OFFICE FOR THE REVISION OF ADDIS ABABA MASTER PLAN

NORMS AND STANDARDS

OF

THE ADDIS ABABA STRUCTURE PLAN COMPONENTS

May, 2002

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Introduction

The Standards and norms are one of the major components of the Addis Ababa Structure Plan, which is a framework for guiding future development activities in the city. Within this framework, and the assumption of planning as a continuous process the Norms and Standards are developed to be used as basic planning elements in the preparation of Local Development Plans, other detail plans, including those to be prepared for improvements and also spot interventions. They are basically developed to give responsive implementation tools that are used as instrument for phased, flexible, targeted, and scaled development and improvement. They also provide flexible implementation tools that give opportunity for timely evaluation, monitoring and correction at appropriate steps.

Setting of this preliminary standards and norms is aimed at bringing

- Well-balanced hierarchy with efficient, balanced and equitable distribution of services, and up to standard facilities at various levels
- Well-organized, serviced, healthy and liveable neighbourhoods that have good urban quality, mixed land use, and social integration characteristics.

In view of the changing nature of planning due to uncertainties and unforeseen socioeconomic changes involved, there is a need for revising the norms and standards according to the objective realities and conditions that arise within and beyond the planning period.

PART I- NORMS AND STANDARDS OF MAJOR LANDUSES OF THE STRUCTURE PLAN

1. HOUSING

1. Standards for social mixity: land budget share for high, middle and low-income groups in detail planning and corresponding plot area standards in intermediate and expansion areas (income group percentage modified according to Effective Demand).

Income groups	Social mixity percentage	Assumed plot area for a unit in m.sq.	Assumed population share to respective plot sizes	Remarks
High – income	5%	300 (average plot area)	50%	Average plot area is calculated from information obtained from lease office. However the use of land requested for such housing shall be regulated by the guidelines provided in consecutive sections of this document.
		500 (average plot area)	50%	
Middle-income	21 %	150	50%	Plot area adopted from existing standards. Part of this income group could also be allocated the 120 m. sq. plot, depending on circumstances.
		175	50%	
Low-income	74%	75	25%	Housing for the low-income is proposed to be developed through block approach and there should not be individual plots below 150 m. sq. Therefore these plot areas are proposed to be used only as a basis for land budget estimation. Rental housing to be provided by the government and private developers are also assumed to have similar average plot areas. The percentage corresponding to plot standards could be modified according to the objective realities and over all implementation results of consecutive periods. There should also be an option of 150 m.sq. plot depending on local conditions
		95	25%	
		105	25%	
		120	25%	

NB: From the total housing need the effective demand is 73%. Taking this effective demand to be 100%; the Percentage of high, middle and low-income group to be allocated minimum serviced land (for rental, owner-occupied, real estate developers etc) respectively is 5, 21 and 74%.

2. Area/HH standards in core, intermediate and expansion areas

Areas	Average land area per House Hold (M. sq./HH)		
	For pure residential use	**For housing units and supporting physical and social infrastructure services**	**For housing units, supporting physical and social infrastructure and higher level uses**
Core	40-80	80-100	100-120
Intermediate	80-130	130-140	140-150
Expansion area	125	185	215

- It shall be noted that the area/hh standard for core areas are not plot area par se but are the ground area share of pure residential use per household. Communal spaces and facilities are excluded. For example a G+2 building that accommodates 20 families (mixed use at ground floor and the other floors for housing) will have 800-1600 m. sq. ground area. Such arrangement works for condominium housing and related mixed uses. Thus it is recommended that as far as applicable and practicable such buildings and housing typologies should be built in core areas of the city.
- Neighbourhood services and higher-level uses should be developed using guidelines, standards and norms proposed by this and other component studies.

3. Housing typologies

Area	Housing typology	Remarks
The city core	G+0-G+5, row houses, duplex, cluster, flats in rental and condominium walk-up apartments.	Existing low-income households should also be integrated in High-density residential developments of core areas through renewal projects.
The intermediate zone	G+0-G+5 flats in rental and condominium walk-up apartments	Medium density area
Expansion areas	Formal/informal, incremental cluster and/or row housing G+0, G+1- G+4 and flats in walk-up apartments	Low density areas

Refer to the density standards of respective areas presented below.

