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A GREEN BELT OF SYNERGIES

- a study on the implementation of a contemporary Green Belt

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Research on Green Belts in cities with informal growth is not that prevalent in Sweden and, as such, we had limited understanding at the onset of our study. The people that we met along the way were integral in developing our understanding of this topic and the area Medellin.

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Photo 1. Elin together with Beatriz Álvares

Photo 2. Maria together with Beatriz Álvares at San Vicente Ferrer

Photo 3. Elin with Alejandra and Marco from the municipality

Photo 4. Maria at the Library in La Loma

ABSTRACT

The prevailing urban migration is a worldwide process. This results in growing cities and a diminishing proportion of people living in the countryside. As the urbanization continues a large amount of the world's population is expected to live in urban settlements of informal character by 2050. Green Belts have for many years been used to control urban growth and to secure the sustention of larger green areas around towns and cities. As the world is facing a large population growth, it becomes increasingly important to adopt strategies that deal with urbanisation and the upcoming challenges; the Green Belt appears to be one possible course of action.

This thesis aims to study Green Belts' suitability in relation to urban sprawl and informal settlements and to show examples of an implementation of a contemporary Green Belt. A case study has been done on the current Green Belt project in the city Medellin, Colombia. Colombia has a high level of urbanisation and many settlers live in informal settlements. In Medellin there is a pioneering approach to urban planning and a separated approach is taken regarding the rural-urban interaction zone. This distinguishes Medellin and makes it an interesting case to study. The result reveals that in order to implement a contemporary green belt that can improve nature and living habitats the implementation need to fulfil multiple purposes. The focus of a contemporary Green Belt should not be the restriction of urban growth but the assurance of a sustainable growth of cities. For the Green Belt to sustain its purposes in a city with high urbanization pressure, the Green Belt need to be based on the local context and directly contribute to the settlers in the rural-urban fringe, adjacent to the Green Belt.

By studying Green Belts' suitability in relation to urban sprawl and informal settlements a redrafting of the strategy could begin. By discussing and highlighting the current challenges within urban planning in low-income countries a need for deeper understanding is evoked. A more complex world, with many interdependent variables, requires adaptable strategies that consider each and every local condition. Finally, the paper discusses the Green Belts' relevance today, noting that the Green Belt has much in common with the planning strategy green fingers. But strategies in the rural-urban fringe, such as the Green Belt, will still remain important for sustainable urban development. It is in the fringe zone where the greatest opportunity to secure green structure is and that is where the city can grow around the green structure of the Green Belt.

SAMMANDRAG

Den rådande inflyttningen till städer är en världsomspännande process som resulterar i växande städer och att en allt mindre andel av befolkningen lever på landsbygden. Med fortsatt urbanisering förväntas en stor del av världens befolkning leva i informella bosättningar år 2050. Grönbälten har under många år använts för att kontrollera stadsutbredning och för att säkra upprätthållandet av större grönområden runt orter och städer. När världen nu står inför en stor befolkningsökning blir det allt viktigare att anta strategier som behandlar urbanisering och kommande utmaningar; grönbältet förefaller vara en möjlig åtgärd.

Denna uppsats syftar till att studera grönbältets lämplighet i förhållande till stadsutbredning och informella bosättningar och till att visa exempel på en implementering av ett samtida grönbälte. En fallstudie har gjorts på det aktuella grönbältesprojektet i staden Medellin, Colombia. Colombia har ett högt urbaniseringstryck och många invånare bor i informella bosättningar. I Medellin finns det ett banbrytande förhållningssätt till stadsplanering och ett separerat synsätt på den rural-urbana gränszonen i stadens periferi. Detta skiljer Medellin från andra städer och gör grönbältet ett intressant fall att studera. Resultaten visar att en implementering av ett samtida grönbälte som kan förbättra naturen och människors levnadsmiljöer, måste uppfylla flera syften. Fokus för ett samtida grönbälte bör inte vara att begränsa städers tillväxt, utan snarare att säkerställa en hållbar tillväxt av städer. För att grönbältet ska upprätthålla sina syften, i en stad med högt urbaniseringstryck, måste gestaltningen och planerandet av det ta sin utgångspunkt i den lokala kontexten och bidra direkt till bosättarna i den rural-urbana gränszonen.

Studien om grönbältens tillämplighet i relation till stadsutbredning och invid informella bosättningar har lett fram till en omformulering av grönbältesstrategin. Aktuella utmaningar inom stadsplanering i låginkomstländer har diskuterats och belysts, och på så vis erhölls den djupare förståelse som behövdes. Sammanfattningsvis kan sägas att en allt mer komplex värld, med många av varandra beroende variabler, kräver anpassningsbara strategier som kan ta hänsyn till olika lokala kontexter och förutsättningar. Avslutningsvis diskuterar uppsatsen grönbältets relevans idag och konstaterar att grönbältet har mycket gemensamt med planeringsstrategin gröna fingrar. Men strategier i den rural-urbana gränszonen, såsom grönbältet, kommer ändå vara fortsatt viktiga för en hållbar stadsutveckling. Det är i gränszonen som störst möjlighet att säkra grönstruktur finns och det är där staden kan växa kring grönstrukturen i grönbältet.

SAMMANFATTNING

Grönbälten har under många år används som en etablerad stadsplaneringsstrategi för att kontrollera städers tillväxt och säkra större grönområden utanför staden (Amati 2008). Med förestående global befolkningsökning och alltjämt informellt växande städer tycks det viktigt med strategier som handskas med urbanisering och åtföljande utmaningar; grönbältet framstår som ett verktyg med potential. Användningen av grönbälten är dock omdebatterad, då implementeringar skett utan hänsyn till lokala förutsättningar och komplikationer har uppstått. Grönbältets tillämplighet i utvecklingsländer diskuteras också av forskare runtom i världen och man ifrågasätter grönbältets förmåga att förhindra urban utbredning i städer med informell tillväxt (Research Gate 2013).

Denna uppsats analyserar förutsättningarna för ett grönbälte invid informella bosättningar. Uppsaten avser undersöka de levnadsvillkor och behov som finns i informella bosättningar, i gränslandet mellan det urbana och rurala där stadstillväxten först och främst sker och där grönbältet också appliceras. Urbaniseringsprocessen är stark och hotar naturområden till förmån för bostadsområden och uppsatsen undersöker de trender som karakteriserar det pågående tillväxtmönstret för att kunna ta hänsyn till desamma i planerandet av ett grönbälte.

I Medellin, en stad i Colombia med en hög grad av informell tillväxt, finns ett pågående grönbältes-projekt under namnet Cinturón Verde Metropolitano, CVM. Projektet syftar till att begränsa stadens utbredning och förbättra villkoren för de informella bosättarna. Stadens läge i en dalgång ställer särskilda krav på en implementering av ett grönbälte. Ekosystem i bergstrakter är särskilt känsliga och de skarpa bergsbranterna förorsakar jordskred med emellanåt digra konsekvenser för de bosättare som slagit sig ner i enkelt konstruerade hus av låg standard. Projektet är särskilt intressant att studera som referensprojekt för fördjupade kunskaper om grönbälten. CVM i Medellin ett aktuellt projekt som uppvisar ett banbrytande sätt att förhålla sig till stadens periferi där också människans levnadsvillkor sätts i fokus.

Syfte och begränsningar

För att tillgodogöra sig kunskaper om grönbälten och kontextualisera lärdomarna, avser den här uppsatsen svara på tre huvudsakliga frågeställningar som inbegriper tre skalor och olika tillvägagångssätt. Frågeställningarna innefattar en global, regional och intermediär skala:

1. Hur kan ett samtida grönbälte utvecklas för att minska en stads miljöpåverkan och förbättra levnadsvillkoren för informella bosättningar i den rural-urbana gränszonen?
- *Denna fråga besvaras genom litteraturstudier av grönbälten och informella bosättningar.*

2. Hur kan ett grönbälte anpassas till en regional skala och sammanhang?
- *Denna fråga utforskas genom studier på CVM och en utvärdering av det grönbälte som används i Medellin.*

3. Hur kan ett regionalt grönbälte för Medellin implementeras på den lokala skalan?
- *Denna fråga examineras genom en fallstudie och ett designförslag i den informella bosättningen La Loma, Medellin.*

Denna uppsats springer ur diskussionen om det ökade behovet av grönstruktur i en snabbt urbaniserad värld. Studien handlar om fysisk planering i förhållande till informella bosättningar och fokus ligger på grönbältet som ett planeringsverktyg. Andra typer av grönstrukturs-strategier omnämns endast där de visar sig väsentliga för sammanhanget men studeras inte djupare.

