at the same time* of the present unsatisfactory state of the European inland waterway infrastructure due mainly to the somewhat fragmentary nature of the E waterway network and limited reliability of traffic on some of its sections which represents a major obstacle to further development of this mode of transport on the continent;

*Desiring* to give an impetus to improving the network of inland waterways of international importance, in particular, by drawing the attention of Governments and international institutions concerned to its most important bottlenecks and missing links;

1. *Decides* to replace the text of the annex to Resolution No. 49 with the text contained in the annex to this Resolution,<sup>1</sup>
2. *Invites* Governments to inform the Executive Secretary of the Economic Commission for Europe of any progress in the elimination of the bottlenecks and completion of missing links relating to their respective inland waterways,
3. *Requests* the Executive Secretary to place this Resolution periodically on the agenda of the Working Party on Inland Water Transport with a view to monitoring the progress in the elimination of the bottlenecks and completion of missing links in the E waterway network and revising the Inventory whenever necessary.

### III. Draft revised Inventory of Most Important Bottlenecks and Missing Links in the E Waterway Network

#### I. Introduction

The European Agreement on Main Inland Waterways of International Importance (AGN) in its annex I establishes the network of E waterways including a few portions that do not presently exist and are considered as missing links. In its annex III, the Agreement stipulates the requirements for the classification of E waterways. In total, 29,131 km of European inland waterways have been earmarked by Governments as E waterways. The above length excludes the double counting of sections on which two or more E waterways overlap.

The breakdown by classes of European inland waterways of international importance may be summarized in the table below.

#### Structure of E waterways

	<i>Missing links</i>	<i>Less than class IV</i>	<i>Class IV</i>	<i>Class Va</i>	<i>Class Vb</i>	<i>Class VIa</i>	<i>Class VIb</i>	<i>Class VIc</i>	<i>Class VII</i>	<i>Total</i>
<i>Length (km)</i>	<b>2,328</b>	<b>2,580</b>	<b>4,963</b>	<b>4,558</b>	<b>4,625</b>	<b>524</b>	<b>3,532</b>	<b>4,274</b>	<b>1,747</b>	<b>29,131</b>
<i>%</i>	<b>8.0</b>	<b>8.9</b>	<b>17.0</b>	<b>15.6</b>	<b>15.9</b>	<b>1.8</b>	<b>12.1</b>	<b>14.7</b>	<b>6.0</b>	<b>100.0</b>

In accordance with the AGN Agreement, only waterways meeting the basic minimum requirements of class IV (minimum dimensions of vessels: 80.00 m x 9.50 m) can be considered as E waterways. The Agreement recommends that the new E waterways to be built (for the completion of missing links) should meet, at least, the requirements of

<sup>1</sup> Draft annex is presented in Part III.

class Vb, while the waterways to be modernized should meet the requirements of at least class Va.

## **II. Definition of bottlenecks and missing links in the network of main inland waterways of international importance**

In the course of its work on the draft AGN the Working Party on Inland Water Transport endorsed the following definitions of “bottlenecks” and “missing links” in the inland navigation network, elaborated by the ad hoc Group of Experts on Inland Waterway Infrastructure:

“Those sections of the European waterway network of international importance that have parameter values being substantially lower than target requirements are called bottlenecks.

There are two kinds of bottlenecks:

“**Basic bottlenecks**” are the sections of E waterways whose parameters, at the present time, are not in conformity with the requirements applicable to inland waterways of international importance in accordance with the new classification of European inland waterways (class IV).

“**Strategic bottlenecks**” are other sections satisfying the basic requirements of the class IV but which, nevertheless, ought to be modernized in order to improve the structure of the network or to increase the economic capacity of inland navigation traffic.

“**Missing links**” are such parts of the future network of inland waterways of international importance which do not exist at present.

The basic condition for the elimination of bottlenecks and completion of missing links is the positive result of economic evaluation.” (TRANS/SC.3/133, paragraph 18 and TRANS/SC.3/WP.3/AC.1/4, paragraph 18).

## **III. Most important bottlenecks and missing links in the E waterway network by country**

### **Austria**

Missing links: Danube-Oder-Elbe Connection (E 20).

Strategic bottlenecks: Danube (E 80) from 2,037.0 to 2,005.0 km and from 1,921.0 to 1,873.0 km — low fairway depth (in some locations down to 2.20 m).