4. Housing area standards

Income-group	Minimum habitable housing standard (m^2)	
Low-income	20	It consists of a multi-purpose room (13 m^2), toilet (3 m^2) and kitchen (4 m^2) will be built at the first phase and an additional bedroom of 10 m^2 at the final stage.
Middle-income	30	It consists of a living room (13 m^2), toilet (3 m^2) and kitchen (4 m^2) and 10 m^2 bedroom at the first phase and an additional bedroom of 10 at the final stage.
High income	-	

5. Existing and proposed population density levels in Addis Ababa and the proposed intervention mechanism

No.	Density zone	Proposed Net house hold Density HH/Hect.	Proposed net population density levels in Addis Ababa (Inh./hect)	Catchment radius and areas included in the density zone	Proposed intervention mechanism
1	Core Area	125-380	650-2000	Areas within 5 Km radius: Merkato, Teklehaimanot, Piazza, Lagaar, Mexico, Kazainchis etc.	Maintain the density by encouraging the change of housing typology from single to multi storey walkup buildings (through condominium and other systems) and introduce required services within the space to be obtained. Most of the housing in this areas are Kebele owned so an appropriate privatization mechanism shall be prepared.
2	Intermediate Zone	80-125	400-650	Areas between core and infill.	Increase the existing density by encouraging residents to build rental units within their existing properties for housing other uses. Also allow people to sell part of their properties to other users.
		80-125	400-650	Infill areas	Increase the density to the proposed level by identifying and encouraging devt. of new plots within the existing infill areas.
3	Periphery and Expan. areas	54-80	280-400	Existing non-and partly built-up areas.	To be developed according to the density and other guidelines proposed in this and other structure plan component studies

- Gross residential density in expansion areas (where all levels of uses are included) will be 246 inh/hect. or 47 households/hect.

6. Minimum basic physical infrastructure service standards at wide weave grid level.

No	Services	Minimum requirement	The lowest Level of provision	Remarks
1	Road	Gravel	Collector	Compacted and well surfaced with gravel
2	Access roads	Well compacted	At block level	At the first phase but has to be upgraded as the settlement develops.
2	Water	Main water lines and public tap	Collector	Public taps are proposed to be provided for the low-income group
3	Electricity	Main lines	Along collector streets	House to house connection has to be provided at the completion of the construction
4	Telephone	Public telephone	At least public phone have to be provided at selected spots	House to house connection has to be provided after the residents started to live in the area.

7. Standards for plot preparation: Housing development type and corresponding percentage breakdown according to income sub-category (modified based on the effective Demand).

Housing development type	Percent. Share from tot. Housing	Percentage breakdown according to income sub-category (%) taking those in the column at the left as 100%			Remark
		Low	Middle	High	
Rental- apartments, villas, simple units, & low-cost housing	25%	45	35	20	Interventions by the City Government to make rents affordable are very important Use of local materials in the construction of low-income rental housing should also be allowed
Real estate housing	7%	-	25	75	Regulatory mechanisms and relevant laws and by-laws shall urgently be set-up and enforced.

Individual builders through cooperatives	45%	74	21	5	Provisions for improvement of affordability shall be considered
Formal Informal	20%	100	-		Minimum regulations should be implemented urgently.
Public housing by City Govt, institutions and organizations	3%	100	-	-	Responsible institution should be set-up to coordinate individual efforts of supporting the urban poor.

8. Landuse mixity standards

No.	Housing component	Proposed percentage from the total specific settlement area		
		Core	**Intermediate**	**Periphery**
1	Residence	35-45	40-50	50-65
2	Administration, Commerce including mixed commerce, residence, service, and other compatible uses.	20-30	15-25	5-10
3	Services	10-20	15-25	5-10
4	Manufacturing (only non-polluting compatible activities should be allowed in core and intermediate areas)	0-5	0-5	5-10
5	Recreation, and green areas	5-10	5-10	10-15
6	Roads (local access and collector streets)	15-20	15-20	15-25

- The actual landuse mixity will be result of specific site conditions.

9. Site Occupancy Ratio Standards

N0	Plot size	Site Occupancy Ratio (SOR) Number of stories.
	<150	- Single storey detached Max. 75% - Single storey attached Max 65% - Two and three storey detached Max 60% (rental or condominium)
	150-175	- Single storey detached middle-income- Max 65% - Single storey semi-detached - Max 60% - Single storey attached - Max 55% - Two and three storey detached - Max 60% - Two and three storey semi-detached -55% - Two and three storey attached - Max 50%
	175-250	G+1-G+2- Min 65 **%**
	250-400	G+0, G+1 Min 65 and 50% respectively
	400-600	For G+2, G+1-and G+0 Min 45, 50 and 65 Respectively.
	>600	G+0, G+1, G+2 Min 40% and above shall be allowed. In doing so proposed facilities and building elements shall be considered.

- In allocating land for high-income, minimum Site Occupancy Ratio should not be lower that 40 per cent for G+2 housing units and the maximum not more than 65 per cent for G+0 residential complexes
- Maximum SOR for low and middle-income housing in expansion areas should be 75 and 65% respectively.

10. Household sanitation standards

- A housing unit should have a septic tank or a connection to a public sewer system
- Size of septic tank (clear space) should correspond to family size and within a range of 8-27 cu.m for economical and efficient usage
- Setback standards of septic tanks stipulated in the building permit document should be respected.