Den för studien valda staden Medellin är komplex vad gäller flera aspekter. Ämnena ekonomi, säkerhet och politik behandlas därför inte djupgående. Däremot kan temana inte ignoreras

i analysen och diskussionen, eftersom de problematiserar och kontextualiserar våra frågor.

Ambitionen är att visa på en implementation som tar extra hänsyn till de dynamiker, förutsättningar och behov som finns i de informella bosättningar som återfinns in den rural-urbana gränszonen av en stad. Fältstudien och gestaltningsförslagen genomförs i och på ett avgränsat studieområde i en informell bosättning i den rural-urbana gränszonen i Medellin. Gestaltningsförslagen kan inte ses som fullständiga förslag för den aktuella platsen, utan som en strategi som tar lokala sammanhang i beaktning. På grund av säkerhetsproblem hade vi endast möjlighet att besöka La Loma två gånger. Tack vare stipendiet som vi mottagit, kunde vi bo tio veckor i Medellin.

Metod

Uppsatsen inriktar sig på *en strategi* samt *en plats* men förutsätter ett kunskapssökande ur flera perspektiv. Kunskapsområdena omfattar allt från planeringsstrategier, ekonomiska intressen, sociala seder, socioekonomiska orättvisor till invånarnas inställning till naturen. Metoden "fallstudie" uppmanar till flera olika tekniker, metoder, strategier och teorier och har valts för uppsatsen. Inom ramen för fallstudien har vi använt oss av både litteraturstudier, dokumentanalyser, intervjuer, platsobservationer. I ett senare skede har vi också använt oss av analysmetoden SWOT för att få fram väsentliga fokusområden.

Litteraturstudien delades in i tre olika faser; grönbältet som planeringsverktyg i förhållande till informella bosättningar, Medellins förhållningssätt till planering i rural-urbana gränszonen samt information om den lokala skalan La Loma. I den andra och tredje litteraturstudien ingick också dokumentanalys. Övergripande styrdokument, inklusive planer och kartor, analyserades grundligt för att extrahera relevant information. Semi-strukturerade intervjuer med folk från planeringsdepartementet och lokalt aktiva i La Loma, tillsammans med spontana samtal med invånare i Medellin, har gett oss en grundförståelse för kulturen, pågående projekt och området för designförslagen. Genom att visa intresse och öppenhet har vi blivit accepterade, fått förtroende och kunnat ta emot många hjälpande händer och tips igenom vårt arbete.

Bakgrund till grönbältet och informell tillväxt av städer

Planeringsverktyget introducerades under en modernistisk period mellan 1950 och 1970 och spreds då världen över. Den omgivande grönskan i ett grönbälte kan utgöras av mark reserverad för skog, plantager eller öppna landskap (NE). Syftet med implementationerna har varierat från stad och genom tiderna men har alltjämt syftat till att kontrollera städers storlek.

De huvudsakliga idéerna med grönbälten idag kan sammanfattas som:

- begränsning av urban utbredning
- förbättring av landskapsmönster
- rekreation
- förbättring av urban ekologi (inkluderar luftrening, förbättrade mikroklimat och ökad biodiversitet)
- undervisning (grönbältet kan påvisa vikten av natur), (Li, Ouyang and Wang 2005).

Idag ifrågasätter man det modernistiska antagandet att en skarp linje kan dras mellan olika markanvändning (Amati 2008). Ett projekt från Sao Paulo i Brasilien påvisar svårigheten i att vidmakthålla en statisk indelning av mark när behovet på bostäder upplöser grönbältet till förmån för urban utbredning (The Free Library 2004). Vissa forskare ifrågasätter om det ens är berättigat att försöka begränsa städers storlek i låginkomstländer, eftersom förekomsten av städer är nödvändig för att trigga ekonomin. Istället kanske grönbälten kanske bidra med multifunktionella grönytor och förbindningszoner mellan olika aktiviteter (Research Gate 2013).
Förenta Nationernas befolkningsfond,

UNFPA (2007), uppskattar att 80 % av världens befolkning kommer att bo i utvecklingsländer år 2030. Av dem kan en stor del väntas bo i bosättningar av informell karaktär (Taylor 2011). Latin Amerika and Karibien är de mest urbaniserade regionerna bland utvecklingsländer och man uppskattar att ungefär en tredjedel av städernas invånare bor i informella bosättningar (The World Bank Group 2010).

Det häftiga inflyttningstrycket hotar naturområden i städers utkant, till förmån för bostadsområden. Förändringar i markanvändning kan innebära oåterkalleliga förluster i biodiversitet (Pauchard et al. 2006) och likafullt är förlusten av natur oönskad med tanke på stundande klimatförändringar och naturens inneboende förmåga att mildra dess effekter (Boverket 2012). Grönska i städer eller i den rural-urbana gränszonen sägs vara nyckeln till en miljövänlig livsmedelsförsörjning av städer (Summers 2011) vilket ger skäl för en medveten och aktuell grönstrukturplanering i och runt städer.

Ett hållbart samtida grönbälte - möter globala utmaningar och behov i informella bosättningar

Uppsatsens litteraturstudie påvisar att ett samtida grönbälte, utöver ovanstående nämnda funktioner, bör ha särskilda huvudsakliga syften om det ska svara för ett hållbart stadsplanerande och beakta de utmaningar som finns med att planera i den rural-urbana gränszonen. Ett samtida grönbälte bör:

- nyttjas som ett strukturerande element
- verka för en mängd olika landskapsmiljöer med varierande habitat
- kombinera människans verksamheter med naturvård
- minska naturkatastrofer
- bidra med multifunktionella gröna områden och offentliga utrymmen
- utveckla en starkare koppling mellan den rural-urbana gränszonen och stadskärnan
- främja lokala cykliska produktionssystem
- förbättra möjligheterna att försörja sig av landskapet (särskilt jordbruk)

Informella bosättningars utbrednings - mönster, morfologi, sociala relationer, försörjningsstrategier och förhållande till naturen både ställer krav på grönbältet men presenterar också vissa kvaliteter som grönbältet kan utnyttja. Ett samtida grönbälte *invid informella bosättningar* bör följa nio strategier för att uppnå både direkta förbättringar för de boende i den rural-urbana gränszonen men också för att bidra till en hållbar stadsplanering (med utgångspunkt i de ovanstående huvudsakliga syftena). De nio essentiella strategierna för ett samtida grönbälte är:

- **Möjliggör rurala och urbana kopplingar med kvalitativa gröna ytor och publika utrymmen.**
- **Förbättra den jämlika tillgången på kvalitativa ytor och publika utrymmen.**
- **Förse med spatiala förbättringar i en oordnad urban struktur.**
- **Innefatta diversifierade naturreservat och kombinera dem med människors aktivitet.**
- **Implementera grönstrukturer som kan stå emot förändringar i markanvändning.**
- **Gestalta flexibla multifunktionella publika platser.**
- **Inkludera produktivt land i det offentliga rummet.**
- **Basera designen på lokal kultur, tradition och kunskap.**
- **Återställ förstörda ekosystem.**

Lärdomar och insikter från CVM

En studie av projektet CVM i Medellin gav kunskaper om vad ett grönbälte bör fokusera på vid en lokal implementering för att också tillgodose behoven på en regional skala. Studien gav också insikter om att ett regionalt planeringsverktyg kan ha svårt att ta fasta på lokal kontext och kultur. Således blir lärdomen att en grönbältesimplementering måste lägga större vikt på just detta.