### **Belarus**

Strategic bottlenecks:

1. Mukhovets (E 40) from Brest to Kobrin — low maximum draught (1.60 m).
2. Dneprovsko-Bugskiy Canal (E 40) from Kobrin to Pererub — low maximum draught (1.60 m).
3. Pina (E 40) from Pererub to Pinsk — low maximum draught (1.60 m).
4. Pripyat (E 40) from Stakhovo to Pkhov — low maximum draught (1.30 m).
5. Pripyat (E 40) from Pkhov to Belarus/Ukrainian border — low maximum draught (1.50 m).

## Belgium

Missing links:

1. Meuse — Rhine link.<sup>2</sup>
2. Maldegem — Zeebrugge (E 07).

Basic bottlenecks:

1. Bocholt — Herentals Canal (E 01–01), Bocholt — Dessel section.
2. Zuid — Willemsvaart (E 01–01), section Bocholt — Belgium/Netherlands border.
3. Gent — Oostende Canal (E 02), Brugge — Beernem section.
4. Charleroi-Bruxelles Canal (E 04), Lembeek — Bruxelles section — upgrading the height under bridges and improvement of the waterway is required. **Project is under study.**
5. Bossuit — Kortrijk Canal (E 05–01), Zwevegem — Kortrijk section — **upgrading from class I to class Va. Project is under study.**
6. Dender (E 05–04), Aalst — Dendermonde section<sup>3</sup> — **upgrading from class II to class IV. Project is under study.**
- ~~7. Harelbeke Halluin lock (E 02) — upgrading from class II to class IV.<sup>4</sup>~~
- ~~8. Canal de Lanaye (E 01) building of a class VIb lock.<sup>5</sup>~~
7. **Beneden-Nete (E 05–06) upgrading the height under bridges. Project is under way.**

Strategic bottlenecks:

1. Meuse (E 01) from Pont d'Ougrée to Liège — upgrading from class Vb to class VIb is envisaged.
2. Lys Mitoyenne — Lys (Menin — Deinze section) and Lys Derivation Canal up to Schipdonk (E 02) — upgrading from class IV to class Vb is envisaged within the Seine — Escaut link project. **Project is under way.**
3. **Sea Canal Bruxelles — Schelde (E 04) — improvement of section Wintam — Willebroek. Project is under way.**
4. Albertkanaal (E 05), Wijnegem passage and section Kanne — Liège — upgrading from class Vb to class VIb is envisaged.

## Bosnia and Herzegovina

**Basic bottlenecks: Sava (E 80–12), 507.0–174.8 km — upgrading from classes III/IV to classes IV/Va.**

<sup>2</sup> This link is not mentioned in the AGN Agreement, however, the Government of Belgium has suggested including it into the Inventory.

~~<sup>3</sup> The Government of Belgium informed the secretariat that according to the Flemish Region E 05–04 should be limited to the Bovenzeeschelde — Aalst section and should not include the rest of the Dender and the Blaton — Ath Canal as provided for in the AGN Agreement.~~

~~<sup>4</sup> Project is under way.~~

~~<sup>5</sup> The project is under study.~~

**Bulgaria**

Strategic bottlenecks: Danube (E 80) from 845.5 to 375.0 km — low fairway depth during dry seasons (below 2.50 m — value recommended by the Danube Commission) at several critical sections i.e.:

- (a) from 845.5 to 610.0 km, with fairway depth limited to 2.10–2.20 m for 10–15 days a year, and
- (b) from 610.0 to 375.0 km, with fairway depth limited to 1.80–2.00 m for 20–40 days a year.

**Croatia**

Missing links: Danube — Sava Canal (E 80–10) from Vukovar to Samac.

Basic bottlenecks: Sava (E 80–12) section between Sisak and Brčko — upgrading from class III to class IV.

Strategic bottlenecks: Sava (E 80–12) section between Brčko and Serbian/Croatian State border — upgrading from class IV to class Va.

**Czech Republic**

Missing links: Danube — Oder — Elbe Connection (E 20 and E 30).

Basic bottlenecks: Elbe (E 20) from State border to ústí nad Labem — extremely low fairway depth during dry seasons (0.9–2.0 m), in the years 1997–2004, the draught was less than 1.40 m during 160–262 days a year making the section commercially non-navigable; the construction of two locks is necessary.

Strategic bottlenecks: Elbe (E 20) from Mělník to Chvaletice — narrow width of lock gates (12.00 m); from Chvaletice to Pardubice the construction of a lock at Přelouč is necessary.