11. Greenery and Environmental norms and standards

- One plot one tree for plots of area up to 150 m sq. and 1 tree for every additional 100 m sq. plot area.
- 12-25 % of a plot area should be unsealed (for greenery and natural open space so that rain water should percolate to the ground, decrease water discharge and reduce runoff).
- Green areas of different standards (Neghibourhood-city level) should be provided and developed according to the norms and standards provided in the Social Facilities component.
- In any case an average of 0.5-1m sq./person should be reserved for green spaces

2. ROAD NETWORK

2.1. General

Design and construction of roads (Local, Collector, Sub-arterial and Principal Arterial Boulevards, Avenues, and High speed Streets) should be based on the typical cross-section standards proposed in this document. Utility lines construction should also refer to these cross-section standards

2.2. Road width standards

No	Streets	Right-off-way width (m)			Remarks
		Core areas	Intermediate Zone	Expansion Areas	

1	**Principal arterial - PAS**	25,30	25, 30	30, 40, 50, 60, 100, 120 m	In existing built up areas, where widening is difficult, 25m streets are also categorized as principal arterial ones.
2	**Sub-arterial-SAS**	20,25	20,25,30	20 and 25 m	In some cases, existing streets of 30 m width with less important connections are categorized as sub-arterial streets.
3	**Collector streets -CS**	>11 and <20	>11 and <20	>11 and <20	Within the built-up area where widening is difficult, streets with width less than 12 m having important function in collecting traffic are also categorized as collector ones.
4	**Local Streets- LS**	4-10	8-10	10-12	Special design and traffic management considerations should be taken into account to use existing streets in the built-up city areas. Widening of streets targeting at optimum size should be considered in Redevelopment projects.

- Minimum access roads
  - In core areas should be minimum of 4 m for single plot and 6 m for shared access (if more than one plots use). Special design and traffic management considerations should be taken into account to use existing streets in the built-up city areas efficiently.
  - In intermediate zones should be 8 m and
  - 10 m in expansion areas

2.3. Streets Spacing Standards

No	Streets	Standard Spacing
1	Principal Arterial Streets **(PAS)**	Maximum of 1.5
2	Sub-Arterial street **(SAS)**	0.8 km-1.5 Km
3	Collector Street **(CS)**	300-800 meters
4	Local Street **(LS)**	150-300 meters

2.4. Design Standards for Road Cross Section and Elements

- Road width determined by Local Development Plans shall prevail over those specified in the table above for areas to be covered by such plans.
- The minimum corner curvature for roads entering a junction or round about squares should be 7 -15 m depending on the required design speed and angles of the junction.
- The radius of Roundabout Island should not be less than 8 m and for greater carriage ways it should be greater than one-third of outer carriage way boundary.
- The minimum horizontal alignment curvature of a road for design speed of 60 km/h R is 150 m (allowable urban speed) and for the urban high speed (80-100 km/h) minimum radius is 230 km.
- The maximum recommendable vertical grade for asphalted arterial street is 12%
- The standard (requirement) of vertical open space for motor ways is 4.7 m and for the rest 4.5 m
- Minimum average road density in the city should be 20%

3. MASS TRANSPORT

3.1. Pedestrian ways

- Pedestrian ways should be provided on both sides of Arterial Street.
- For collector and local streets provision, location and size of pedestrian ways should be decided by Local Development Plans, Detail Plans, and other studies as applicable.
- Pedestrian ways should be raised 15-20 cm above the carriage way
- Minimum drainage slope of such streets should be 2.5%
- The capacity of footways should be 30 to 50 persons per minute per meter width after deducing approximately 0.9 m dead width in shopping areas and 0.45m else where
- The gradient of continuous ramps should not be steeper than 10%
- Minimum height of 2.3 m should be provided for pedestrian ways.
- Pedestrian ways of the following widths should be provided for the following areas

3.2. Pedestrian ways width standards

No	Street types	Average width of pedestrian ways (m)
1	Urban motorway	No pedestrian ways
2	Sub-arterials	2.5-4 both sides 5-8
3	Principal arterial	Should not be less than 3.5m and maximum 5. both sides total 7.00 - 10.00m
4	Collector streets	Should not be less than 2.00m
5	Local	Should be decided based on local conditions.

Average width of pedestrian ways along sides of arterial streets in

a. Industrial areas - 1.8 m
b. Shopping frontages - 3.7 - 4.5 m
c. Business and commercial areas- 3-5 m and
d. Areas along all purpose road - 2.7 m

3.2. Cycle tracks

- There should be track segregation if large number of cyclists are using a street. The following standards should be considered as a basis in detail studies and implementation
    - Minimum width of pavement = 2m (2 lanes)
    - Vertical clearance= 2.25 m minimum
    - Gradients of 5% and 3.5% may be allowed for short lengths of 20m and 50 m respectively
    - Tracks should be clear of obstructions such as hedges, ditches, tree roots, curbs etc. by at least 0.5 m