- ***Basera designen på lokal kultur, tradition och kunskap.***

Designförslag i grannskapet La Loma

Uppsatsen identifierar de lokala förutsättningarna i grannskapet La Loma med hjälp av en SWOT-analys. Med aktning på var de nio strategierna kan framhävas, utgör dessa grunden för tre designförslag. Här följer en redogörelse för den lokala kontexten i La Loma, med avseende på den sociala, naturliga och byggda miljön.

La Loma är ett grannskap i stadsdelen San Cristobal och återfinns på den västra bergssluttningen i Medellin, i gränszonen mellan stad och land. Marken är brant och rasrisken stor på flera ställen. Tidigare har landområdet definierats som ruralt men som en följd av en stark inflyttning kommer det i stadens nästa översiktsplan omnämnas urbant. Rurala och urbana dynamiker samspelar således i området och invånare med stark lokal förankring lever jämte nyanlända bosättare.

Fortfarande är långt bakåtgående traditioner levande i La Loma och påtagliga bland annat i den alltjämt starka musiktraditionen. Motsättningen mellan nya och ursprungliga bosättare är stark och då La Loma är Medellins huvudsakliga port till knark- och vapenhandel vid kusten, är kriminaliteten märkbar och spänningarna mellan olika sociala grupper starka. Också finns det spänningar mellan La Loma och det intilliggande centrala grannskapet San Javier. Ändå rör sig många dit eller till staden och närliggande centrumet i San Cristobal där många arbetstillfällen finns. Få eller långa vägförbindelser med omgivande centraliteter gör emellertid att La Loma upplevs något frånkopplat.

Lokala försörjningsstrategier omfattar i huvudsak gruvdrift och odling, både för eget bruk men också försäljning. De många floder som leder ner för berget är karaktärsskapande och ingår i olika försörjningsstrategier - men trots detta är de alltjämt förorenade som ett resultat av befolkningens livsstil och bristande sanitära system. De större grönområdena är starkt fragmenterade och artfattiga odlingsmarker gör de ekologiska systemen otillräckliga med konsekvenser både för människan och naturen. Också inom den täta urbana småskaliga strukturen är grönskan uppbruten.

I huvudsak handlar de nio strategierna om att förbättra naturens och människans livsmiljöer genom att etablera länkar och noder. I La Loma är avsaknaden på kopplingar uppenbar. Människa och natur syns frånkopplade varandra men samtidigt håller grannskapet flera förutsättningar till förbättring. Med ett fokus på gångvänlighet, länkning av stadsparker, restaurering av blå och gröna korridorer samt noder för interaktion och utbyte av kultur och kunskap kan designförslagen adressera det viktigaste i La Loma och inkorporera de nio strategierna som ett grönbälte med flera intressen och användargrupper bör innehålla.

Målsättningen är att designförslagen ska fylla flera syften och skapa ett grannskap av synergier. Studien av CVM har visat det extra viktigt att förslagen utgår från den lokala kontexten. (1.) Ungdomsfristaden, (2.) eko-bron och (3.) marknadshubben utgör tre förslag på hur ett regionalt grönbälte kan implementeras på en intermediär skala i staden Medellin.

Förslaget "ungdomsfristaden" syftar i huvudsak till att skapa säkra förbindelser och mötesplatser i en osäker offentlig miljö samt bidra med kvalitativa, tillgängliga publika platser av stor betydelse, främst för lokalbefolkningen men också för besökare. Frekvent använda gatumiljöer görs säkra för fotgängare och länkas till mindre och större parker.

Förslaget "eko-bron" syftar i huvudsak till att sammanbinda gröna länkar, restaurera förorenade vattendrag samt förse med rekreativa, säkra gång- och cykelstråk mellan två större centra i en, för fotgängare, osäker vägmiljö.

Förslaget "marknadshubben" syftar i huvudsak till att fungera som mötesplats för utbyte av kunskap och varor som kan brygga sociala

motsättningar. Hubben utgör grogrunden för ett nytt centra i ett expansivt område med kraftig informell inflyttning. "Marknadshubben" bildar också en ny entré-port i ett läge där två huvudvägar leder in i La Loma.

Diskussion

1. Hur kan ett samtida grönbälte utvecklas för att minska en stads miljöpåverkan och förbättra levnadsvillkoren för informella bosättningar i den rural-urbana gränszonen ?

Grönbälten har utvecklats till att försöka kombinera naturens och människans intressen men vi har insett att ett exakt svar på hur ett samtida grönbälte bör utvecklas därutöver kanske inte är önskvärt. Litteraturstudierna påvisar värdet i att *inte* formulera riktlinjer eftersom sådana riskerar hindra kreativa lösningar. Litteraturen påvisar också poänger i att *inte* lägga fram universella lösningar på platsspecifika utmaningar. Vi tror dock att en omfattande planeringsstrategi behöver viss guidning och ett satt ramverk som kan repeteras annorstädes. Viktigt är dock att sådana strategier inte ger detaljerade lösningar utan snarare förespråkar en förståelse för den lokala kontexten - och att lösningarna grundar sig på den förståelsen. I vår studie konstaterar vi nio strategier vilka kan sägas utgöra vårt ramverk för ett samtida grönbälte och ger svar på frågeställningen om hur det kan minska en stads miljöpåverkan och samtidigt förbättra levnadsvillkoren för informella bosättningar i den rural-urbana gränszonen. Vår slutsats är att det senare görs genom att behålla ett fokus på försörjningsstrategier, säkerhet och hälsosamma livsmiljöer för de informella bosättarna.

2. Hur kan ett grönbälte anpassas till en regional skala och sammanhang?

Denna frågeställning har studerats genom att titta på ett samtida regionalt grönbältesprojekt i Medellin, CVM. CVM är samtida, inte bara för att det är ett aktuellt pågående projekt, utan för att det skiljer sig på många sätt från tidigare implementeringar. CVM söker inte bara begränsa stadens utbredning utan har ett särskilt fokus på den rural-urbana gränszonens levnadsmiljöer och en uttryckt vilja att utgå från en lokal kontext. CVM har dock fått kritik för bristande insikt i de förhållanden som finns i den rural-urbana gränszonen och för att inte lyckas omvandla lokala uttryck. Vi drar slutsatsen att det är svårt för planerare att i en storskalig strategi nå ut till invånarna som strategin berör, vars liv relaterar till och utspelar sig i en mindre och mer lokal skala. Utmaningen vid en implementering av ett regionalt grönbälte blir således för planerare att organisera sig så att kommunikationen med invånarna blir bättre.

3. Hur kan ett regionalt grönbälte för Medellin implementeras på den lokala skalan?

Vi tror att en implementering av ett grönbälte i Medellin skulle vinna på att prioritera de områden som håller störst utmaningar och problem, eftersom vi antar att lokala lösningar ger positiva effekter för hela staden. Den lokala kontexten och utmaningarna är del av ett större system i staden. Ett grönbälte torde nå sin fulla potential att skydda naturområden och förbättra levnadsmiljöer genom ingående studier av den lokala kontexten och vi ser analysverktyget SWOT som ett lämpligt verktyg för dessa studier. SWOT identifierar sammanhangen och är applicerbart på flera skalor. Planerare som förstår relationen mellan skalor tror vi bättre kan bidra med sammanhängande hållbara lösningar.

Våra förslag på lokala implementeringar visar det möjligt med en design som utgår från lokalt givna omständigheter. Förslagen relaterar nära till de informella bosättarna i gränszonen samtidigt som de sörjer för mer allmängiltiga intressen hos stadsborna i Medellin. Vi frågar oss dock hur väl vi lyckats förstå och omvandla de lokala förutsättningarna och menar att det är svårt att fullt förstå dem. En huvudsaklig anledning kan vara kulturella skillnader men en begränsad möjlighet att undersöka området, när det ibland är farligt för

utomstående att äntra informella bosättningar. Att planera i sådana områden är säkerligen en utmaning också för lokala planerare. Regional planering i dag skiljer sig mycket från processer i informella bosättningar - både administrativa, realiserande och beslutsfattande processer.

