

### 8.3 Selection of Alternative Highway Alignments

One of the major functions of the Outer Circular Highway is to bring growth and prosperity to surrounding communities and to create growth centers at appropriate locations along the alignment to stimulate resettlement from inner Colombo to suburban areas. This will result in a polycentric urban structure with self-contained communities that should result in less urban sprawl and a sustainable pattern of development.

The Fig.8.3 shows a concept of the Metropolitan Area Central Interconnection Expressway in Tokyo Area which is applicable for the Outer Circular Highway to the City of Colombo.

In consideration of the above role of The Outer Circular Highway, a selection of alternative highway alignment is to be made.

#### 8.3.1 Possible Highway Alignments

The location of a 10km wide belt and possible alternative alignments those are located in the belt, were discussed with the RDA and determined basing on the pre-feasibility study and land acquisition requirements. The alignments those were obviously inappropriate, were eliminated.

These possible alignments and the geological characteristics summarized in each segment are shown in Fig.8.4 and Tab.8.1 respectively.

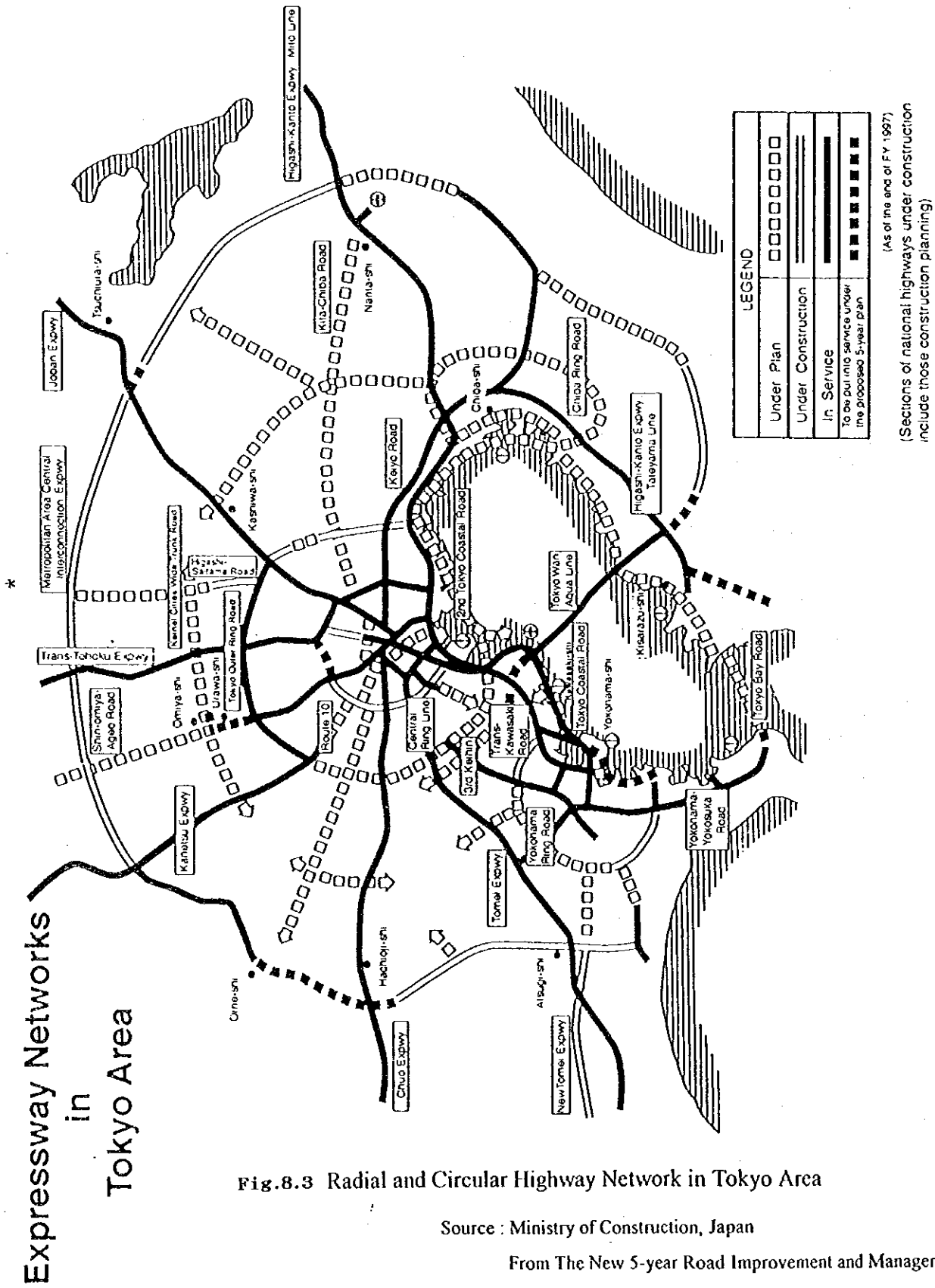


Fig.8.3 Radial and Circular Highway Network in Tokyo Area

Source : Ministry of Construction, Japan

From The New 5-year Road Improvement and Management Program  
 July 1998

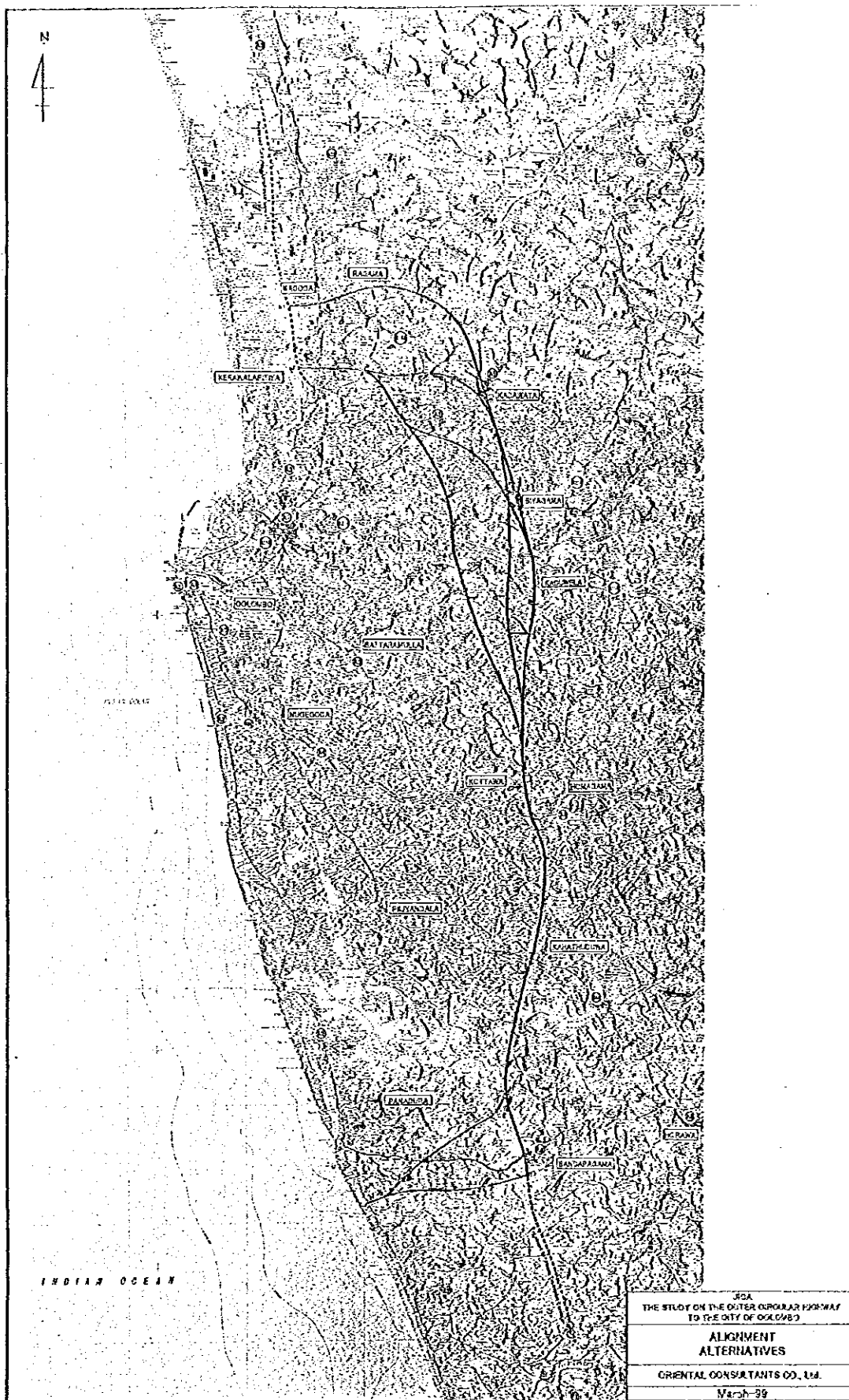


Fig.8.4 Possible Highway Alignments

Tab. 8.1 Geological and Geomorphological Analysis  
figure : distance in kilometers