3.3. Parking and stopping places provision standards

- Off - street of carriage way stopping points should be provided along major traffic lines at distance of 400 - 500m and at end points of buses trips.
- Types of on - street parking and standards

a) Parallel parking 2.5 x 5.9 m per car P No. $\frac{L}{5.9}$

b) 30^0 angle parking 5 x 2.5 m P No. = $\frac{L-1.25}{5}$

c) 45^0 angle parking 5 x 2.5 m P No = $\frac{L-1.77}{3.54}$

d) 60^0 angle parking 5 x 2.5 m = P No = $\frac{L-2.16}{2.89}$ 90^0 angle parking 5 x 2.5 m = P No = $\frac{L}{2.5}$

L = Length of Kerb

P No = Number of parking spaces

3.4. Building type and parking requirement standards

Building type	Parking requirement
Flats in rental apartments and condominium housing	1 parking/flat
Offices	1 parking/every 40 m^2 floor space
Supermarkets, Department stores, trade fares etc.	1 parking/every 60 m^2 floor space
Primary and secondary schools	1 parking/2 class rooms
Universities	1 parking/every 5 employees
Hospitals	1 parking/every 40 m^2 floor space
Museums and libraries	1 parking/every 40 m^2 floor space
Hotels and motels	1 parking/every 5 beds
Theatres and Cinemas	1 parking/every 10 sitting spaces
Stadium	1 parking/every 10 spectator
Restaurants, bars, coffee houses, pastries etc.	1 parking/every 10 sitting spaces

3.5. Standard widths for Bus and taxi bays

a) The length of the recess should be about 15 m for single bus with an additional length of 15 m for every additional bus.

b) The length of the recess for mini-bus taxi should be 7 m

c) The taper on either side should be about 8:1m

d) Separate bay with passage provision should have widths of 6.0 to 6.5 m for mini-buses and buses respectively.

4. CENTRALITY AND MARKET HEIRARCHY

4.1. Catchments distance, area, population and size standards

Centers	Catchment area	User population size	Catchment Radius
Sub-Kebele	-	To be decided depending on the new population size	-
Kebele	-	To be decided depending on the new population size	-
Woreda	-	To be decided depending on the new population size	-
Minor sub center	3-4 woredas	300,000 - 600,000	(3-5 km)
Major sub center	4-6 woredas	450,000 - 900,000	5 km

4.2. Landuse standards of respective centers

Center	Functions to be incorporated in the respective centers
Sub Kebele (neighbourhood)	• Kiosk • Small Gulit/open market • Public office/Edir • Development association office
Kebele	• Kebele Adm. • shops-daily consumption • Open market • Mill • Bar, Clubs, Hotel, and Grocery • Small scale manufacturing i.e. wood work • Post Office, telephone service • Development and consultation office
Woreda	• Administration offices • Open markets and covered (modern) shops • Sport activity • Development association
Minor and major sub centers	• Specialized high school • Administrative center • Commerce and Financial institutions • Green areas, Sport complex and recreational facilities, cultural center • Hotel/Restaurant • Specialized workshop • General hospital • Home for Aged/Handicapped • Fire Brigade • Utility/Service office • Terminal for trips from short distance urban centers

4.3. Proposed market heirarchy, size, catchment (area, radius and population), service and building standard

No	Market Heirar.	Catchment area	Catchment radius (Km)	User Population size	Catch. Area (hectare)	Service standard	Building standard
1	Primary	City/national/ international	city/national/i nternational	City/national/i nter.	115	High standard wholesale and selective special retail trade.	G+1-G+5 buildings
2	Secondary	One-trip taxi/mass transport range	5-7	450,000-900,000	4 to 6 hectare	Specialized shops of high-order goods, supermarkets and department stores.	G+1-G+3 buildings
3	Tertiary	Walking distance	1-2	100,000 to 200,000	1 to 2.5 hectare	Mini supermarkets marketing durable and food items and services,	G+0-G+3 of semi-covered and open markets.
4	Local	Kebele, neighbourhoo d	0.5-0.75	5,000 to 15,000	0.25-0.5	Open and semi-covered market, short distances for frequently purchased items	G+0 of semi-covered and open markets.

5. SOCIAL SERVICES

5.1. Education

5.1.1. Site selection, population and catchment area standards

Type of services	Catchment radius		Distance to be respected from incompatible activities and uses	Preferred Site condition
	Distance (KM)	User Population		
Kindergartens	0.5-1	750-1000	100 from Dumpsters noise pollutants 200 from liquor houses	A clear surrounding plenty of fresh air Far from health facilities for communicable diseases

Primary schools	2.5-3	5000-10000	100 from market areas, dumpsters, traffic congestions, liquor houses, pollutant and noisy industries and other such premises including garages, flour mills etc.	Far from health facilities for communicable diseases
Secondary schools	3-5	10000-12000	100 from traffic congestion, liquor houses and market areas	Site should easily be accessible and within a walking distance from transport services
Higher educational and research institutions	3-5	100000-500000	100 m from major traffic points	Should be easily accessible and within a walking distance to transport services

5.1.2.General norms and standards and proposed enforcement mechanism

- Schools at different levels should be developed according to the guidelines, regulations, norms and standards recommended in this document.
- Incremental development of schools through well studied and designed phasing should be encouraged.
- Appropriate governmental institution should check and follow-up that projects are realized according to the guidelines, standards, and norms set in this, the Structure Plan and other component study documents.