CVM försöker inkludera lokala bosättare i beslutfattningsprocessen. Vi tror att det är rätt väg att gå men vill addera till diskussionen behovet av en ökad tilltro till de lokala invånarnas möjlighet att ta egna initiativ till stadsutveckling. Idag förespråkar planerare medborgardialog men planläggningen av mark ligger fortfarande i händerna på planerarna. Om marklotter inkluderas i grönbältet, där temporär design kan initieras av lokalinvånarna, tror vi utformningen av bältet bättre kommer att tillfredsställa de lokala behoven som finns. Planerare kommer också kunna lära av de kreativa lösningar som uppstår.

Slutgiltiga lärdomar för reflektion

I korthet anser vi de nio strategierna vara relevanta också för utvecklade länder, eftersom de exemplifierar hållbara lösningar som syftar till att säkra grön infrastruktur, fungerande ekosystem med fokus på sociala aspekter. Informella bosättares nära förbundenhet med naturen kan sägas vara en modell för hållbart leverne. Städer bör utvecklas hållbart och kanske kan de identifierade kvalitéerna i informella bosättningar planeras för i den formella staden; lokala produktionssystem som ett exempel. För att utvecklingsländer ska få lika lågt koldioxidavtryck som informella bosättare, och bli hållbara på fler sätt, krävs dock incitament som förändrar livsstilen hos de som lever över jordens tillgångar. Vi tror att grön infrastruktur kan skapa förutsättningar för en sådan förändrad livsstil.

Under vår studie har vi flera gången kommit att diskutera grönbältets tillämplighet som ett framtida stadsplaneringsverktyg. Våra resultat visar att grönbältens främsta uppgift är att befästa grönstrukturella kopplingar, vilket är det som planeringsstrategierna gröna kilar och fingrar också åsyftar. Är grönbältesstrategin därmed överflödig?

Städer idag uppvisar täta urbana strukturer, där det kan vara svårt och tidsödande att restaurera gröna korridorer. Detta gör det viktigt att jobba med grönstrukturstrategier inom den urbana strukturen. Vad som blir intressant vid användandet av ett grönbälte, är hur den implementeras i den rural-urbana gränszonen - en zon som är mycket annorlunda än den urbana struktur där gröna fingrar används. I gränszonen finns det större möjlighet att säkra grönstruktur eftersom stadsväven är glesare. Om vi tror att kontrollen av städers tillväxt är omöjlig att uppnå, eller kanske inte ens önskvärd i utvecklingsländer, kan en implementering av ett grönbälte i gränszonen säkra de gröna strukturer som staden kan växa kring, så att de blir en del av “morgondagens" täta stad.

TABLE OF CONTENT

CHAPTER 01
INTRODUCTION

CHAPTER 01

INTRODUCTION

CONTENT. This chapter introduces the discussion on the future relevance of a Green Belt as a strategy for mitigation of urban growth. This is followed by an introduction to the current Green Belt project in Medellin and the importance of landscape architect involvement. Thereafter, the purpose, aim and research questions are followed by a definition of the limitations and target groups of this study. Finally there is a description of the thesis structure.

1.1 GLOBAL URBANISATION

The "Green Belt" is a planning concept that for many years has been used to control urban growth and to secure the sustention of larger green areas around towns and cities (Amati 2008). Such green areas can, in modern planning, be land reserved for forest, plantations or open landscape (Nationalencyclopedin (NE) 2015). As the world is facing a large population growth, it becomes increasingly important to adopt strategies that deal with urbanisation and the upcoming challenges; the Green Belt appears to be one possible course of action.

The United Nations Population Fund, UNFPA (2007), estimates that 80% of the world population will live in developing countries by 2030. The prevailing urban migration is a worldwide process often motivated by economic factors (Boundless n.d.). This results in growing cities and a diminishing proportion of people living in the countryside. As the urbanization continues a large amount of the world's population is expected to live in urban settlements of informal character by 2050 (Taylor 2011).

Latin America and the Caribbean is the most urbanized region in the developing world. More than three quarters of the population live in urban areas and two of the world's largest sprawling mega-cities (New Mexico and Sao Paulo) can be found in this region (The World Bank Group 2010). The urbanization pattern of Latin America shows that almost every country holds a single bigger city. In recent years, however, the economic development has made it possible for intermediate cities to grow in size, which has reduced the number of new mega-cities. Much poverty is concentrated to the urban areas and poor urban dwellers often live in substandard housing with a limited or no access to basic services (UN 2001). The World Bank Group (2010) estimates that around one-third of Latin America's and the Caribbean's urban population live in informal settlements.

The urbanising process is powerful and threatens nature areas in favour of residential development. Planners have to understand the trends that characterize current growth patterns (Alcaldía de Medellín 2011) and take the urbanisation process into account when planning for greenery and landscape restoration (Weller and Hands 2014). Land-use changes due to city expansion can entail irreversible losses in biodiversity (Pauchard et al. 2006), which would go against a sustainable development and the United Nations' objectives to "assure the needs of the present without compromising the ability of future generations to meet their own needs" (UN 1992a).

Nature is additionally important for the ability to moderate the effects of climate change. Thereto an integration of nature in the urban tissue is vital for recreational fulfilments, especially in large cities with a great distance to surrounding green areas (Boverket 2012). Moreover, greenery in cities or the rural-urban fringe plays an important role in environmentally friendly food supply, giving reasons to a concious and contemporary green structure planning wthin and around cities (Summers 2011).

1.2 THE USE OF GREEN BELTS TO HANDLE URBAN GROWTH

The Green Belt was introduced in Great Britain during the modernistic era between 1950s and 1970s. The use of this planning tool spread rapidly around the world. Few Green Belts have been implemented without complication, hence the controversy and discussion surrounding the Green Belts.

Critics argue that the modernistic assumption that a clear line could be drawn between different land uses without any problematic outcome is not applicable today (Amati 2008). Previous Green Belt projects for example Sao Paulo Megacity in Brazil, have shown that a static division between different land uses is hard to sustain when pressures on land for houses can dissolve the Green Belt in favour for urban sprawl (The Free Library 2004).

The Green Belt Strategy's suitability to prevent urban sprawl in developing countries is currently discussed by researchers around the world. In a discussion between researcher Pa Azeez, Professor Arshad Chughtai and research assistant Kai Wang (Research Gate 2013), Azeez claimed that urban sprawl is unsustainable but still a natural way for cities to grow. Azeez further believes that the Green Belt strategy cannot mitigate urban sprawl, as the concept does not take into consideration the socio-cultural and ecological aspects of the dwellers' lifestyles. Instead Azeez demands a new approach to city development where the city itself is viewed as a modern ecosystem. Professor Chughtai argues that a more sustainable solution would be to increase job opportunities and basic human facilities in the rural areas in order to decrease the amount of immigrants from rural to urban areas.

The discussion about the use of Green Belts to control urban growth is further complex by the differences in implementation in high and low income countries. Wang describes how the existence of cities in low income countries is essential to trigger economies. He points out how urban sprawl in this case should not be considered as a negative development. Wang suggests that instead of controlling urban sprawl, Green Belts should provide multifunctional green areas and act as a connecting zone between different activities.

1.3 MEDELLIN GREEN BELT

The Green Belt Strategy is currently used in Colombia in order to control urban growth and improve the conditions for informal settlers. A recent Green Belt project is under implementation in Medellin, the second largest city with 2 million inhabitants. Colombia has a high level of urbanisation with approximately 34.5 million, out of the country's 45.8 million inhabitants, living in urban areas. This is equivalent of three quarters of the population (Index Mundi 2013).

In Medellin there is a pioneering approach to urban planning that raises questions about how to handle the urban periphery. The will to deal with this topic and the more separated approach taken regarding the rural-urban interaction zone, distinguishes Medellin from other cities in developing countries. Many practitioners see Medellin as being at the forefront of urban planning and city improvements. This is apparent through the numbers of prizes awarded Medellin (SVD 2014).

1.4 LANDSCAPE ARCHITECTURE & GREEN BELTS

In the light of the current debate, the ambition to be at the forefront of strategically Green Belt implementation makes Colombia, and Medellin, an interesting place for landscape architects to enter the debate of sustainable urban growth. Landscape architects can play an important role in the debate as mediators between city planning, nature conservation, social aspects and aesthetical values. With the broad knowledge of human and natural systems, landscape architects can help find new solutions and strategies that mitigate future disasters due to rapid urbanization and climate change.