Sector Segment	Marshes (Boggy & Peaty Soil)	Alluvial Clays (including Paddy)	Sandy soils (including Clayey sands)	Laterites and Gravelly soils	Total distance	Observations
SECTION 1						Lateritic high ground around Ragama North to Mahara and Karagahamuna with rock. Peat at Nagoda.
a <sub>1</sub> - c <sub>1</sub>	1.28	0.92	1.35	8.49	12.04	
a <sub>2</sub> - b	1.39	0	1.20	0	2.59	Marsh at Nawanmehara and estuarial sand at Maltumagala.
b - c <sub>1</sub>	2.71	0.08	0.17	3.64	6.60	Marsh at Nawanmehara and Pahala Karagahamuna. Latefitic high ground Ihala Karagahamuna with rock.
b - c <sub>2</sub>	2.47	0	0.17	0.51	3.15	Marsh crossing Nawanmehara, Pinnameda and Talawatuhenpita.
c <sub>1</sub> - e	0.69	1.33	1.21	11.18	14.41	Lateritic high ground Makola, Heiyantuduwa, Hewagama and Malabe to Hokandara. Alluvial and peat around Kelani ganga.
c <sub>1</sub> - d - e	0.75	6.50	1.03	6.27	14.55	Lateritic high ground Makola and Hewagama. Alluvial flood plain crossing Biyagama, Kelani ganga, Malabe and Hokandara.
c <sub>2</sub> - d - e	2.05	4.66	1.02	8.92	16.65	Lateritic high ground Makola, Heiyantuduwa and Hewagama. Marsh and alluvial flood plain Makola, Kelani, Malabe and Hokandara.
c <sub>2</sub> - e	1.56	2.46	0.79	10.29	15.10	Lateritic high ground Makola, Sapugaskanda, Hokandara and Malabe. Marsh and alluvial flood plain Talawatuhenpita, Kelani and
SECTION 2						Tracing on boundary between the narrow alluvial flood plain and the foot of lateritic hill from north to south.
e - f <sub>1</sub>	0	7.34	4.14	2.91	14.39	
SECTION 3						Marsh and alluvial around Bolgoda river. Lateritic round terrain Arukgoda.
f <sub>1</sub> - g	0.50	1.45	0.34	2.45	4.74	
f <sub>1</sub> - f <sub>2</sub>	0	1.26	0.48	1.14	2.88	Crossing streams and floods of Bolgoda river.
f <sub>2</sub> - f <sub>3</sub>	0	0.26	0.90	0	1.16	ditto
g - h <sub>2</sub>	0	0.81	2.02	0	2.83	Boggy across Bolgoda river. Flat terrain with alluvial floods of Bolgoda lake and laterites.
f <sub>3</sub> - h <sub>2</sub>	1.02	1.87	3.36	0.76	7.00	Flat terrain with alluvial streams to Bolgoda lake and estuarial sand.

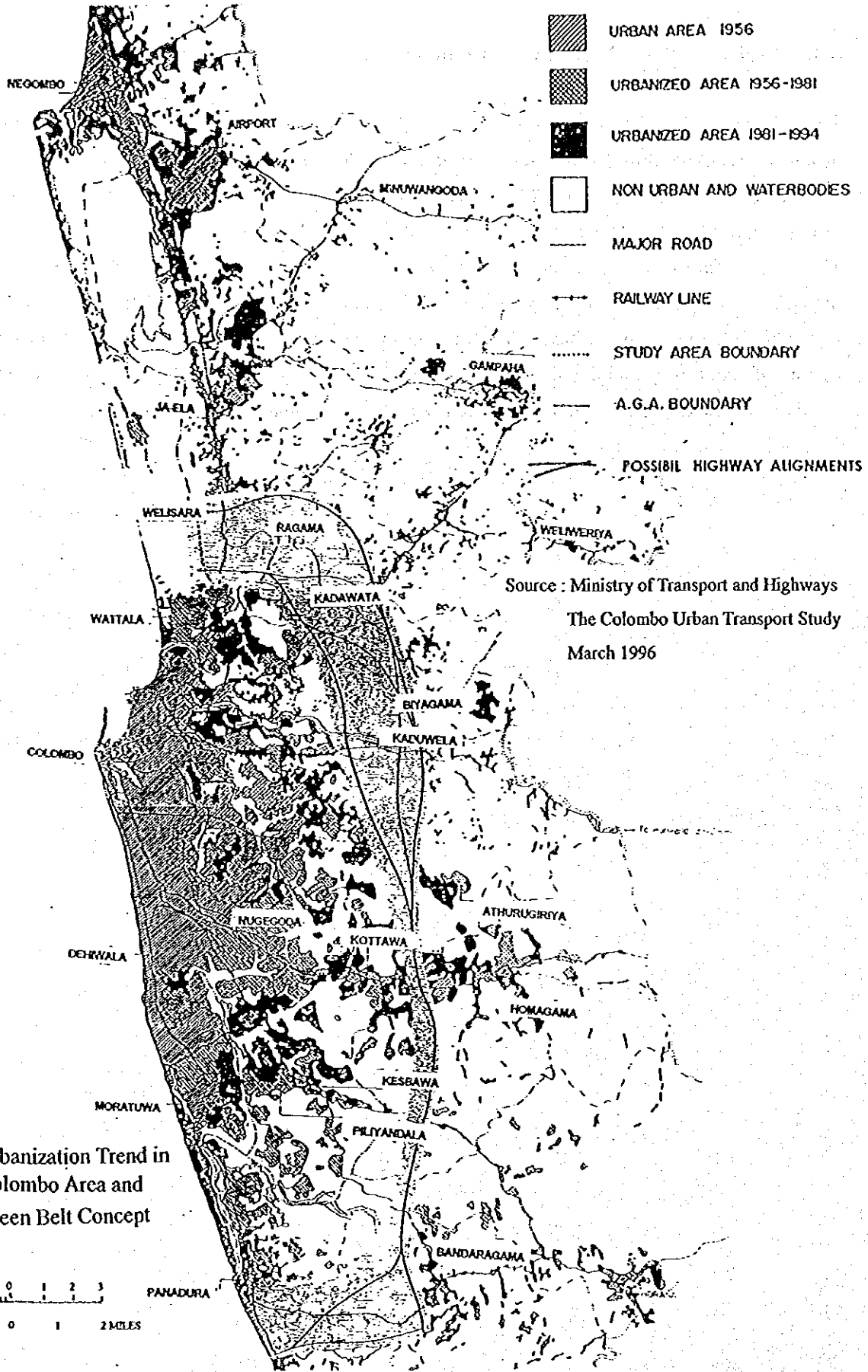
Notes : The analysis is made based on site visits and topographic map. Therefore values are not absolute on the tabulation.

### **8.3.2 Preferred Possible Highway Alignments**

The Outer Circular Highway will be expected to perform a function as Green Belt to intercept urban sprawl expanding from inner Colombo to suburban areas. ( refer to Fig. 8.5 )

Therefore, highway alignment is to be determined in consideration of the concept of the role of Outer Circular Highway and urban sustainability.

The Study Team has investigated several segments of the three ( 3 ) divided sections to find the preferred possible highway alignments. The comparison of alternative alignment segments have been made basing on the concept of urban sustainability consisting of three factors of economic, social and environmental sustainability. The possible alignment segments are then screened to eliminate those which are obviously unacceptable.



Source : Ministry of Transport and Highways  
 The Colombo Urban Transport Study  
 March 1996

Fig.8.5 Urbanization Trend in Colombo Area and Green Belt Concept

### 8.3.3 Prevalent Characteristics of Preferred Possible Alignments

The Study Team has selected 9 (nine) preferred possible highway alignments. The selection has been made based on the concept of urban sustainability, which consists of the three factors of economic, social and environmental sustainability. These alignments has been then evaluated by applying these factors, with comments from the RDA on the Progress Report taken into consideration. The prevalent characteristics of the 9 (nine) preferred possible alignments are summarized as follows:

#### A1 (a<sub>1</sub>-c<sub>1</sub>-e-f<sub>1</sub>-g-h<sub>2</sub> approx. 49.37km)

##### a<sub>1</sub>-c<sub>1</sub> (approx. 12.09km)

This segment starts from the proposed Colombo – Katunayake Expressway junction at Nagoda, which is located in a proposed conservation area. The alignment crosses the Colombo – Puttalam Road (Route A3) near the 10km post. It then crosses two main railways headed for Negombo and Veyangoda approximately 3km north of Ragama Station and passes over high ground and rolling terrain interspersed with some paddy fields and rubber estates. It also crosses the Colombo – Kandy Road (Route A1) near the 17km post at around 1.5km from Kadawata going towards Kandy. The terrain profile varies from 3m in elevation at Nagoda near the coast and to 40m in elevation north of Ragama.

Some significant religious institutions like the Tewanthe Church, Prasansaramaya, and Boys Town can be avoided by marginally shifting the segment northward. The impact on the ecosystem, both fauna and flora, is insignificant as well is the impact on plantations. However, a large number of home gardens may be affected. The impact on economic activities is significant, while the overall environmental impact is considered to be in significant.

##### c<sub>1</sub>-e (approx. 14.41km)

The alignment passes over high ground and rolling terrain interspersed with some paddy fields. It crosses Route B214, A110, and the Kelani River on the way and passes at a point approximately 1,500m downstream from the existing Kaduwela Bridge. After Kaduwela, it continues to pass over high ground and rolling terrain interspersed with some paddy fields. The elevation at Kaduwela is 5m in height and is the lowest spot on this segment. The terrain then rises from Kaduwela to the north and south with undulations.

This segment runs between town and rural areas and crosses many minor roads. Site resettlement may be possible and the overall environmental impact is moderate.

**e - f<sub>1</sub> (approx. 15.30km)**

This is the fixed portion of the alignment that the RDA has already selected for the Southern Transport Corridor, which was examined in a feasibility study in 1998. The overall environmental impact for this section is moderate to low. This segment runs from the Colombo -- Ratnapura trunk road approximately 2km to the north and ends at about 3km north-west of Bandaragama. It passes between the toe of hill and paddy fields. The terrain profile is almost flat with gentle undulations.

This segment covers large land holdings that are rural in setting. Large tracts of cultivated land will be affected. The overall environmental impact is moderate.

**f<sub>1</sub> - g (approx. 4.74km)**

The alignment passes over high ground and rolling terrain interspersed with some paddy fields. It crosses the Bolgoda River and meets Route A8. The highest point on this segment is 20m above sea level and the lowest 0m at Bolgoda River.

The alignment mostly runs through scattered towns and rural areas. While the impact on the ecosystem may be moderate, impacts on economic activity will be insignificant. The overall environmental impact is moderate.

**g - h<sub>2</sub>(approx. 2.83km)**

This segment starts from Route A8 and ends at the Colombo -Galle Road ( Route A2 ) near the 30km post at approximately 3km south of Panadura. It passes over high ground and rolling terrain interspersed with some paddy fields. The elevation varies between 5m to 10m.

Impacts on resettlement and economic activities may be high and the overall environmental impact is expected to be significant.