**Finland**

Strategic bottlenecks: Saimaa Canal (E 60–11) from Vyborg (Russian Federation) to Kuopio/Joensuu — upgrading to class Va is envisaged.

**France**

Missing links:

1. Seine — Moselle Link (E 80).<sup>6</sup>
2. Seine — ~~Eseaut~~ Nord Europe Link (E 05).<sup>7</sup>
3. Saône — Moselle Link (E 10–02)/Saône — Rhine Link (E 10).<sup>8</sup>

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<sup>6</sup> The secretariat was informed by the Government of France that the project concerning the Seine — Moselle link has been abandoned.

<sup>7</sup> Currently, Voies Navigables de France undertake preparatory works regarding the Seine-Schelde connection project, that includes a 106 km long Seine-Nord Europe Canal (E 05, class Vb). The Canal will provide a link from the Rhine basin to the currently isolated western part of E 80 and E 80–04. A procedure of competitive dialogue is under way for the Canal project. To become operational as of 2017.

<sup>8</sup> Public debate on the possibility of a Saône-Moselle/Saône-Rhine Link is envisaged in 2013 in accordance with the Grenelle Law of 3 August 2009.

~~4. Rhône — Rhine Canal (E 10).<sup>9</sup>~~

Basic bottlenecks:

**1. Seine (E 80–04) between Bray-sur-Seine and Nogent — upgrading is envisaged. Public debate took place between the end of 2011 and the beginning of 2012.**

~~2. Meuse (E 01-02) between Givet and the Belgian border — upgrading to class IV.~~

Strategic bottlenecks:

**1. Saône (E 10) — extension of the Couzon Lock to 195.00 m by 12.00 m is envisaged.**

**2. Oise (E 80) from Conflans to Creil — low draught and height under bridges (3.40 m and 5.18 m, respectively) — increasing the water depth up to 4.00 m is under way.**

**3. Oise (E 80) from Creil to Compiègne — low draught (3.00 m), increasing the water depth up to 4.00 m is considered.**

~~4. Rhine (E 10) from Iffezheim to Niffer — length of convoys is limited by 183 m, upgrading to class VIb (186.5 m).<sup>+0</sup>~~

~~5. Oise (E 80) from Conflans to Creil — low height under bridges (5.18 m), from Creil to Compiègne low draught and height under bridges (2.50 m and 5.76 m, respectively).~~

~~6. Moselle (E 80) from Toul to Apach — upgrading of maximum draught from 2.50 m to 2.80 m.<sup>+1</sup>~~

~~7. Moselle (E 80) — lifting of bridges between Metz and Apach enabling 3-layer container transport.~~

~~8. Network Nord-Pas-de-Calais (E 02 and E 05) — lifting of bridges and upgrading of links with Belgium to class Va.~~

~~9. Oise (E 80) increasing the water draught up to 3.5m between Creil and Conflans — Sainte-Honorine.~~

## Germany

~~Missing links: Link between the Mittellandkanal and the Elbe-Havel-Kanal (Magdeburg Waterways Crossroads?) (E 70).<sup>+2</sup>~~

Basic bottlenecks:

**1. Saale (E 20–04) from Calbe to Elbe — upgrading to class IV is under way.**

2. Mittellandkanal (E 70) — sections which have not yet been modernized are being upgraded to class Vb.<sup>+3</sup> **The project is under way.**

3. Elbe — Havel — Kanal (E 70) — upgrading **from class IV to class Vb<sup>+4</sup> is under way.**

4. Untere Havel — Wasserstraße (E 70) from Plauen to Spree — upgrading **from class IV to class Vb<sup>+5</sup> is under way.**

<sup>9</sup> ~~The secretariat has been informed by the Government of France that the project had been abandoned.~~

<sup>+0</sup> ~~Project is under way.~~

<sup>+1</sup> ~~Project is under way.~~

<sup>+2</sup> ~~Project is under way.~~

<sup>+3</sup> ~~Project is under way.~~

<sup>+4</sup> ~~Project is under way.~~

5. Berlin region waterways (various sections) upgrading to classes IV and Va ~~higher classes~~<sup>16</sup> **is under way.**

6. Havel — Oder — Wasserstraße (E 70) — upgrading **from class IV to class Va**<sup>17</sup> **is under way to enable navigation of vessels with two layers of containers.**

Strategic bottlenecks:

1. Rhine (E 10) — low fairway depth during dry seasons: downstream from Duisburg (2.50 m), from St. Goar to Mainz (1.90 m) **and low height under bridges at Kehl/Strasbourg (6.75 m).**

2. Elbe (E 20) **lower Elbe — need for lifting of bridges for container transport with three layers of containers; middle Elbe from Lauenburg upstream to the border between Germany and the Czech Republic** — low fairway depth during dry seasons (1.40 m).