5.1.3. Space requirement and building typology Norms and standards

The Ministry of Education issues national standards and norms for the development of different levels of schools and the corresponding recommended optimum number of students and classrooms per school (kindergarten, primary and secondary) under a single and two shift systems. However, the plot size standards set for the whole country with regard to space requirement for kindergarten, primary and secondary schools can hardly be applied to Addis Ababa's objective conditions due to lack and shortage of space. Accordingly, the revised standard and means for economical utilization of land are recommended below to accommodate the required number of schools in the city and bring about quality services.

5.1.3.1. Space requirement and building typology standards for different levels of school

School facilities	**Proposed maximum standard Plot size (m^2)**	**Building typology**

	Built-up city-Core	Built-up Intermediate Zone	Infill and Expansion areas	
College	-	40000	60000	G+1, 2 and 3
Technical school	12000	20000	30000	G+1, 2 and 3
Secondary school (9-12)	12000	20000	30000	G+0,1, and 2
Primary and secondary schools (1-12)	20000	30000	50000	G+0, 1, and 2
Primary school (1-8)	12000	15000	18000	G+0, 1, and 2
K.G. to 12 grades	20000	35000	60000	G+0, 1, 2 and 3
Kindergarten	2500	2500	3000	G+0
K.G. to Primary school (KG - 8 grades)	15000	17000	20000	G+0,1, 2 and 3

Site selected for schools should be of adequate area as per the standard recommended below. Site should be suitable to be easily utilized for educational projects and programmes, sport fields and school gardening. It should not be exposed to flooding, sewerage lines, and wind and dust hazards.

5.1.4. Student and classroom standards to respective school levels

School level	Grade	Adopted standards		
		Student per school	Classroom per school	Student per classroom
Kindergarten	0	240	6	40
Primary	1-4	200	4	50
	5-8	160	4	40
	1-8	720	16	45
		1440	32	45
Secondary	9-12	480	12	40
		640	16	40
		800	20	40

5.1.5. Building and classroom height standards

- Height of class rooms in kindergartens should not be higher than G+0
- Primary schools should not have more than G+1 height of class rooms
- Other schools could have combination of G+0, 1, 2, and 3 height of classroom buildings depending on the function of specific buildings.
- Clear height of class rooms should not be less than 3 m

5.2. Health Service Facilities

5.2.1. User population standards

Types of Health Facilities	Population served	Remarks
Referral Hospital	1:5,000,000	-
Regional Hospital	1:1,000,000	Site should be near to and within walking distance of secondary centers and mass transport services Should be at a distance of 200 m from market areas, noisy industries and other premises

		including garages.
Health center	1:25,000	If possible site should be adjoining to high density residential settlement and located at center of serviced area Site should be well accessible
Health post	1:5,000	Size for such services should be adjoining a kebele center and have Easy access to transport

5.2.2. Plot size standards of health facilities

Types of facilities	Plot area m^2		
	Minimum	**Medium**	**Maximum**
General Hospital	10,000	11,000	13800
Special Hospital	7000	8000	9000
Health Center	4500	5000	6000
Health Posts	1500	2000	3000

5.3. Sport and Recreational Facilities

5.3.1. Plot size standards for Kebele level Sport and recreational facilities

No	Type of Sports and fields	Size (m)	Area m^2
1.	Football field for children	$65^{+7.6}$ X 100^{+12}	8064
2.	Athletics	6 lane by 110M 15^{+18} X	1500
3.	Basket ball	28^{+5}	1419
4.	Volley ball	9^{+19} X 18^{+75}	952
5.	Hand ball	20^{+15} X 40^{+5}	1925
6.	Tennis	7 X 14 X2	196
7.	Walk way, green areas, Recreation parks	-	11598
	Total area		**25654 (2.6 hectare)**

5.3.2. Plot size standards for Woreda level Sport and recreational facilities

No	Type of Sports and fields	Size (m)	Area m^2
1.	Football field	70^{+7} X 105^{+50}	11935
2.	Athletics	8 lane by 400	4100
3.	Basket ball	15^{+18} X 28^{+15}	1419
4.	Volley ball	9^{+19} X 18^{+16}	952
5.	Hand ball	20^{+15} X 40^{+15}	1925
6.	Ground Tennis	$23.77^{+16.23}$ X $10.97^{+9.03}$	800
7.	Swimming pool	25 X 13	325 (Lane care)
8.	Table Tennis	7 X 14 X 4	392
9.	Gymnasium	-	3010
10.	Walk way, green & others	-	7446
	Total area		**99319 (10 hectare)**

NB. Standards has to be revised according to the results of Kebele and Woreda restructuring