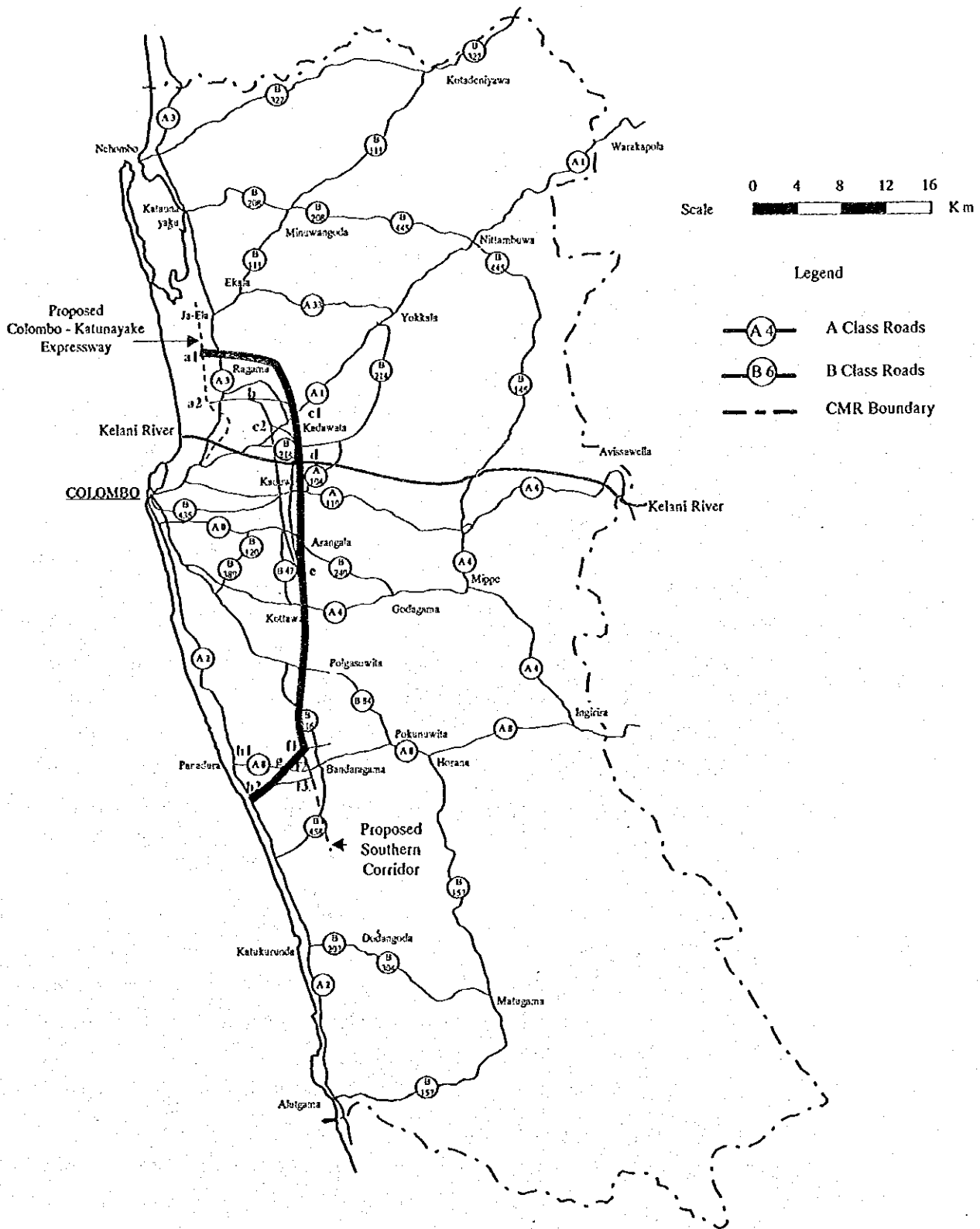


Fig.8.6 Alignment A1

**A2 (a<sub>2</sub>-b-c<sub>1</sub>-e-f<sub>1</sub>-g-h<sub>2</sub> approx.46.51km)****a<sub>2</sub>-b (approx. 2.59km)**

This segment starts from the proposed Colombo – Katunayake Expressway junction at Kerawalapitiya in which urban development is ongoing. The alignment crosses the Colombo – Puttalam Road (Route A3) near the 8km post. It then passes through marsh area and crosses the main railway 2km south of Ragama Station. The elevation of the marsh at Nawammhara is almost below sea level. The alignment runs through populated urban areas and industrialized areas along Route A3. Resettlement will be required for a part of this segment. The impact on ecosystem may be significant and many home gardens and marsh vegetation may be affected. The overall environmental impact will be insignificant if a large milk factory can be avoided.

**b-c<sub>1</sub> (approx. 6.64km)**

The alignment crosses Route B168 and passes over high ground and rolling terrain interspersed with some paddy fields. It also crosses the Colombo – Kandy Road (Route A1) at around 1km from Kadawata going towards Kandy. The terrain profile greatly varies, from 0m in height in paddy fields on both sides of Route A1 to 35m in height after crossing Route A1. The alignment runs through populated urban areas and industrialized areas Resettlement will be required for a part of this segment. The impact on the ecosystem is small, but economic activities will be affected. The overall environmental impact may be minimized by shifting the crossing point of Route A1 further north.

**c<sub>1</sub>-e (approx. 14.41km)**

The alignment passes over high ground and rolling terrain interspersed with some paddy fields. It crosses Route B214, A110, and the Kelani River on the way and passes at a point approximately 1,500m downstream from the existing Kaduwela Bridge. After Kaduwela, it continues to pass over high ground and rolling terrain interspersed with some paddy fields. The elevation at Kaduwela is 5m and is the lowest spot on this segment. The terrain rises from this low point to the north and south with undulations. This segment runs between town and rural areas and crosses many minor roads. Site resettlement may be possible and the overall environmental impact is moderate.

**e-f<sub>1</sub> & f<sub>1</sub>-g-h<sub>2</sub> (approx. 22.87km)**

This alignment is the same as A1.

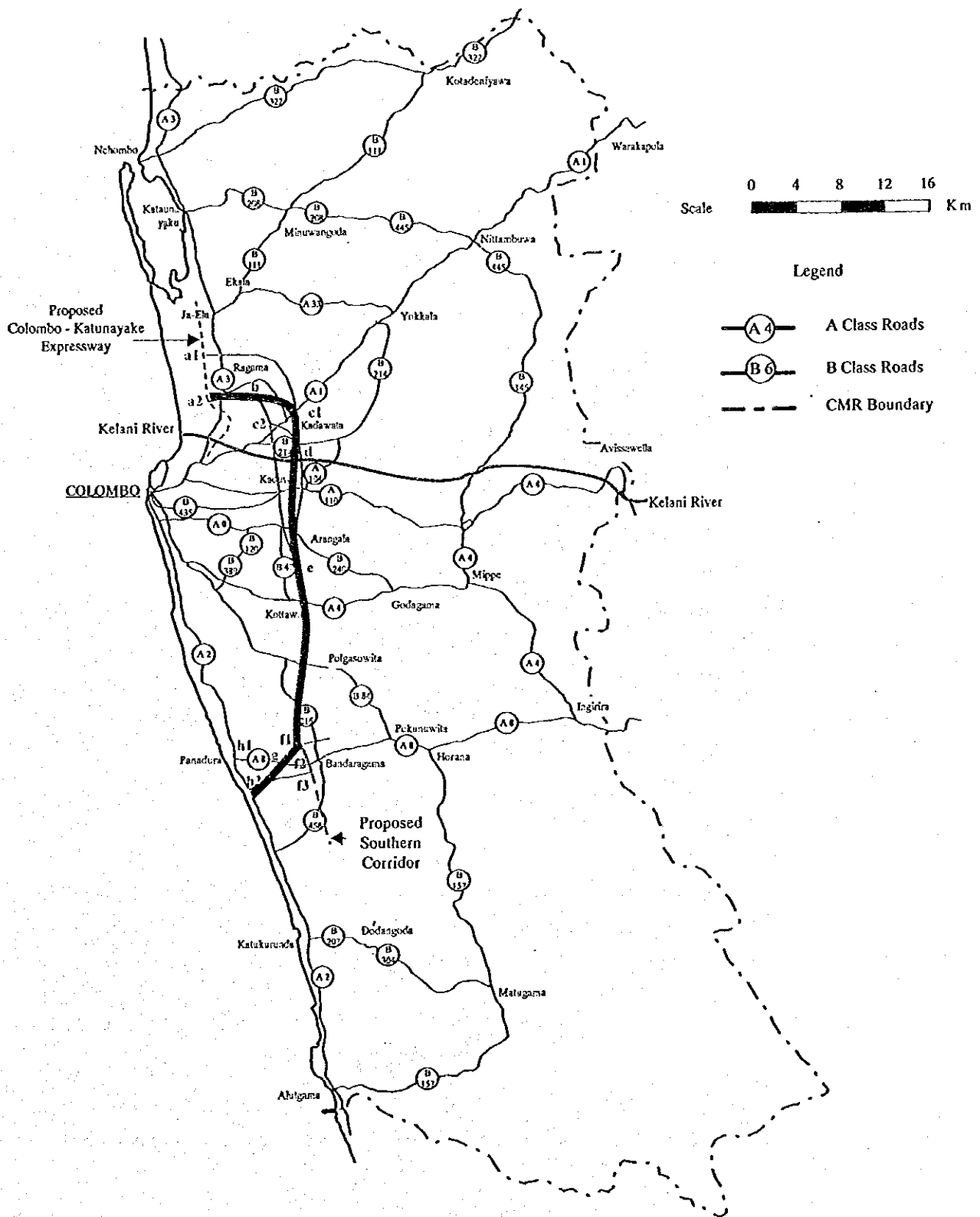


Fig.8.7 Alignment A2

**A3 (a<sub>2</sub>-b-c<sub>2</sub>-e-f<sub>1</sub>-g-h<sub>2</sub> approx 43.71km)****a<sub>2</sub>-b (approx. 2.59km)**

This segment starts from the proposed Colombo – Katunayake Expressway junction at Kerawalapitiya in which urban development is ongoing. The alignment crosses the Colombo – Puttalam Road (Route A3) near the 8km post. It then passes through marsh area and crosses a major railway 2km south of Ragama Station. The elevation of the marsh at Nawammhara is almost below sea level.