1.5 THE SIGNIFICANCE OF THE TOPIC

Current discussions about the Green Belt strategy and its suitability in the modern urbanized world have unearthed many questions. There is a need for the Green Belt Strategy to consider more socio-cultural and economic aspects, as well as taking a more dynamic approach. But uncertainty remains as to what form the strategy should take and how it should be implemented. The Medellín Green Belt, Cinturón Verde Metropolitano (CVM) could be a point of entrance to the wider discussion as it works as an example of a Green Belt strategy that seeks to find new solutions on what form the confrontation between urban and rural should take.

By studying Green Belts' suitability in relation to urban sprawl and informal settlements a redrafting of the strategy could begin. By discussing and highlighting the current

challenges within urban planning in low-income countries a need for deeper understanding is evoked. A more complex world, with many interdependent variables, requires adaptable strategies that consider each and every local condition.

This subject is relevant because ongoing rapid urbanization demands stronger protection of nature and sets new conditions for the Green Belt Strategy, conditions that have not yet been studied to any great depth. The Green Belt strategy is currently being discussed as a suitable planning tool for mitigation of informal urban expansion. As informal settlements in many cities are expected to grow, one can anticipate that the significance of the tool will increase in the discussion and planning of our future cities. To assure a continuous protection of green areas in cities under pressure of urbanization, the protection of nature needs to be anchored at the local scale and be incorporated into peoples' everyday life.

1.6 PURPOSE OF STUDY

The purpose is to study how a Green Belt strategy can be implemented in a city with informal settlements adjacent to the Green Belt. The existing Green Belt project, Cinturón Verde Metropolitano (CVM) in Medellin, Colombia is the starting point for this study. By a locally anchored design we wish to give examples on how a Green Belt can be implemented. The purpose of the design intervention is to show an example of an implemented strategy that could be applicable to other areas with similar prerequisites.

1.6.1 Aim

The aim of our study is to exemplify an implementation of a Green Belt strategy in the rural- urban fringe that addresses the specific conditions and requirements in the informal settlement. This is done through a small-scale design intervention in a limited research area in an informal settlement in the rural-urban fringe of Medellin.

1.6.2 Research questions

The research question is divided into three parts in order to cover three different scales:

1. *How can a contemporary Green Belt strategy be developed to reduce environmental impact and improve living conditions in informal settlements in the rural-urban fringe?*

- This question is answered through a literature study of Green Belts and informal settlements.

2. *How can a Green Belt strategy be adapted to a regional context?*

- This question is explored through the study and evaluation of the Green Belt strategy used in Medellin, CVM.

3. *How can the regional Green Belt strategy of Medellin be implemented at a local site?*

- This question is examined through a case study and a design proposal in the informal settlement La Loma, Medellin.

1.6.3 Limitations

This thesis derives from the discussion of the increased need for green structure in a fast-urbanising world. The thesis concerns land use planning in relation to informal settlements and the focus is on the Green Belt as a planning tool. Other types of green structure strategies are mentioned when being relevant for the context but are not studied any further.

The chosen setting of Medellin presents many complex aspects: the topics of economics, security and politics will not be comprehensively addressed in this thesis. However, they cannot be ignored in the analysis or discussion as they problematize and contextualize the question.

The ambition is to show a Green Belt implementation that attends the dynamics, conditions and needs that are present in an informal settlement in the rural-urban fringe zone of a city. The field study and design proposals are carried out in and on a defined study area in an informal settlement in the rural-urban fringe zone of Medellin. The design interventions

are not to be seen as complete design proposals that includes the most detailed scale, but as a vision taking local context into consideration. Due to security, we only had the opportunity to visit La Loma twice. The scholarship received made it possible for us to stay ten weeks in Medellin.

1.6.4 Target group

This thesis is an example of how a Green Belt strategy can be implemented in informal settlements. The study is done from a landscape architecture perspective and the target group comprises primarily landscape architecture and planning professionals. Secondly it comprises stakeholders and decisions makers in Medellin such as EDU and the City Planning Department.

The thesis can also be of interest to professionals with specific interest in urbanization and green structure on a planning level or those who are searching for new aspects of the Green Belt strategy. It will also be of interest for professionals discussing the actual case of a Green Belt strategy in Medellin.

1.7 KEY CONCEPTS

Green Belt
A planning strategy of rural land around a city, on which building is restricted.

Green Wedges
A planning strategy of land, stretching from the rural area into the urban city centre, (different from Green Belt that contains land around the city) on which building is restricted.

Green Corridor
A concept within planning. Green corridors support environmentally sustainable transportations between housing areas and community facilities and act as vital linkages for wildlife dispersal.

Green Infrastructure
A concept within planning. Green infrastructure refers to a system of multi-functional green space, urban and rural, which is capable of delivering a extensive range of environmental and quality of life benefits for local communities.

Informal settlement
This encompasses settlements developed in an informal manner with respect to building regulations, time, material, ownership of land and formal guardianship. To avoid ambiguity, we do not refer to informal settlements as temporary.

Nature
Referring to the wider understanding of nature that includes both larger and smaller areas with functioning ecosystems. We do not see a single tree or river as nature, but rather as components contributing to the lager definition of nature.

Greenery
This term is used when describing single green components; such as tree alleys, parks, river corridors etc.

Rural-urban fringe
This term refers to a transition zone between rural and urban land. We do not consider a rural-urban fringe as a static border, neither as an area in the urban periphery. The rural-urban fringe should be seen as a set of mixed rural and urban dynamics and does not have to be bound to a specific spatial site.

The thesis is divided into three parts:

1. General guidelines
(Literature study)
Chapter 3-4

2. Regional adaptation (CVM)
(Case study)
Chapter 5

3. Local implementation (La Loma)
(Case study)
Chapter 6-7

1.8 THESIS STRUCTURE

CHAPTER 01 **Introduction**
Gives a description of the main topic of the thesis and the framework for the investigation.

CHAPTER 02 **Methodology**
Explains the chosen methodology and describes the thesis approach.

CHAPTER 03 **Theory: Green Belts**
Describes the history of Green Belts as a planning method and discusses the future challange with informal settlements. Identifies the most important aspects to consider when implementing a Green Belt strategy in relation to informal settlements.

CHAPTER 04 **Synthesis**
Suggests the main focuses of a contemporary green belt adjacent to informal settlements

CHAPTER 05 **Medellin Green Belt**
Introduces the situation in Medellin and the current Green Belt project. It also identifies important regional considerations.

CHAPTER 06 **Case Study: La Loma**
Studies the community La Loma and concluding important needs and opportunities in the social, natural and built environment.

CHAPTER 07 **A Community of Synergies**
Proposes an intermediate design intervention that demonstrates an implementation of a Green Belt based on the findings in Chapter 3 and 5. The implementation shows how a Green Belt can consider local contextual challenges and needs, and simultaneously illustrate an example of sustainable urban growth.

CHAPTER 08 **Discussion**
Discusses the outcome of the thesis and the gained knowledge. Thereafter, the thesis ability to contribute to the debate is discussed as well as future studies.

CHAPTER 02
METHODOLOGY

CHAPTER 02
METHODOLOGY

CONTENT. This chapter describes the methods used during the work with the thesis. The case study methodology, including; literature studies, semi-structured interviews, SWOT analysis and the design tools are reviewed, explained and finally discussed and evaluated.