5.3.3. Plot size standards for Zonal level Sport and recreational facilities

No	Type of Sports and fields	Size (m)	Area m^2
1.	Football field	70^{+7} X 105^{+50}	11935
2.	Athletics	8 lane by 400	4100
3.	Basket ball	15^{+18} X 28^{+15}	1419

No	Type of Sports and fields	Size (m)	Area m^2
4.	Volley ball	9^{+19} X 18^{+16}	952
5.	Hand ball	20^{+15} X 40^{+15}	1925
6.	Ground Tennis	$23.77^{+16.23}$ X $10.97^{+9.03}$	800
7.	Swimming pool	25 X 17	425
8.	Tennis	7 X 14 X 8	784
9.	Gymnasium	-	4925
10.	Walk way, green & others	-	85815
	Total area		**113080 (11.5 hectare)**

5.3.4. Plot size standards for City Level Sport Complex

No	Type of Sports and fields	Size (m)	Adopted from
1.	National stadium	40,000*	Federal Sport Commission
2.	Big International stadium	40,000*	Federal Sport Commission
3.	Olympic size stadium	6,000,000 - 8,100,000*	AAMP
4.	Olympic size swimming pool		
5.	Gymnasium that accommodates 5000 spectators		
6.	National cultural center	18 - 29 hector****	ORAAMP Land use Study
7.	Festive places	45,000 - 72,000***	ORAAMP Land use Study

5.3.5. Stadium, gymnasium and swimming pool plot size standards

Types of facilities	Plot size standards (M^2)		
	Woreda level	Zonal level	Capital city level
Stadium	29000	31,000	40,000
Gymnasium	4000	6000	9000
Swimming pool	7600	7600	12,000

5.3.6. Revised plot size standards for allocation of land for investments in Sport and recreational facilities

Types of Facilities	Plot size standard (M2)
Stadium	46,000
Gymnasium	10000
Higher multi purpose sport center	15000
Lower multi purpose sport center	10000
Circus center	8000
Children and youth center	12000
Theatre and Cinema hall	8000
Horse race ground	5000-10000

The plot size standards set by the Federal Sport Commission in 1992 EC are adopted as implementation tools for the Revised Structure Plan. The City Government has to accordingly revise permit requirements.

5.4. Fire Brigade services plot, catchment radius and population standard

- Plot area 2500-5000 square meter.
- Catchment population 60000
- Catchment radius 2.5-5 Km

5. 5. Slaughterhouses

5.5.1. General standards and norms

Allocation of land, siting, waste disposal and treatment, design and construction requirements, of abattoirs should be guided by the standards and regulation of the Ethiopian Livestock Authority listed below.

- Guidelines for establishment and construction of small-scale shoat slaughterhouses
- Guidelines for establishment of export abattoirs (Livestock marketing authority, 2000)
- Guidelines and regulations for establishment of higher slaughterhouses
- Guidelines for establishment of small scale slaughterhouses (Livestock marketing authority, 2000)

5.5.2. Land allocation and development standards

No	Type of abattoir	Capacity	Required Site area (hectare)	Maximum Site Occupancy Ratio (SOR in %)	Estimated Initial investment cost (Million Birr)	Manpower	
						Skilled	Non-skilled
1	Satellite (Higher) abattoir	75-100 cattle /day and 250-300 shoat/day (three shifts and half and one third of these in two and one shifts respectively)	0.9-1.1	50	2.5-3.0	25	85
2	Export abattoir	90 cattle/day and 225 shoat/day	1.8-2	50	3-4	25	100
3	Shoat Abattoir	60-100 shoat/day	0.05-0.1	60	.25-.30	2	8

5.6. Cemeteries and worship places

5.6.1. Area, Catchment radius and population size standards of Cemeteries (Municipal)

- Catchment population 25000-30000
- Catchment radius 2.5-5 Km
- Burial space for a person should be 2 m by 0.80 m
- Space requirement per burial with statue is 5.38 m^2 and without statue is 3.38 m^2
- After 7 years the corpse shall be removed and the space reused.
- Maintain green buffer strip of 100m between housing areas and cemeteries
- Maintain a set back of 20 metres from major roads
- Develop standardized, economical and healthy burial practices through planned land utilization of cemeteries, use of "Fuka" and recycling, etc.

5.6.2. Area, Catchment radius and population size standards of Worship places

- Space requirement for worship place is 2500-3000 m^2
- A new worship place is required to be at least 2 to 3 km away from an existing similar one.
- Catchment radius 1-1.5 Km
- There should be at least 4,000 - 10,000 followers for each new worship place.