The alignment runs through populated urban areas as well as industrialized areas along Route A3. Resettlement will be required for a part of this segment. The impact on the ecosystem may be significant and many home gardens and marsh vegetation may be affected. The overall environmental impact will be insignificant if a large milk factory can be avoided.

**b - c<sub>1</sub>(approx. 3.15km)**

The alignment passes through marsh area and paddy field and meets the Colombo –Kandy Road (Route A1) near the 13km post about 2km before Kadawata going towards Kandy. The terrain is almost flat, varying from 0m to 5 in elevation. Traffic congestion on the Route A1 may be aggravated and the overall negative environmental impact is expected high.

**c<sub>2</sub>- e (approx. 15.10km)**

The alignment passes through paddy field and rolling terrain. It crosses Route B214, A110, and the Kelani River on the way and passes at a point approximately 4km west of Kaduwela. After crossing Route A110, it passes between the toe of hill and a paddy field. The terrain profile is the almost same as c<sub>2</sub>- d - e .

This segment crosses highly populated towns and industrialized areas with a number of minor crossings, and there is the possibility of significant community severance occurring. The overall environmental impact is high.

**e - f<sub>1</sub> & f<sub>1</sub>-g- h<sub>2</sub> (approx. 22.87km)**

This alignment is the same as A1 and A2.

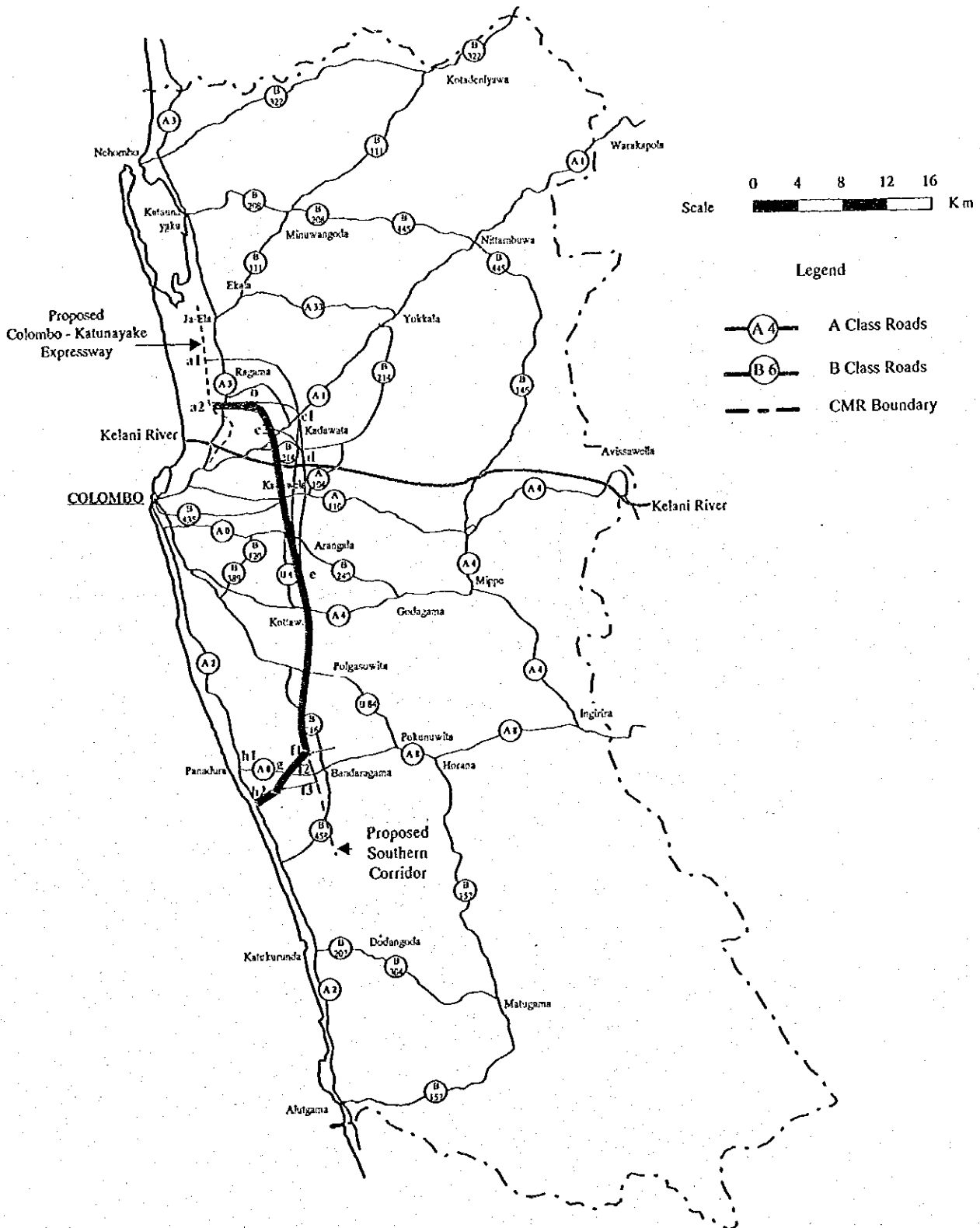


Fig.8.8 Alignment A3

**A4 (a<sub>1</sub>-c<sub>1</sub>-e-f<sub>3</sub>-h<sub>2</sub> approx.52.46km )****a<sub>1</sub>-c<sub>1</sub>-e-f<sub>1</sub> (approx. 41.80km)**

This alignment is the same as A1.

**f<sub>1</sub>-f<sub>2</sub>(approx. 2.88km)**

The alignment passes through paddy and boggy areas along the Bolgoda River and meets Route A8 near the 8km post 2km west of Bandaragama. The terrain profile varies from 2m to 10m high in elevation.

Some impacts on fauna and flora may be expected, while the impacts on economic activity are expected to be insignificant. The overall environmental impact is moderate.

**f<sub>2</sub>-f<sub>3</sub>(approx. 0.78km)**

The alignment passes through paddy and boggy areas on the east edge of Bolgoda Lake. The terrain profile varies from 2m to 10m in elevation. Some impacts on fauna and flora may be expected, while the impact on economic activity is expected to be insignificant. The overall environmental impact is moderate.

**f<sub>3</sub>-h<sub>2</sub>(approx. 7.00km)**

The alignment is located on the moorishy edge of Bolgoda Lake and crosses the Bolgoda River. This section extends from the proposed Southern Transport Corridor junction to Colombo - Galle Road ( Route A2 ). The lowest point is below sea level and is located at the Bolgoda River. The terrain rises up from there towards Route A2

The impact on the ecosystem is expected to be high, while the impact on resettlement may be moderate.

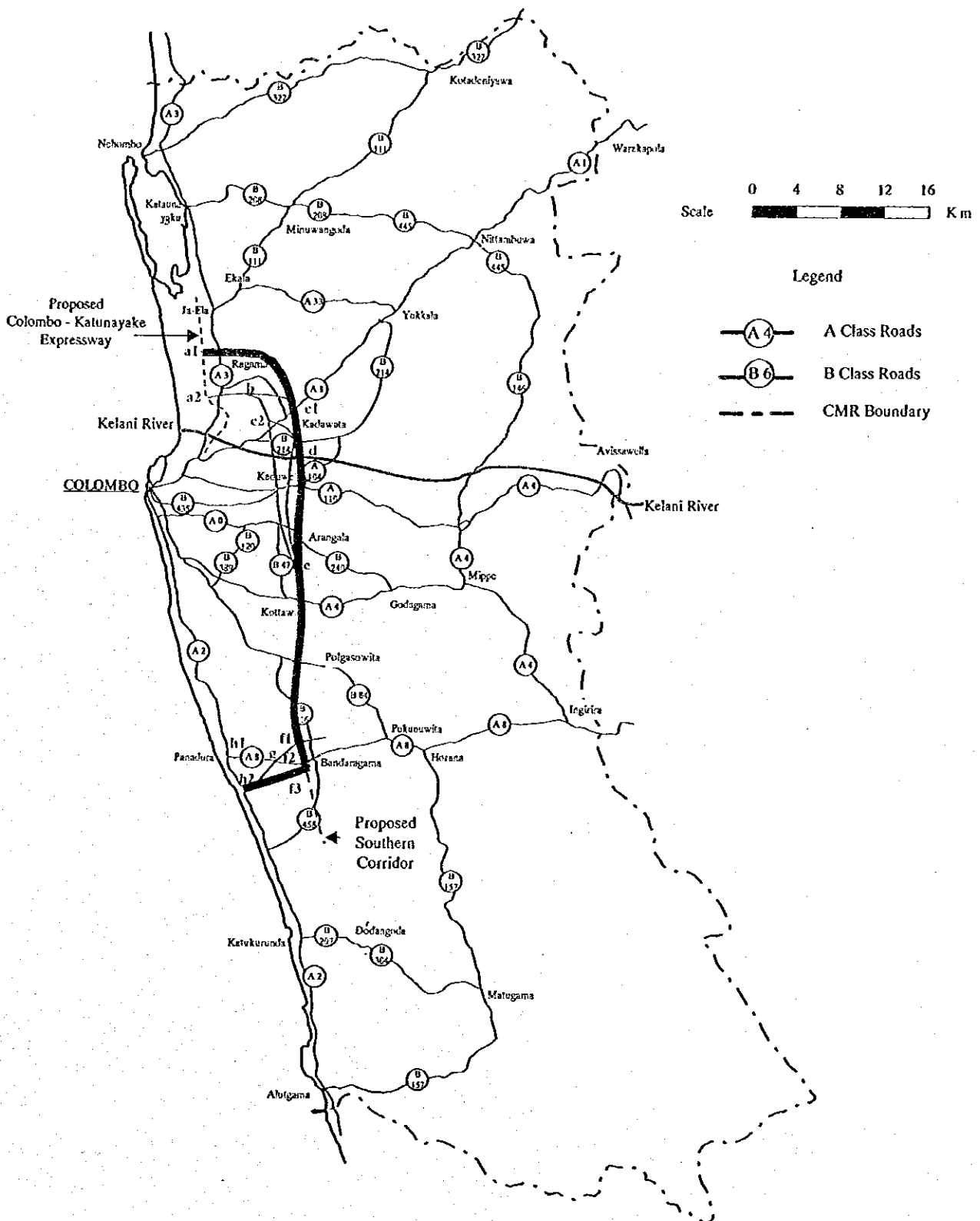


Fig.8.9 Alignment A4

**A5 ( a<sub>2</sub>- b - c<sub>1</sub>- e - f<sub>3</sub>- h<sub>2</sub> approx.49.60km )**

**a<sub>2</sub>- b - c<sub>1</sub>- e- f<sub>1</sub> (approx. 38.94km)**

This alignment is the same as A2.