3. Moselle (E 80) — construction of **10 second lock chambers is under way** ~~second lock chambers~~<sup>18</sup>.

4. Main (E 80) upstream from **Würzburg** ~~Leinfurt~~ — low fairway depth (2.50 m).

5. Danube (E 80) from Straubing to Vilshofen — low fairway depth (1.55 m).

6. **Danube (E 80) — low height (4.70 m) under the railway bridge in Deggendorf (km 2,285.87) — upgrading to 7.00 m is under way.**

7. **Danube (E 80) — low height under bridges at Bogen (km 2,311.27) — 5.00 m; at Passau (km 2,225.75) — 5.15 m and (km 2,230.28) — 6.30 m — upgrading to 7.00 m is necessary.**

## Hungary

Strategic bottlenecks:

1. Danube (E 80), joint Slovak — Hungarian section from Sap (1,810.0 km) to 1,708.2 km — low maximum draught during dry seasons **(1.50 m as registered in the course of years up to November 2011) and at a High Navigable Water Level (HNWL) — low height under bridges: road bridge Medved'ov (1,806.35 km) — 8.85 m between pillars<sup>19</sup> II — III and 9.19 m between pillars I and II; railway bridge Komárno (1,770.4 km) — 8.65 m between pillars IV — V and 8.68 m between pillars III — IV; road bridge Komárno (1,767.8 km) — 9.08 m at centre point of the arches between pillars II — III and III — IV, respectively.** Upgrading of the draught to 2.50 m and the height under bridges to 9.10 m is required.

2. Danube (E 80), the section from 1,708.2 km to Budapest (1,652.0 km) **1,433.0 km** — low maximum draught **(1.50 m — as registered in the course of years up to November 2011).**

3. ~~Danube (E 80), at HNWL — low height under the road/rail bridge at Dunaföldvár (1,560.55 km) — 8.73 m between pillars II — III and III — IV, respectively. Upgrading to 9.10 m is required.~~

<sup>15</sup> ~~Project is under way.~~

<sup>16</sup> ~~Project is under way.~~

<sup>17</sup> ~~Project is under way.~~

<sup>18</sup> ~~Project is under way.~~

<sup>19</sup> **Numbering of pillars of bridges starts from the left bank on the Danube.**



~~4. Danube (E 80), at HNWL — low height under the road/rail bridge at Baja (1,480.22 km) — 8.09 m between pillars III — IV and 8.40 m between pillars II — III. Upgrading to 9.10 m is required.~~

### Italy

#### Missing links:

1. **Milano — Po Canal (E 91) from Milano to Pizzighettone.**
2. **Padova — Venezia Canal (E 91–03) from Romea Dock to Padova.**

**Basic bottlenecks: Cremona — Casale Monferrato (E 91–02) — upgrading from class III to class IV is envisaged.**

**Strategic bottlenecks: Veneta Lateral Waterway (E 91) from Marghera to Porto Nogaro — upgrading from class IV to class Va is envisaged.**

### Lithuania

**Basic bottlenecks: Nemunas (E 41) from Kaunas to Jurbarkas and from Jurbarkas to Klaipeda — insufficient depth of the fairway (1.20 m and 1.50 m, respectively).**

### Netherlands

Basic bottlenecks: Zuid-Willemsvaart up to Veghel (E 70–03) — upgrading to class IV<sup>20</sup> **is under way.**

Strategic bottlenecks:

1. IJssel (E 70) from Arnhem to Zutphen — upgrading to class Va is envisaged.
2. Upgrading of the Zwartsluis at Meppel-Ramspol (E 12–02)<sup>21</sup> **is under way.**
3. Upgrading of the Lemmer-Delfzijl section (E 15) to class Va enabling **4-layer at least 3-layer** container transport<sup>22</sup> **is under way.**
4. Twente Canal (E 70) — upgrading to class Va<sup>23</sup> **is under way** and an increase of the capacity of the Eefde lock<sup>24</sup> is to be carried out.
5. Lekkanaal<sup>25</sup> (E 11–02) — upgrading of the Beatrix lock.
6. **Maasroute** (E 01) — upgrading to class Vb enabling 4-layer container transport<sup>26</sup> **is under way.**
7. E 06 waterway — increasing the capacity of the Kreekrak locks<sup>27</sup>.
8. E 03 waterway — increasing the capacity of the Volkerak locks<sup>28</sup> and Terneuzen lock<sup>29</sup> **is under study.**

<sup>20</sup> ~~Project is under study and is expected to be carried out after 2006.~~

<sup>21</sup> ~~Project is under study.~~

<sup>22</sup> ~~Project is under study.~~

<sup>23</sup> ~~Project is under way.~~

<sup>24</sup> ~~Project is expected to be carried out after 2010.~~

<sup>25</sup> ~~For the time being this waterway is not mentioned in the AGN Agreement. Pending possible amendment of the AGN, the project is added provisionally to the list.~~

<sup>26</sup> ~~The project is under study and is expected to be carried out in 2005–2019.~~

<sup>27</sup> ~~Realization of the project is conditional upon agreement between the Governments of the Netherlands and Belgium.~~

**Poland**

Missing links: Danube — Oder — Elbe Connection (E 30).

Basic bottlenecks:

1. Oder (E 30) from Widuchova to Kozle — upgrading from classes II and III to class Va is required.
2. Glivice Canal (E 30–01) — upgrading from class III to class Va ~~Vb~~ is required.
3. Wisla (E 40) from Biala Gora to Wloclawek and from Plock to Warszawa — upgrading from classes I and II to class Va ~~Vb~~ is required.
4. Zeran Canal (E 40) from Zeran to Zegrze Lake — upgrading from class III to class Va ~~Vb~~ is required.
5. Bug (E 40) from Zegrze Lake to Brest — upgrading to class Va ~~Vb~~ is required. **The depth is limited to 0.80 m for 210 days a year.**
6. Warta — Notec — Bydgoski Canal (E 70) from Kostrzyn to Bydgoszcz — upgrading from class II to class Va ~~Vb~~ is required.
7. Wisla (E 70) from Bydgoszcz to Biala Gora — upgrading from class II to class Va ~~Vb~~ is required.
8. Szarpawa (E 70) from Gdanska Glova to Elblag — upgrading from class III to class Va ~~Vb~~ is required.

Strategic bottlenecks: Oder (E 30) from Szczecin to Widuchova — upgrading from class IV to class Vb is expected.

**Republic of Moldova**

Basic bottlenecks:

1. Prut (E 80-07) from the mouth to Branest — upgrading to class Va is required.
2. Nistru (E 90-03) from Ukraine/Moldova State border to Bender — upgrading from class III to class Va is required.

**Romania**

Missing links:

1. Danube — Bucuresti Canal (E 80–05).
2. Olt (E 80–03) up to Slatina.

Basic bottlenecks:

1. Prut (E 80–07) from the mouth to Ungheni.
2. ~~Canal Bega (E 80-01-02) up to Timisoara.~~<sup>30</sup>

Strategic bottlenecks:

<sup>28</sup> ~~The project is expected to be carried out after 2010.~~

<sup>29</sup> ~~Realization of the project is conditional upon agreement between the Governments of the Netherlands and Belgium.~~

<sup>30</sup> ~~E 80-01-03 has been deleted in accordance with the criteria set in Part I, para. 4.~~

1. Danube (E 80) from 863 to 175 km — low fairway depth during dry seasons (below 2.50 m — value recommended by the Danube Commission) at several critical sections, i.e.:

- (a) from 863 to 845.5 km, with fairway depth limited to 2.20–2.30 m for 7–15 days a year;
- (b) from 845.5 to 610 km, with fairway depth limited to 2.10–2.20 m for 10–15 days a year;
- (c) from 610 to 375 km, with fairway depth limited to 1.80–2.00 m for 20–40 days a year;
- (d) from 375 to 300 km, with fairway depth limited to 1.60–2.20 m for 30–70 days a year;
- (e) from 300 to 175 km, with fairway depth limited to 1.90–2.10 m for 15–30 days a year.