6. MANUFACTURING, MAINTENANCE, WORKSHOP AND STORAGE FACILITIES

6. 1. Industrial category, scale, heirarchy and space requirement standards for manufacturing activities

No	Standard	Type of manufacturing activities	Area required in (m sq)	Remarks
1	**Small scale industries**	Wood and metal workshops, garage, mills, handicrafts such as ceramic, traditional clothing and jewellery production.	**500-2500**	Can be mixed with residence and other compatible uses
2	**Medium scale industries**	Processing plants, packing,	**5000-10000**	Can be mixed with store, distribution services and other compatible uses
3	**Large scale industries**	Flour, and textile factories,	**10000-15000**	Can be mixed with store, distribution services and other compatible uses

6. 2. Category, scale, heirarchy and space requirement standards for storage facilities

No	Standard	Types of materials to be stored	Level of Uses	Area standards	Area required in (m sq)
1	**Small scale storage**	General merchandize, food items, grain and other materials stores	Tertiary market levels	0.5 m sq. m / Quintal	**Up to 500**
2	**Medium storage facilities**	Storage for foam, plastic, rubber, and other bulky materials.	Secondary market and/or at the City center level	To be calculated depending on the volume of the material	**500-5000**
3	**Large scale storage facilities**	Depots, silos,	City and national level	To be decided depending on studies	**5000-10000** **>10000 for those combined with distribution**

6.3. Pollutant emission level limitation norm for industries and related services

- Industrial waste effluents at point of discharge of watercourses should be a maximum BOD = 60 mg/liter and that the effluent should not exceed in any case the limit of 10,000 faecal coliforms/100 ml.

7. ENVIRONMENT

7.1. Green frame standard

- Every plot of area upto 150 m sq. should be provided with at least one tree and other tree/s should be provided for every additional 100 m sq. plot area
- Street walkways should be provided with plantation (tree) at every 10 m

7.2. Solid waste container provision standard

No	Container Size and type	Maximum catchment area (hect)	Maximum Catchment population (HH)	Maximum Catchment radius	Assumed emptying interval (days)	Remarks
	$1.1m^3$	1.25	60	50 m	8	
	$8\ m^3$	3.15	150	100 m	8	

7.3. Sanitation and liquid waste management standard

- Minimum water requirement should not be less than 30 lit/ person/day
- Size of pit-latrines should be 8-27 cubic meter/household
- Industrial waste effluents at point of discharge of water courses should be a maximum BOD = 60 mg/liter and that the effluent should not exceed in any case the limit of 10,000 faecal coliforms/100 ml.

PART II- STANDARDS AND NORMS OF SUPPLEMENTARY COMPONENTS

1. UTILITIES

1. 1. Norms

- Utility facilities to be accommodated on right-of way of roads (under ground, surface, and overhead) should satisfy the required institutional standard and should not adversely affect road safety, construction, maintenance, or operation.
- In principle sidewalk/s shall be occupied as right-of-way for all facilities, unless the occupancy creates problems and obstruction for others, and/or difficulty of excavation.
- Installation should be of minimal obstruction (both visual and physical)
- Right-of-way width for accommodating utility lines should be minimized
- Safety against damage on utility lines and hazard on the users should be provided
- In the construction of utility lines, minimum spacing between utility and their respective depth should be respected and properly executed.
- Storm sewer should be located on opposite side of the street from the water line.
- Utility lines should be located with proper plan to minimize need for latter adjustments
- Conduits should be provided for utilities like road lighting, traffic signal, etc at the initial construction stage.
- Utilities requiring future servicing, such as water supply, gas lines, should be encased or installed in tunnels for servicing without disrupting traffic flow
- To the extent feasible and practical, utility line crossings of roads should be on a line generally normal to the road alignment
- The horizontal and vertical location of utility lines within the right-of-way limits should confirm to the specific conditions of particular road section/s.
- Where it is feasible and reasonable utility lines should be located separately from bridge structures (attachment to bridge structures should be avoided).
- Power cable/s shall be located so as to reduce possibility of damage by traffic and to prove safe access for inspection and maintenance of the structure.

1.2. Standards

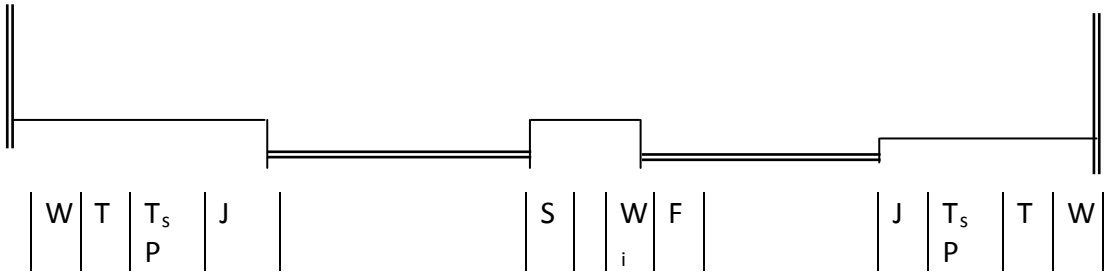
1.2.1. Minimum horizontal distance between utility lines (m)