**f<sub>1</sub>- f<sub>2</sub>- f<sub>3</sub>& f<sub>3</sub>- h<sub>2</sub>(approx. 10.66km)**

This alignment is the same as A4.



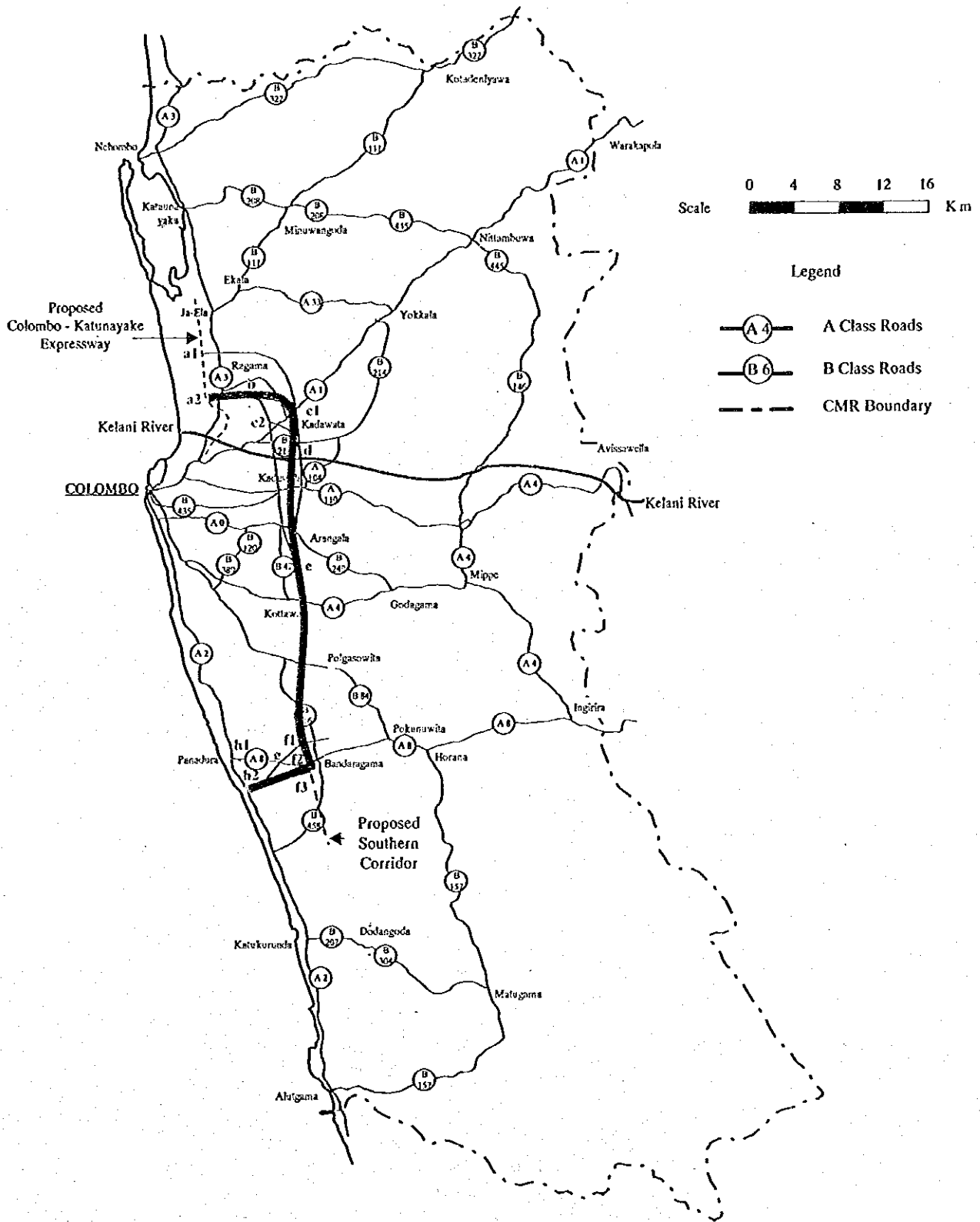


Fig.8.10 Alignment A5

**A6 ( a<sub>2</sub>- b- c<sub>2</sub>- e - f<sub>3</sub>- h<sub>2</sub> approx.46.80km )**

**a<sub>2</sub>- b- c<sub>2</sub>- e - f<sub>1</sub> (approx. 36.14km)**

This alignment is the same as A3.

**f<sub>1</sub>- f<sub>2</sub>- f<sub>3</sub>& f<sub>3</sub>- h<sub>2</sub>(approx. 10.66km)**

This alignment is the same as A4 and A5.

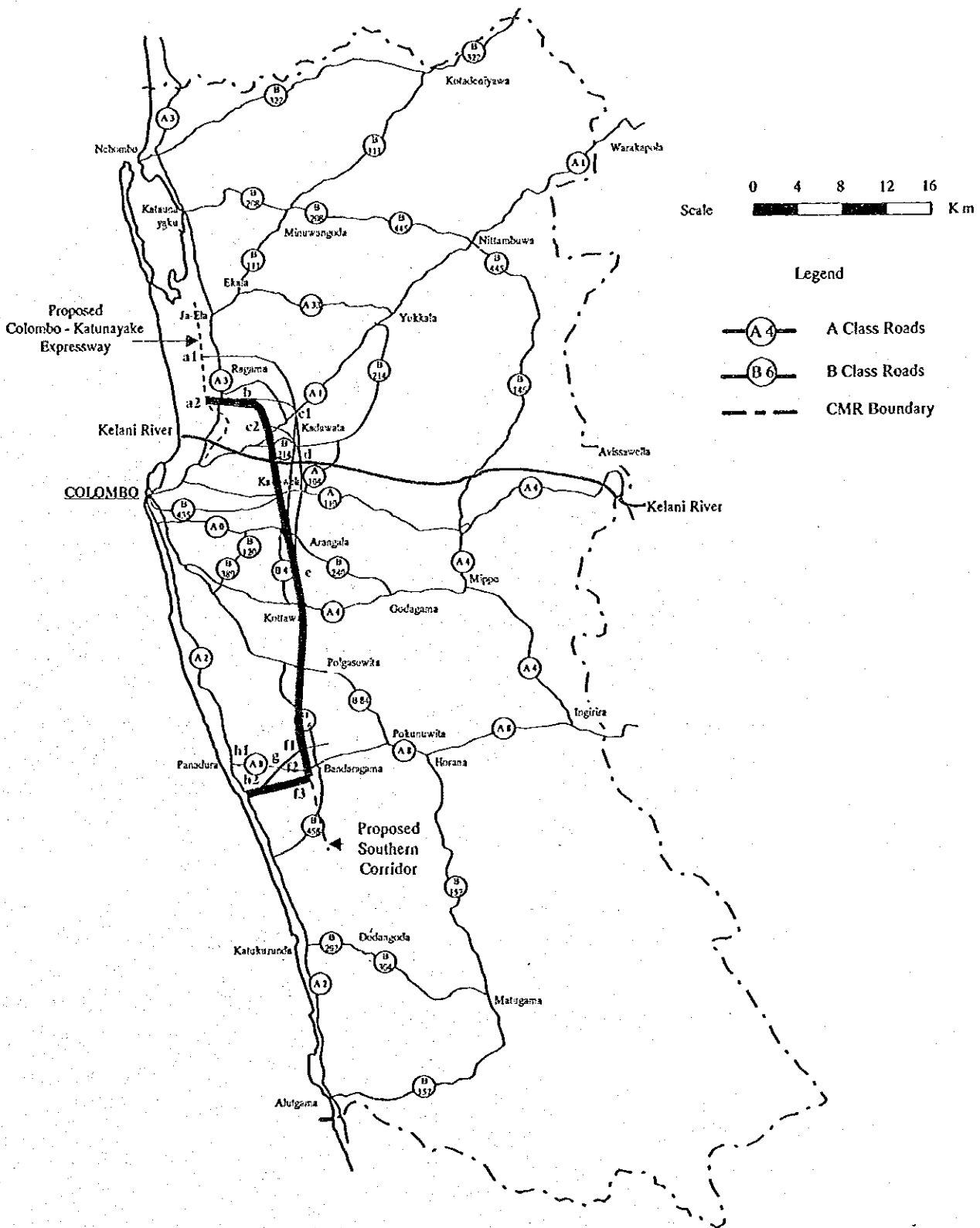


Fig.8.11 Alignment A6

**A7 (a<sub>1</sub>-c<sub>1</sub>-e-f<sub>2</sub>-g-h<sub>1</sub> approx.52.58km)****a<sub>1</sub>-c<sub>1</sub>-e-f<sub>1</sub> (approx. 41.80km)**

This alignment is the same as A1 and A4.

**f<sub>1</sub>-f<sub>2</sub>(approx. 2.88km)**

The alignment passes through paddy and boggy areas along the Bolgoda River and meets Route A8 near the 8km post 2km west of Bandaragama. The terrain profile varies from 2m to 10m in elevation. Some impacts on fauna and flora are expected, while the impact on economic activity is expected to be insignificant. The overall environmental impact is moderate.