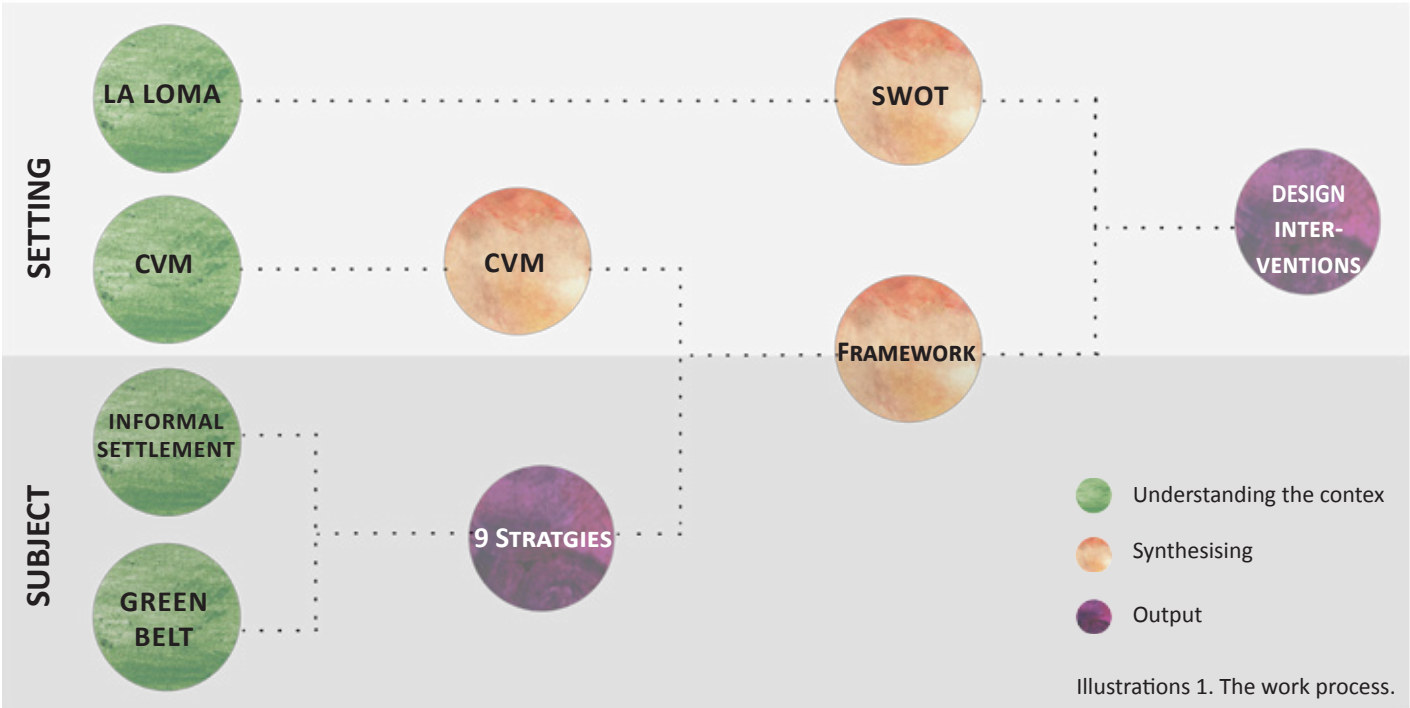
2.1 CASE STUDY - A METHOD

As part of answering our research questions the study examines the configuration of a Green Belt strategy in Medellin. The focus on just one strategy and place makes it an individual example. In the beginning of the study the assumption was made that an evaluation of this specific Green Belt strategy, from a landscape architecture viewpoint, could identify potential improvements. This required an understanding of the Green Belt strategy in Medellin and of the context within which it has been developed with respect to planning strategies, economic interests, social customs, socio-economic inequity and attitude towards nature.

For this purpose 'case study' methodology was suitable. Johansson (2007) states that case study is a methodology in which several research methods are used and hence capturing the complexity of a single case. Case studies encourage a combination of different techniques, methodologies, strategies and theories which allow a case to be viewed from different perspectives. Literature studies, document analysis, interviews, site observations and spatial analysis were used in this case study.

2.1.1 Literature studies

In order to receive a deeper understanding of the topic of Green Belts and to be able to relate it to informal settlements and planning in Medellin, a literature study was conducted. The literature study was divided into three different stages; Green Belt as a strategy in relation to informal settlements, Medellin's approach to planning in the rural-urban fringe and information on the local scale of La Loma. The three different literature studies will be presented below. The second and third literature studies also included document analysis. The comprehensive policy documents, including plans and maps, were thoroughly analysed to extract the relevant information.



Illustrations 1. The work process.

First
With the first literature study the aim was to frame the subject and to facilitate a structured approach to further studies. The literature study included the topics of the Green Belt strategy and informal urbanism and the relations between them. The desired outcome was a framework of the most important aspects when using a Green Belt strategy in relation to informal settlements. This framework would then be used when studying the Medellin Green Belt strategy. The study contained literature collected through the Swedish databases, LIBRIS and Stockholm libraries database. In order to reach beyond the limits of Swedish databases Google Scholar was used.

The keywords used when searching for information were informal growth, informal settlement, slum, edgeland, hinter land, service land, urban fringe, rural-urban interaction, regional development, Green Belt, agriculture and environmental protection. The encountered literature was then selected from the following criteria; relevance for interrelation between informal growth and use of Green Belt strategies, relation to South America and finally the most recent publications. Another important source was cross-referencing from literature conducted form searches in the different data bases.

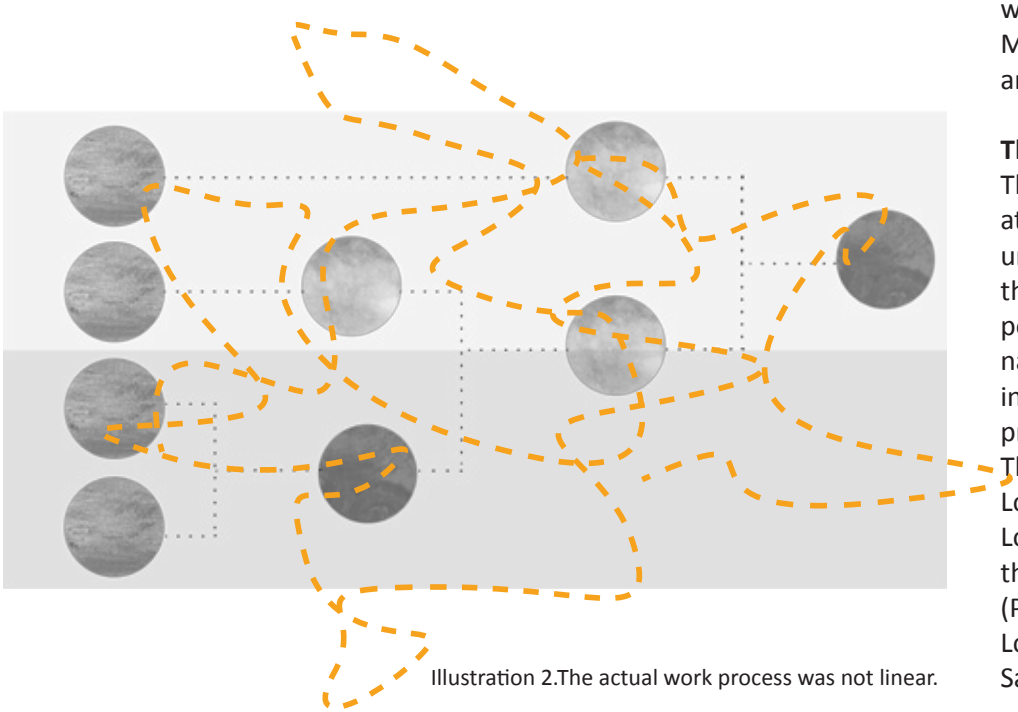


Illustration 2.The actual work process was not linear.

Second
In order to understand the planning strategies in Medellin and their approaches to planning in the rural-urban fringe a second literature study was conducted. This literature study focused on the Green Belt strategy of Medellin, CVM, and supporting documents that relate to nature and land use. The study aimed to extract the attitudes and approaches within Medellin Planning Department towards urban-rural interactions and compare them to findings from the first literature study. The selection was mainly based on suggestions from local planners working with the topic. Furthermore the current discussion regarding CVM was studied and information was collected from the webpages of the main newspapers in Medellin (El Colombiano, El Mundo and Diario adn).

Third
The third literature study aimed at developing a fast and broad understanding for the focus area at the local scale, La Loma. The focal point was social, economic and nature relevance as well as historical information about the setting. The primarily studied document was The Rural Planning Strategy for La Loma (Plan Especial Rural Vereda La Loma, PER), a support document to the Comprehensive Plan of Medellín (POT). The key words used were La Loma, deslizamiento, desplazamiento, San Cristóbal and Comuna 13. The

information was selected by most recent publication. The literature was collected by the help of local planners working with the topic and by search at the databases of the newspapers and blogs; El Colombiano, El Mundo, Diarioadn.com and IPC.