2. Danube (E 80) from 170 km to the Black Sea — low fairway depth during dry seasons (below 7.30 m — value recommended by the Danube Commission) at several critical points, i.e. at 73, 57, 47, 41 and 37 nautical miles and at the Sulina bar at the mouth of the Sulina Canal where it meets the Black Sea, where the fairway depth is limited to 6.90–7.00 m for 10–20 days a year.

### Russian Federation

Strategic bottlenecks:

1. Don (E 90) from Kalach to ~~Aksay Azov~~ — **insufficient depth downstream of the Kochetovski lock (of 116.3 km long) low water depth (3.40 m) at sill of the Kochetov Lock (162.0 km). The construction of a second parallel lock is envisaged with a depth at sill of 4.00m.**<sup>31</sup>

2. Volga (E 50) — **low water depth from the Gorkovsky hydroelectric complex to Nizhni Novgorod**<sup>32</sup> ~~low water depth at sill of the Gorodetski Lock (850.0 km). Due to the lowering during recent years of the level of the lower pond of the Gorodetski Lock by 90 cm the water depth at sill of 3.50 m can only be ensured for 2–3 hours a day. Study is currently under way aimed at step by step improvement of navigational conditions on the lower pond.~~

3. Volgo — Baltijskiy waterway (E 50) — **the Nijne-Svirski hydro-electrical complex.**<sup>33</sup>

### Serbia

Strategic bottlenecks:

- 1. Danube (E 80) from 1,405.6 to 1,227.9 km — **narrow fairway conditions.**
- 2. Danube (E 80) — **low height under the railway bridge at Bogojevo (1,366.5 km) — 8.15 m — upgrading to 9.10 m is required.**

<sup>31</sup> To eliminate the insufficient draught, the construction of a low-head hydraulic complex near the Bagaevsky village is being considered.

<sup>32</sup> To eliminate the insufficient draught, it is planned to build a low-head hydraulic complex in the area of Boljshoe Kozino or increase the water level of the Tcheboksary Reservoir.

<sup>33</sup> The construction of a second parallel lock is planned.

**3. Danube (E 80) at Novi Sad (1,254.25 km) — low height under a temporary road/railway bridge (6.82 m).**

4. Danube (E 80) from 863 to 845.5 km — low fairway depth during dry seasons (below 2.50 m — value recommended by the Danube Commission) with fairway depth limited to 2.20–2.30 m for 7–15 days a year.

**Slovakia**

Missing links:

1. Danube — Oder — Elbe Connection (E 20 and E 30).
2. Váh — Oder Link (E 81).

Basic bottlenecks:

~~—— Vah (E 81) from Sereď/Hlohovec (75.0 km) to Zilina (250.0 km) — insufficient fairway depth. Canalization of the river and its upgrading from class III to class VIa in conjunction with the construction of new locks, and reconstruction of existing locks, are required.~~

Strategic bottlenecks:

1. Danube (E 80) from Devín (1,880.26 km) to Bratislava (1,867.0 km) — **insufficient depth at low water level and insufficient height under bridges: at Bratislava (1,868.14 km) — 7.59 m, at locks of the Gabčíkovo Hydro Electrical Complex (1,819.3 km) — 8.90 m. Upgrading is required to 9.10 m.** ~~upgrading from class VIb to class VIc.~~

~~—— From Devín (Danube (E 80), 1,880.26 km) to Děvinská Nová Ves (Morava (E 30), 6.0 km) — upgrading to class Vb.~~

~~—— Danube (E 80) — insufficient height under bridges: at Bratislava (1,868.14 km) — 7.59 m, at locks of the Gabčíkovo Hydro Electrical Complex (1,826.55 km and 1,819.3 km) — 8.90 m. Upgrading is required up to 9.10 m.~~

~~—— Danube (E 80) from Bratislava (1,867.0 km) to the mouth of the Ipel River (1,708.2 km) — upgrading to class VII is required.~~

2. Danube (E 80) from Sap (1,811.0 km) to the mouth of the Ipel' River (1,708.2 km) — **insufficient depth at low water level and insufficient height under the bridges, and width of the fairway at low water level.**

**Ukraine**

Basic bottlenecks:

1. **Desna (E 40–01) from the mouth to Chernihiv — upgrading from class III to class IV is required.**
2. **Danube, Kilia arm (E 80–09) — upgrading the fairway depth and/or width.**
3. Dnestr (E 90–03) from Belgorod Dnestrovsky to the Ukraine/Moldova border — upgrading from class III to class Va is required.