**f<sub>2</sub>-g-h<sub>1</sub> (approx. 7.90km)**

The alignment starts from Route A8 near the 8km post 2km west of Bandaragama and ends at the Colombo - Galle Road ( Route A2 ) near the 27km post at Panadura. The Panadura - Bandaragama - Horana - Ingiriya - Ratnapura ( Route A8 ) road is one of the trunk roads that connects Panadura, and it runs from Galle Road ( Route A2 ) to Ratnapura (i.e., the Provincial Capital of Sabaragamuwa Province).

The road section from Panadura to Ingiriya, the 34km post, will be rehabilitated starting from 1999. The scope of work for rehabilitation is listed below.

- (1) Widening of the road pavement to a 2-lane standard
- (2) Improving the alignment at critical sections
- (3) Providing well-constructed road shoulders
- (4) Rehabilitation of existing road pavement and provision of a wearing surface
- (5) Improvement of culverts, bridges, and drainage

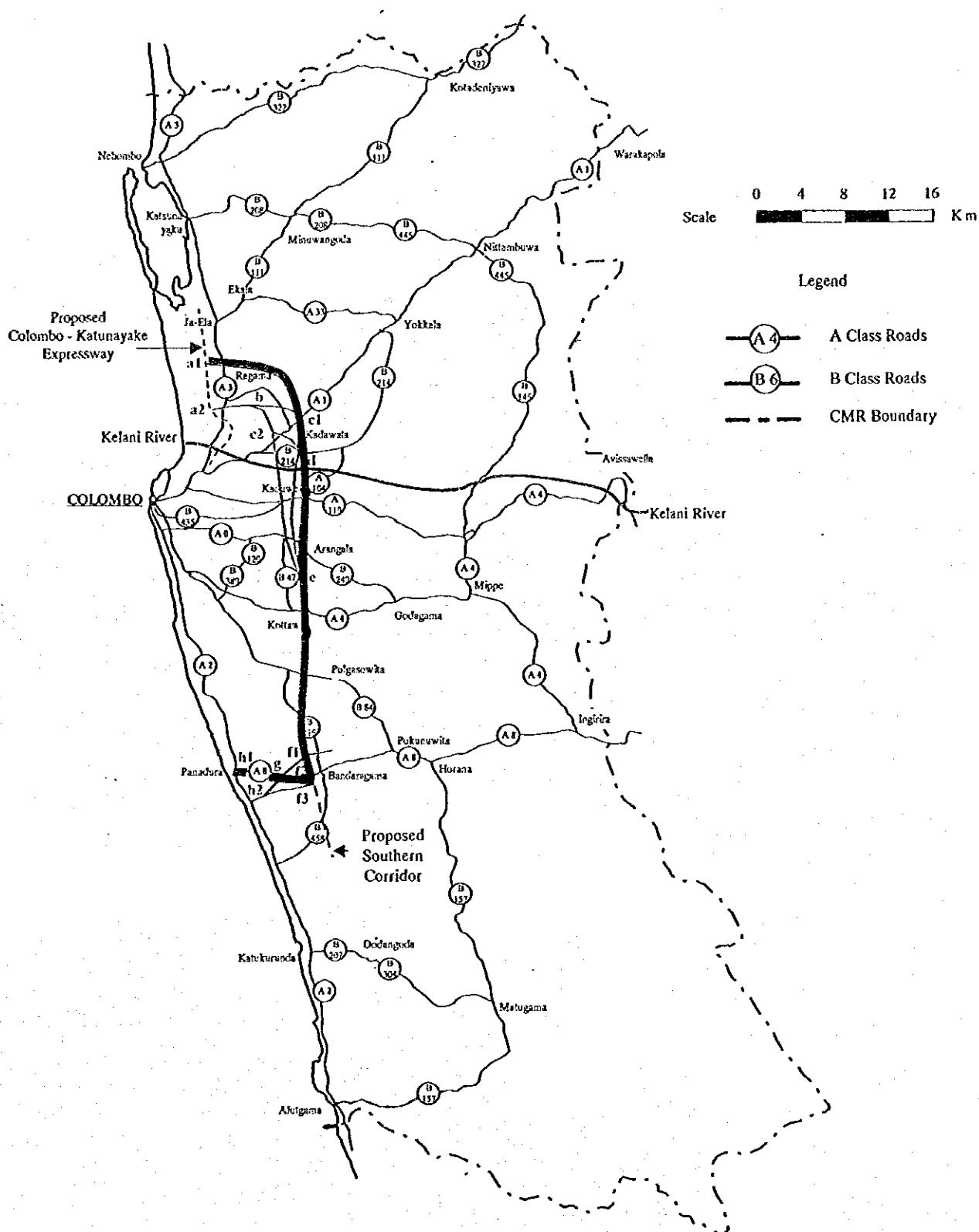


Fig.8.12 Alignment A7

**A8 (a<sub>2</sub>-b-c<sub>1</sub>-e-f<sub>2</sub>-g-h<sub>1</sub> approx.49.72km)**

**a<sub>2</sub>-b-c<sub>1</sub>-e-f<sub>1</sub> (approx. 38.94km)**

This alignment is the same as A2 and A5.

**f<sub>1</sub>-f<sub>2</sub>& f<sub>2</sub>-g-h<sub>1</sub> (approx. 10.78km)**

This alignment is the same as A7.

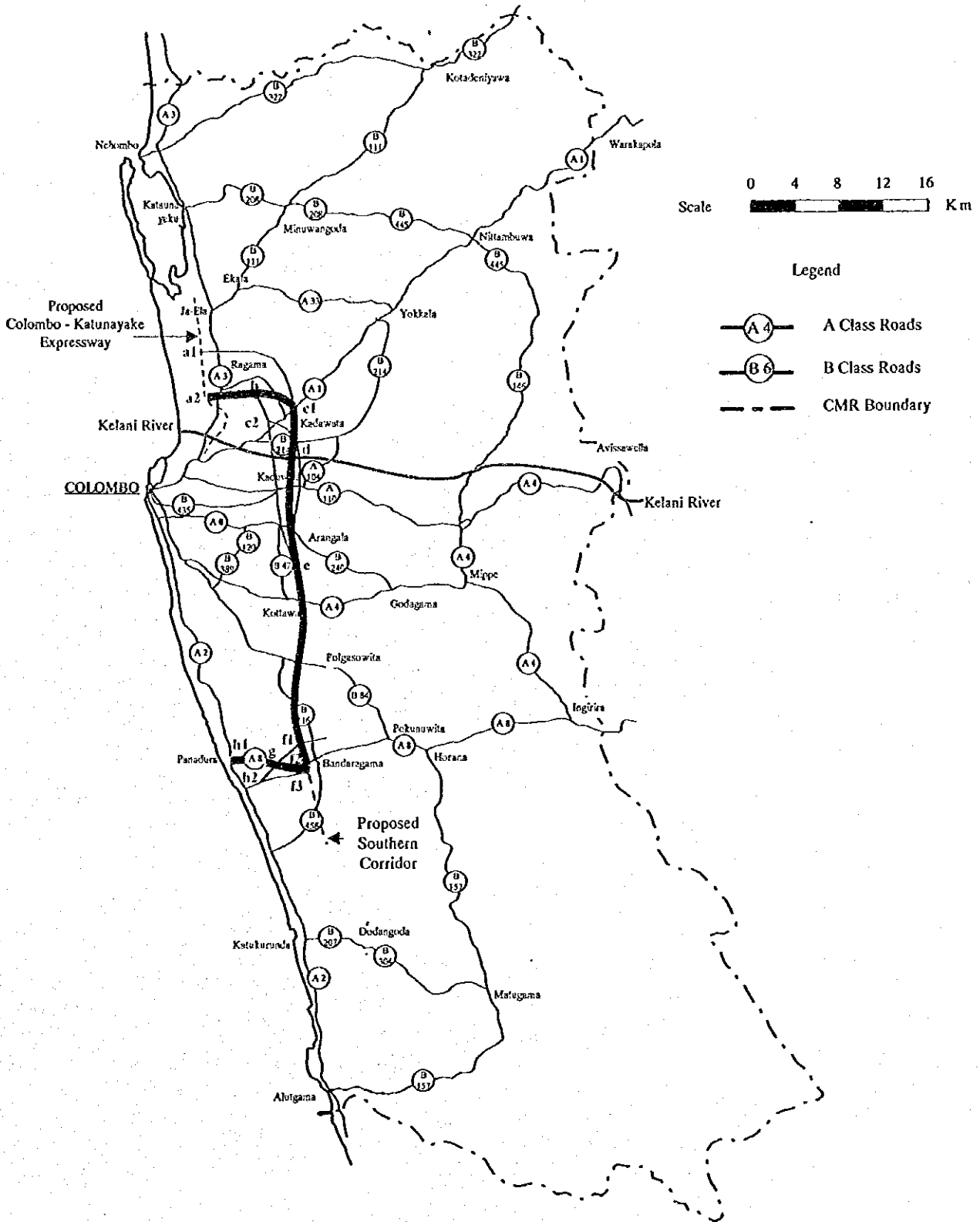


Fig.8.13 Alignment A8

**A9 (a<sub>2</sub>-b-c<sub>2</sub>-e-f<sub>2</sub>-g-h<sub>1</sub> approx.46.92km )**

**a<sub>2</sub>-b-c<sub>2</sub>-e-f<sub>1</sub> (approx. 36.14km)**

This alignment is the same as A3 and A6.

**f<sub>1</sub>-f<sub>2</sub>& f<sub>2</sub>-g-h<sub>1</sub> (approx. 10.78km)**

This alignment is the same as A7 and A8.