2.1.2 Semi-structured interviews

A semi-structured interview is a qualitative method with prepared themes and questions, used to obtain the perception and experiences of the interviewee. The semi-structured interview might resemble a normal conversation as it is characterized by flexibility and openness; questions can be changed or added in the meantime (Kvale & Brinkmann 2009). On the negative side, the method might be time consuming and the interviewer can influence the informant. On the positive side, a less guided interview may contribute with relevant information beyond the prepared questions.

We interviewed four people. Two of them work at the municipality of Medellin and the other two are active in La Loma. During the interviews we had prepared themes and possible questions, which can be seen in Appendix 1 and 2. Not all questions were answered and some following questions were added. The conversations flowed spontaneously, were conducted in Spanish and recorded.

The informants were the forests engineer David Emilio Restrepo Montoya and the social worker and consultant (of the metropolitan area of Aburra Valley) María Eugenia Gallego Urrego. The interviews contributed to the understanding of CVM and EDU's involvement in the Green Belt. The information provided an overview, which facilitated the structuring of the chapter on CVM. The informants represent a planner's view. The other two informants were the local librarian Gabriel Jaime Vanegas Montoya and the local leader Beatriz Álvarez. The informants represent the local inhabitants' view on CVM and interventions in the area. The informants' depiction of La Loma contributed to the site description in this thesis. It provided a deepened understanding of the settlers and the site La Loma and a basis for the design interventions later conducted. The critique on CVM was used as lessons for our designs.

Vanegas Montoya was a suitable informant as he has been working at the Library for over 15 years and therefor has a good insight in the character, challenges, opportunities and ongoing projects in the area. Montoya was not expecting us and had not read the questions beforehand. Álvarez belongs to one of the oldest families in La Loma and she has a comprehensive understanding for the development and history of La Loma. Álvarez was informed about our arrival and our main objectives but she did not receive the questions beforehand. Restrepo Montoya and Gallego Urrego were both suitable informants as they have been closely involved and versed in the plans of CVM since the projects origins.

Spontaneous conversations

During our study we also talked to a number of other people, all of whom have contributed to our perception and image of Medellin and to the understanding of the context. Numerous spontaneous conversations were had with urban planners working at the Medellin City Council and architectural students from The Pontifical Bolivarian University; these conversations contributed to our understanding of the subject and served as a basis when formulating questions for the semi-structured interviews. Spontaneous conversations with the residents of Medellin, such as taxi drivers, restaurant owners, teenagers, local leaders, musicians and local security guards, enriched our understanding of the essence of Medellin. Topics of conversation included opinions on the ongoing strategic planning, social situation, tensions between groups, livelihood strategies, relationship to nature and future visions for Medellin.

2.1.3 Site observations and spatial analysis

To receive a deeper understanding of

the case study area, La Loma, we have done walking tours and spatial analysis on site and at the desk. Following text describes the different methods used.

Walking tours with photography as a tool
Different site observations were conducted, both on site but also remotely by the use of Google Map's street view function. Due to prevailing social unrest and circumstances in the area we were only able to make two site visits to La Loma. The first visit to La Loma we drove around the area in a car. From the car we took photos and marked on a map the locations. We intended to use the photos after the visit, as a basis for describing the area and later on for our design interventions.

During our first visit we got the opportunity to take a short walk around the central part of La Loma (San Vicente Ferrer) together with people from the municipality of Medellin. On the second visit we took a longer walk in the central parts of San Cristobal and the central part of La Loma together with the local leader Beatriz Álvarez. The walks made it possible for us to get a closer view on the everyday life in La Loma and the social interplay. We had less possibility to take photos on the second visit, as we moved by foot. We were exposed to the risk of robbery and we were also informed that not all groups of people in La Loma appreciate outsiders taking photos.

SWOT-analyses
SWOT-analysis tool was used to deepen our understanding of the case study area, La Loma. This analysis tool is designed to identify strengths, weaknesses, opportunities and threats in the field of research. The first two variables concern internal factors and the latter two concern surrounding factors that may impact on the research area (Boverket 2006).

SWOT-analyses were completed on the three subject-matters (social, natural and built environment), that were identified in our literature studies on La Loma. The analysis is used to summarise each subject-matter. Two schematic maps were made for each subject-matter and illustrate the main focus points. One of the two maps brings together the main weaknesses and threats (summarised as problems) and the second map brings together strengths and opportunities (summarised as opportunities). From each SWOT-analysis the main points of significance for La Loma are summarised in a text box. These points form the basis for the design proposals.

2.1.4 Design tools
In order to present our design ideas we used mapping, photos, sketches and fictive collages. The preparations of the illustrations have been made through the usage of computer-based programs such as InDesign, Illustrator and Photoshop provided by the software company Adobe Systems. Prior the final design, we have used the programs together with paper and pen to explore possible design solutions. Inspiration and ideas have been collected and written down during literature studies, web searching and reviews of magazines.

2.2 DISCUSSION METHODOLOGY

The case study included many different methods that were conditioned by different aspects. The following text discusses the methods used, including the challenges faced and possibilities they have created.

Selection of information
We decided to divide the literature study in the theory section into Green Belt theory and Informal Settlement theory because we recognised that there were few completed studies on Green Belt in relation informal growth of cities. The division of the literature study helped us focus on the two different themes and it also gave us a stronger incentive to be more selective. For example, we attempted to find literature on the Green Belt topic that discussed conditions in the rural-urban fringe. Information and literature on the second theme, informal settlements, was overwhelming but we soon realised that it was difficult to find interesting information amongst the large amount of studies. We struggled to understand what could be of importance to our study so a strict

process and extraction of gathered information was necessary. We focused on what we thought were the common denominators for informal settlements globally and tried to specifically select information regarding the conditions in the rural-urban fringe where a Green Belt had been implemented.

The academic databases that we used to search for information were predominantly Swedish, hence the information collected might be from a more western perspective and only include the Swedish selection on a global matter. However, this was something we were aware of and tried to balance by also using global databases, such as google scholar or international known sources such as United Nation. Insights from settlers in informal settlements were not presented in literature so we had to fill this information gap through recording conversations had in Colombia.

The literature included in the third literature study was provided by the Municipality of Medellin. Planners at the Municipality completed this selection of information. The planners' critical voices about the current Green Belt project may have led us in a certain direction; we have taken impression of the people knowing much about the setting in Medellin and La Loma. We have tried to complement our understanding with information from the everyday inhabitants of Medellin and by studying objective policy documents.

Language barriers

When it came to the third literature study, related to Medellin and the local area La Loma, the base literature was only written in Spanish. We both have a vast understanding of the Spanish language but the fact that Spanish is not our mother tongue has of course hampered our nuanced understanding of the literature. This fact also slowed us down when attempting to skim through the extensive policy documents and literature and to quickly select important information. However, having knowledge in Swedish, English and Spanish languages has given us an exclusive possibility to process information from many different sources; from informal conversations with informal settlers on the streets to the reading of policy documents and leading international literature.

Case study of CVM

To understand the ongoing project CVM we started to gather information prior to going to Colombia. We did not found any comprehensive presentation of the project but many slideshow presentations that, once in Colombia, turned out to be the only written source. This was of course a challenge for us as we had to interpret the slideshow presentations. The presentations lacked pictures and maps of good quality which made it difficult to understand what was described in words. The need of pictures is of course more significant for an outsider with different references or experiences of the context and the research area.

To confirm our interpretation and to understand we had to talk to a variety of people with knowledge about CVM. The project is a collaboration on different scales and it took us a while to understand who to ask and about what topic. We truly understood the importance in having spontaneous conversations whenever possible. That seemed to be the only way to extract the information needed in the short time frame we had.