	Water	Sewer	Power line	Telephone, etc	Gas line	Fuel line
Water	-	1.5	0.7	0.7	0.7	1.0
Sewer	1.5	-	1.0	1.0	1.0	1.0
Power line	0.7	1.0	-	0.5	0.5	1.0
Telephone, etc	0.7	1.0	0.5	-	0.5	1.0
Gas line	0.7	1.0	0.5	0.5	-	1.0
Fuel line	1.0	1.0	1.0	1.0	1.0	-

1.2.2. Minimum vertical covering above utility lines (m)

Utility	Vertical covering
Water	1.5
Sewer	1.5
Power line	0.5
Telephone, telegraph	0.5 (above conduits)
Gas line	1.0
fuel line	1.0

1.2.3. Utility Lines Arrangement Standard



P = Power Transmission line
T = Telephone, telegraph, television
T_s = Traffic signal line
J = inlets and drainage line
W = Water
G = gas line
S = sewer
F = Fuel transmission line
W_i = irrigation

1.2.4. Norms and standards for Drainage, Sanitary and Water Supply lines construction

- In no case shall a sanitary sewer be placed above a water main
- A minimum depth of 2 to 2.5 m below ground level is sufficient for sanitary sewer in parts of the city where basements are frequent.
- A depth of 1.25 m of sanitary sewer line may be sufficient to provide protection against superimposed loads.
- Manholes of drainage system are required wherever a drain changes size, slope or alignment also where a tributary drain joins a main line; and at intervals of not more than 150 m along a line.
- Fire hydrants should not be more than 150 m apart to avoid excessive head loss in small diameter hose.
- Minimum design requirement to locate water supply lines is 3 m from the nearest sewer or gas main.
- Water wells are recommended to be at minimum distances of 15 m from septic tanks and sewers, 30 m from drainage fields, and 45 m from cesspools.
- Storm sewers should generally be located at one-third the distance from the curb line to the centerline of the streets.

1.2.5. Norms and standards for Clearances of Electric lines

- The vertical clearance of the over head current conductor from the surface of the ground shall at least be
    - 450 cm for 0.4 KV bare overhead line
    - 400 cm for 0.4 KV aerial bundled conductors
    - 600 cm for 15 KV bare overhead line

- The vertical clearance of the overhead current conductor from growing trees under the line shall be at least
    - 250 cm for 0.4 KV bare over head line
    - 250 cm for 15 KV bare over head line
    - In cases where the vertical clearance is lower than the above mentioned figures, the horizontal clearance shall be at least 400 cm

- When the horizontal clearance of the overhead current conductors of low voltage line from any part of a building is less than 200 cm, its height above the referred part should at least be 300 cm.
- When the horizontal clearance of aerial bundled conductors from any part of the building is less than 50 cm, its height above the referred part should at least be 200 cm.
- The horizontal clearance of a 15 KV over head lines from buildings shall at least be 300 cm.
- The clearance of a dead-ended line to a building i.e. a current conductor from a window or other similar opening as well as from eaves of roof sloping towards the line shall be (in the dead-end point of the line) at least
    - 100 cm for 0.4 KV bare overhead line
    - 50 cm for 0.4 KV aerial bundled conductors

- It is prohibited to dead-end an overhead line below a window intended to be opened, or other openings.

    - The vertical clearance of the overhead current conductor from the surface of a main road and rail ways shall at least be
        - 800 cm for 0.4 KV bare overhead line
        - 800 cm for 0.4 KV aerial bundled conductors
        - 850 cm for 15 KV bare overhead line
    - The vertical clearance of the overhead current conductor from the surface of public street and private drive ways shall at least be
        - 550 cm for 0.4 KV bare overhead line
        - 500 cm for 0.4 KV bundled overhead line
        - 600 cm for 15 KV bare overhead line

- The minimum distance (clearance) of the overhead line with supports or stays shall be 90 cm. However, when it is possible, distance of 200 cm is recommendable
- When the underground power line is encountered along the pedestrian area, the cable shall be buried at least to a depth of 100 cm and the horizontal clearance from the edge of a road shall be 90 cm. When the power cable is crossing the asphalted road, the cable encased in concrete pipe with a diameter of 20 cm shall be buried at a depth of 100 cm.
- High-tension line leading to 5 MW sub-station requires a corridor of 32 m.

1.2.6. Norms and standards for Clearance of Telecommunication lines

- The distance between two manholes or hand holes for duct cable installation should not be more than 200 cm
- Cables shall be placed in chambers or cable vaults/trenches in such a manner that they do not block vacant ducts and/or restrict the working space.
- Aerial cable shall be regularly suspended at 50 cm from top of each pole.
- The optimum pole span shall be approximately 40 m and shall not exceed 50 m without any strengthening measure for keeping the specific strength
- The covering depth from the top of PVC ducts to the surface of ground shall be as follows

  a) Side-walk, farm land, forest 80 cm or more
  b) Carriage way 100 cm or more

1.2.7. Minimum underground clearance between telephone facilities and other utility lines

Utilities	Parallel	Crossing
Power lines	45 cm (short span)	45 cm
Water pipes	30 cm	15 cm
Sewerage	30 cm	15 cm