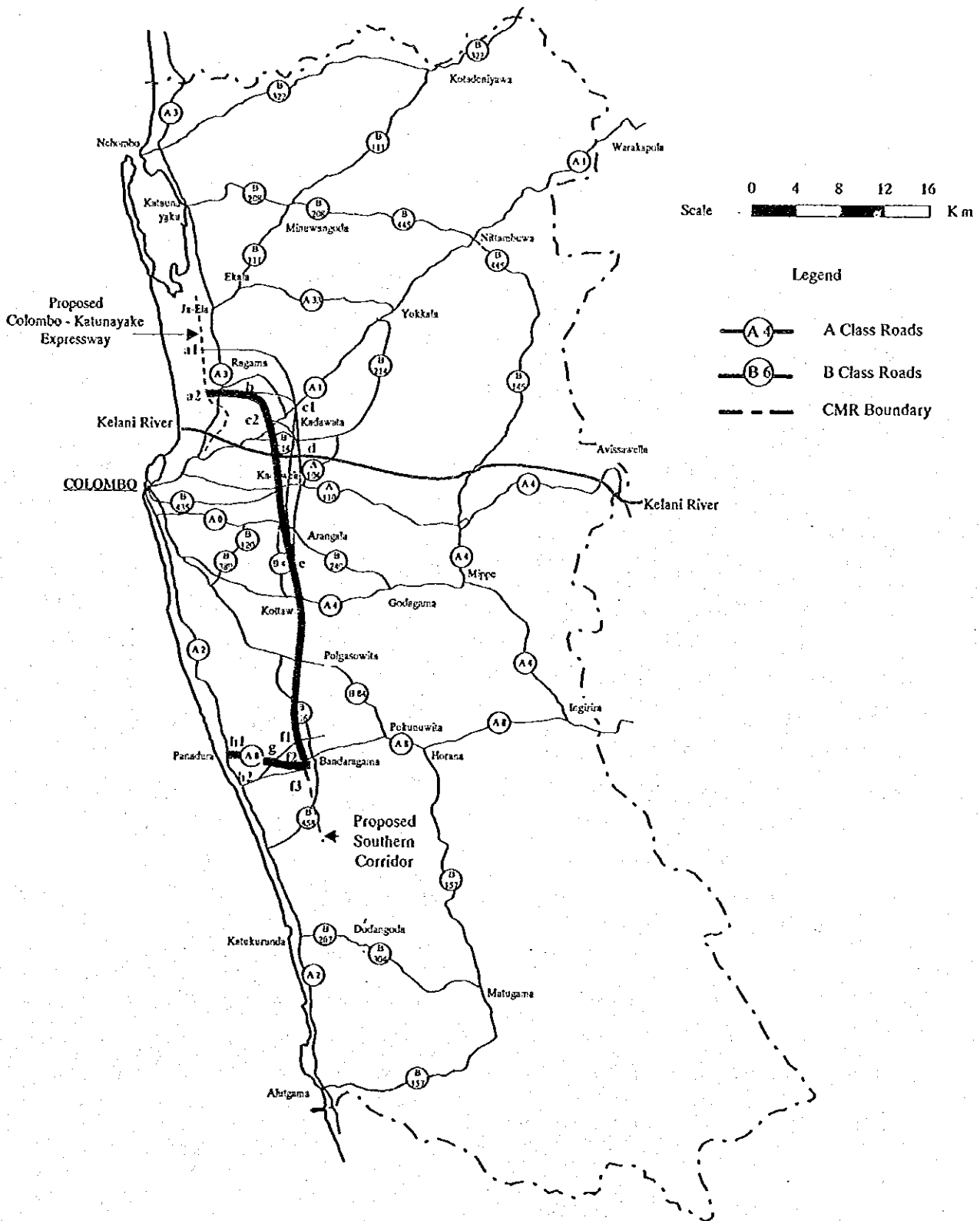


Fig.8.14 Alignment A9

### 8.3.4 Aerial Photographs of Preferred Possible OCH Alignments

The aerial photographs which have been taken on February, 1999 by the Survey Department, have been applied for further processing such as producing mosaic photographs with a scale of 1/20,000 and topographic maps with a scale of 1/5,000 and 1/2,000. The two sets of contact prints and one set of diapositives pertaining to the Study area of the Outer Circular Highway have been taken out to Japan.

The aerial photographs have been digitized by scanning and been compiled as photograph mosaic data in the following manner :

(1) Scanning and digitalization of aerial photographs

The aerial photographs are scanned with resolution of 800 dpi.

(2) Digital Mosaic

Digital photograph data are retrieved and shown on screen, and the photograph images are connected one by one.

(3) Compilation and Original Mosaic

Mosaic sheets are arranged according to the index map. Major roads and rivers are annotated on the monitor as original mosaic data. Original mosaic data are compiled by providing marginal information, such as photograph mosaic scale, sheet number, adjoining sheet map and north direction.

(4) Output

Final results are produced by laser plotter at 800 dpi. resolution

(5) Main Equipment to be used

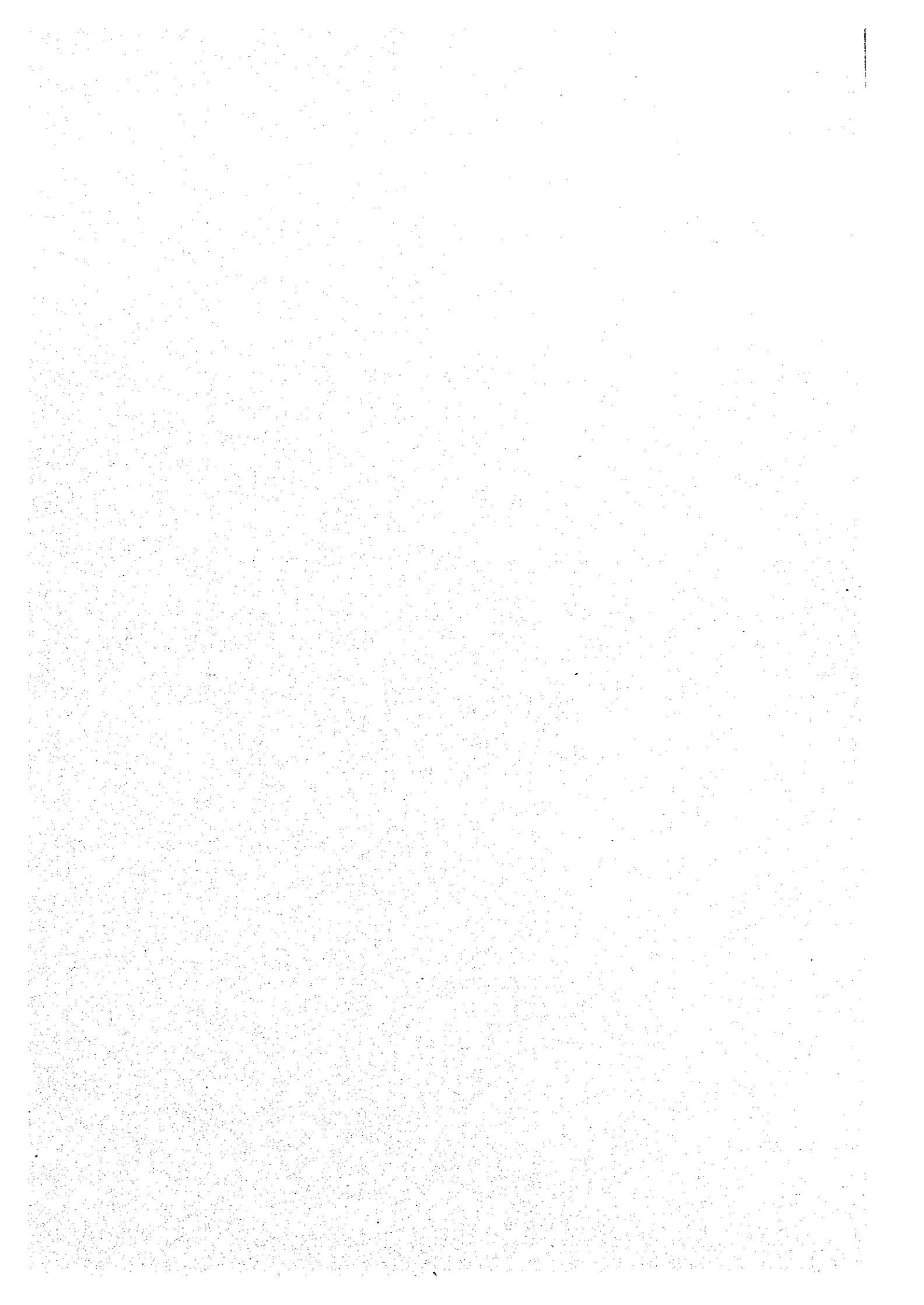
Software : ER Mapper 5.2

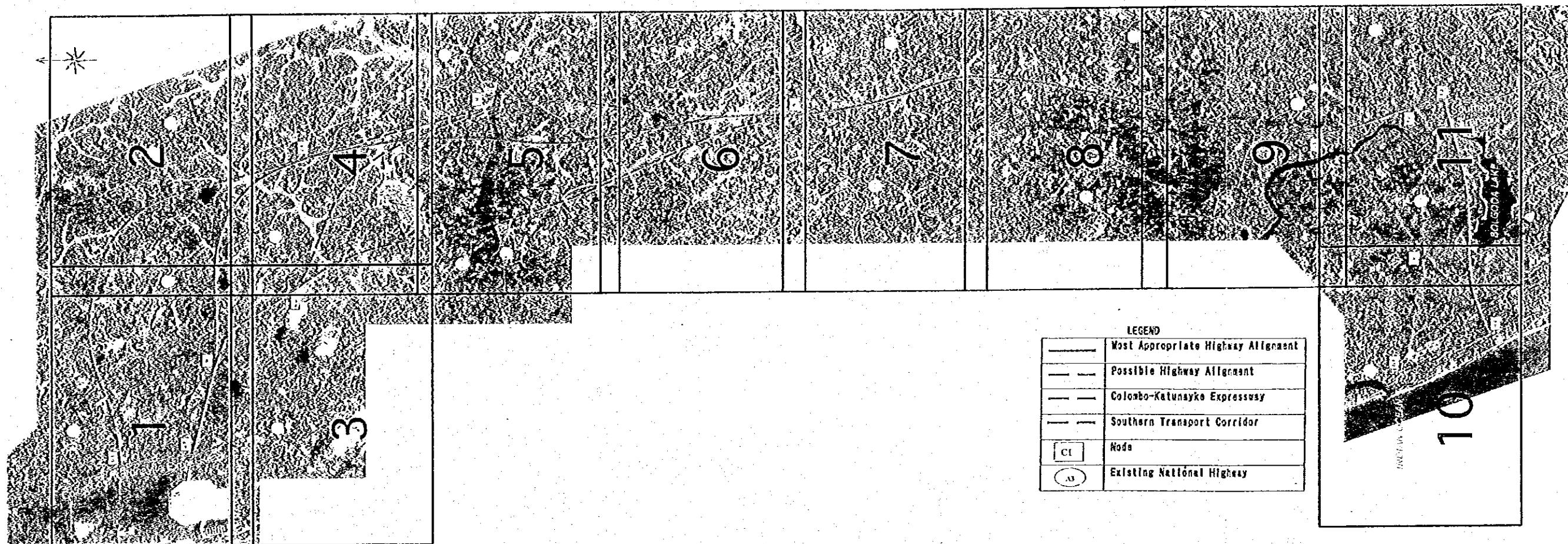
Scanner : UMAX ; Mirage II , CPU; Pentium 150, Hard disk, 2.5GB

Computer : CPU ; Pentium 233(RAM 64 MB), Hard disk, 6 GB

Laser Plotter : Lightjet 5000

The mosaic photographs produced with the above manner have been utilized for the evaluation of preferred possible alignments and the selection of most appropriate highway alignment. The mosaic photographs in which the highway alignments are plotted are shown next.





LEGEND

	Most Appropriate Highway Alignment
	Possible Highway Alignment
	Colombo-Katunayake Expressway
	Southern Transport Corridor
	Node
	Existing National Highway

1 : 120,000  
 AREA  
 THE STUDY ON THE OUTER CIRCULAR HIGHWAY  
 TO THE CITY OF COLOMBO  
 MOST APPROPRIATE HIGHWAY ALIGNMENT  
 ORIGINAL CONSULTANTS' DRAWING  
 MAY - 88

Fig.8.15 Location Map: Highway Alignment on the Mosaic Potograph

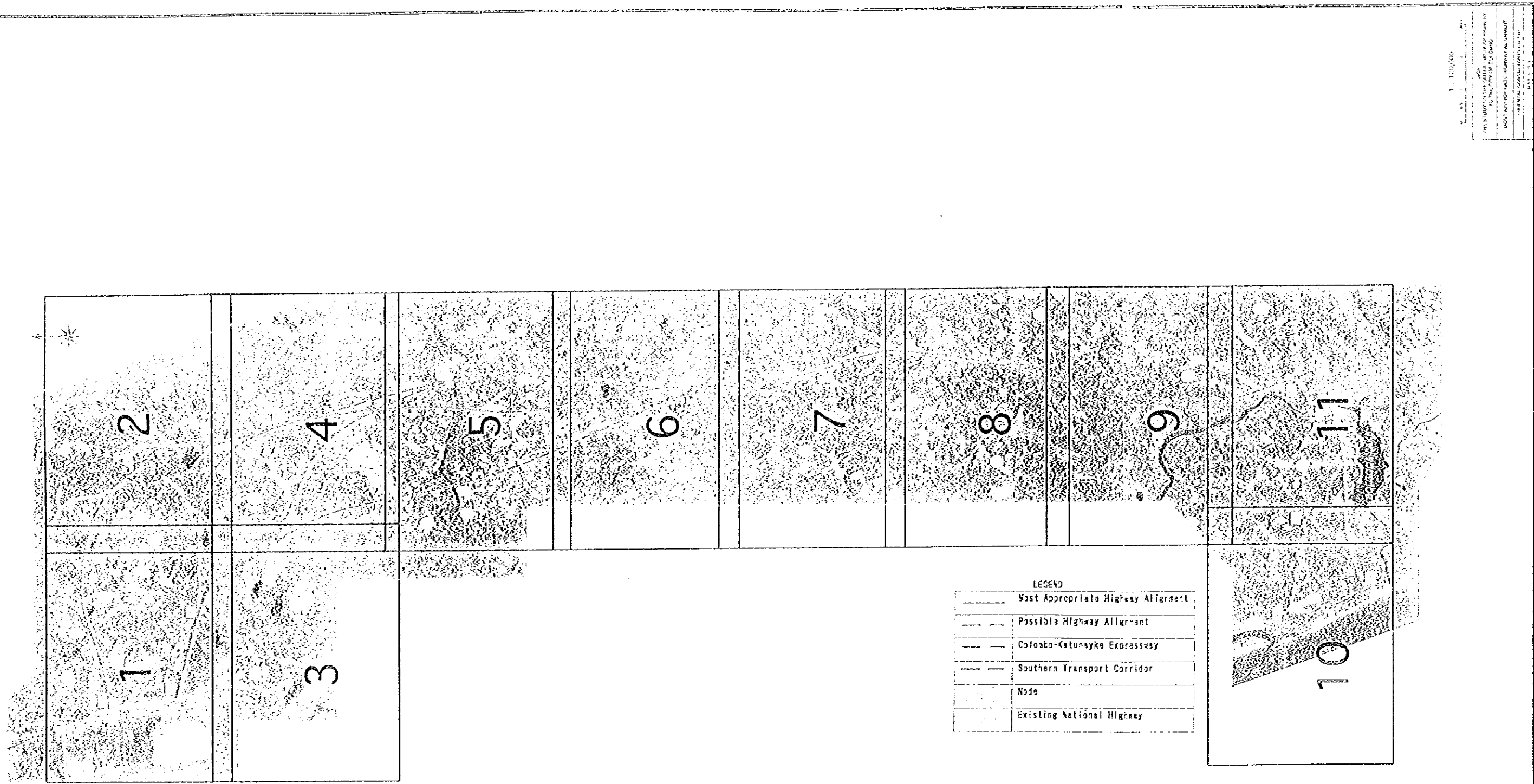


Fig.8.15 Location Map: Highway Alignment on the Mosaic Photograph

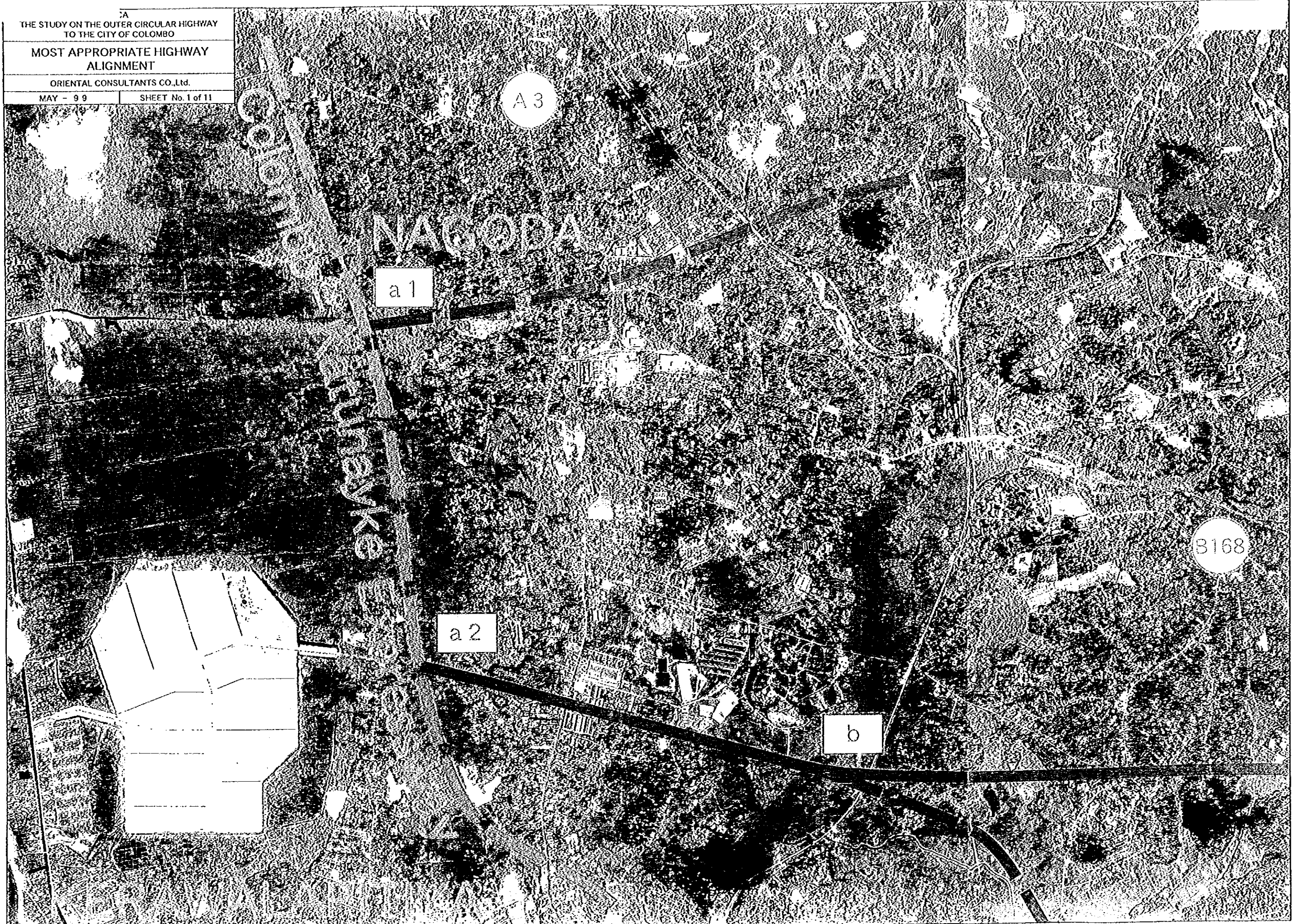
THE STUDY ON THE OUTER CIRCULAR HIGHWAY  
TO THE CITY OF COLOMBO

**MOST APPROPRIATE HIGHWAY  
ALIGNMENT**

ORIENTAL CONSULTANTS CO., Ltd.

MAY - 99

SHEET No. 1 of 11



JICA  
THE STUDY ON THE OUTER CIRCULAR HIGHWAY  
TO THE CITY OF COLOMBO

**MOST APPROPRIATE HIGHWAY  
ALIGNMENT**

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