Understanding the context

A case study is conducted with the intention to understand a setting or a case. It can be discussed if it is ever possible to fully understand a new setting when you have totally different history, culture and traditions. Throughout our case study we tried to see the possible connection points were we and the people within the setting could meet. We tried to have the connection points as our platform and to be attentive to what the local people told us. The knowledge we have gained from our studies at a Swedish university and the fact that we have both grown up in a country with a strong connection to nature would give us a different perspective and allow us to see things differently. With conversation questions we sought to get an understanding of both the area of our case study, La Loma, but also about our field of research. Not all of the questions may have been relevant to the area of La Loma. Some of the

questions may also have been difficult to understand for the informants, being formulated on the basis of little actual experience of informal settlements but with lot of assimilated academic knowledge. The intended interviews became semi-structured interviews as we let the many prepared questions be in favour for more generous answers from the informants. The possibility to free associations made it possible for us to get hold of knowledge that we did not know to ask for. However, it sometimes made the stream of information in Spanish overwhelming and difficult to follow. Although, the recording of the semi-structured interviews allowed us to go back and study the answers. It is possible that the recordings would affect the answers of the informants, but seemingly the people we talked to paid little attention to the recorder.

Limited time and restricted possibility to be on the set

The visit in Medellin was restricted to ten weeks. During our time there, we sought to take on a whole new context and field of study. Unfortunately we had little time for preparations before going there, which impeded on the process and delayed the particular search of information. The understanding of La Loma was also conditioned by the limited time, as we could not visit the site as much as we would have liked to. Back in Sweden, we felt it would have been useful with more photos. The "street views" provided by Google Maps offered scarce and not well documented information of the hilly and informal community. The choice to study the community of La Loma was mainly based on the challenges it presented and the need of studies in the area. The choice of study area was mainly initiated by our supervisor in Medellin, the architect and municipal planner, Giovanna Spera. The inherent challenges in La Loma presented an interesting area to study but at the same time it restricted our ability to fully understand the area. La Loma had a strong presence of criminal activities and the security in the area was restricted. This meant we could not explore the area as we wished as we needed to be accompanied by municipal workers or local leaders, hence we could only visit the area twice. In retrospective we would have chosen a different area to study, since it strongly affected the outcome of the study.

Teamwork

This study has been conducted as teamwork and the open dialogue has been essential for the result of the study. Having two pair of eyes and different perspective in discussions have had positive consequences for the result. Since we have different approaches to and ways of working we have automatically taken different roles in our teamwork. We have had strong roles from the beginning which has not always been positive. Sometimes it can be of value to swop or change the role in teamwork to better understand the opposite team-worker. Regardless of our different roles we have always discussed upcoming challenges and we have put in equally amount of effort and thoughts into the text writing process. In Colombia it was invaluable to be a team when meeting new people and trying to understand discussions and conversations. After our interviews we were always able to fill in the gap that the other person lacked. During this study we have learnt from each other and realised the importance with a transparent dialogue, especially when there is a problem. It has been important, but not always easy, to respect the decisions we took together and to follow the time plan. Another important aspect has been to constantly review the common vision in order to work thigh together towards a clear goal.

CHAPTER 03

THEORY: GREEN BELTS

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CONTENT. This chapter describes the history of the Green Belt as a planning method and discusses future applicability. It reviews historical changes in the Green Belt strategy and evaluates its suitability and possible form today with consideration to arising challenges. Discussions on the potential need for change to the green belt strategy are presented in green boxes. Finally, a short list of important changes to the green belt strategy is presented.

In order to understand the future relevance of a Green Belt as a planning tool it is important to acknowledge its origin. The earlier sections review the history and main concepts behind Green Belts until present times. The second part of the text discusses challenges for the Green Belt and adaptations that take into consideration urban growth and climate change, as well drawing lessons from previous implementations of Green Belts. Green Belts are implemented in rural-urban fringes in order to control urban growth. Rapid urbanisation and generation of informal settlements has changed the conditions and lifestyles in rural-urban fringes. The third part of the text delves into the specific conditions and requirements of informal settlement in the rural-urban fringe.

3.1 THE STARTING POINT FOR THE GREEN BELT

The history of Green Belts was founded in England in 1898, with Ebenezer Howard's idea of a new city form; the "garden city". Howard proposed that garden cities should work as self-sufficient units outside the main city, with industries that offered jobs and an agricultural Green Belt for the provision of food. To ensure the accessibility to the qualities of nature, the size of such cities was restrained by a Green Belt (Rådberg 1994). Common ownership of land within the Green Belt was believed to prevent land speculation and in that way control the development of the cities (Caldenby 1991).

Garden cities as a planning concept, was widely spread in the turn of the 19th century (Carmona et al. 2010) but the Green Belt strategy itself peaked among planners from the early 1950s to the 1970s during high modernism. The strategy corresponded to the modernistic predilection for order (Amati 2008) and followed British contemporary beliefs that town and country should be clearly separated (Elson 1986). The adoption of a Green Belt was seen as a way of imposing an rural-urban polarity on an in-between landscape of outer urban suburbs and as a tool to secure the preservation of a beautiful surrounding landscape. It was assumed that the rural landscape would be built upon if no restraints were made so and British planners subsequently promoted the Green Belt concept as a universal solution to urban growth (Amati 2008).

Sometimes the Green Belt strategy is referred to as the "blanket prohibition" because of a strict regulation of development (Amati 2008). Strong guidelines are presented in British policy documents and dictate the acceptable and non-acceptable land uses within the Green Belt. The policy documents however leave some room for interpretation and have changed over time. Few authorities have therefore implemented the Green Belt in precisely the same way. This indicates that the strategy is not actually a blanket prohibition on development but rather a highly selective planning tool (Elson 1986). With the Green Belt concept promoted as a universal solution to urban growth, it was soon being deployed around the world regardless of the contingencies that affect urban growth in different cities (Amati 2008).

3.2 THE MAIN IDEAS

Today Green Belts are seen around large cities such as Moscow, Bangkok, Tokyo, Seoul, Ottawa and Paris, to name a few. These Green Belts, however, may showcase different structures and patterns; the ambitions are more or less similar to the goals of the Green Belt in the Garden City. Based on the global experience, the main ideas of Green Belts can be summarized as:

- mitigation of urban sprawl and improvement of landscape patterns.
- recreational functions.
- enhancement of the urban ecology including air purification, improving microclimates and increased biodiversity.
- educational function, as a Green Belt can demonstrate the importance of nature (Li, Ouyang and Wang 2005).

3.2.1 Greening benefits of a Green Belt

Beyond the stated principal functions, further positive outcomes could be expected when implementing a Green Belt that contributes to ecosystems. The benefits to humans from ecosystems are called ecosystem services and can be divided into regulating, providing, cultural and supporting services, exemplified in the section below (WHO 2014). The concept of ecosystem services made an important breakthrough in the end of the 1990s (Demker 2006). This suggests ecosystem services have not always had an expressed focus within Green Belt implementation but might play an even bigger role in future implementation.

Regulating services are those that lessen the impact of natural disasters. Providing services can give us clean water and food. The supporting eco-system services include nutrition cycles and pollination, and the cultural services generally relate to multifunctional places that comprise education and historic values (WHO 2014). As a cultural service, greenery can be a structuring element in the urban design and additionally make recreation and leisure possible, supporting a healthy lifestyle (Boverket 2010).

Greenery's ability to moderate effects of climate change is furthermore an ecosystem service. The ability to moderate the effects of climate change can be presumed to be more relevant in Green Belt implementations of present day than in the earlier Green Belts; climate change was not officially acknowledged until the Rio conference Agenda 21 in 1992 (UN 2011). Climate change brings about extreme weather conditions and rising temperatures. Greenery can help to restore the health of our cities by reducing carbon emissions, urban heat island effects, provide noise reduction and purification of water runoff from hard surfaces (Boverket 2010). Furthermore, green structures can mitigate floods, landslides and avalanches which is helpful in urban areas prone to natural disasters (WWF n.d.).

3.3 A GREEN BELT IN CHANGE

Arisen challenges related to urban growth and climate change pave the way for a discussion on what the main ideas of a Green Belt should be today. Since the first Green Belt implementations, globalisation has changed the parameters for the Green Belt as a planning tool. Experiences from previous implementations have also brought insights as to what a Green Belt should be.

3.3.1 Need for a flexible and local context based Green Belt

The apparent success of the Green Belt implementation in London led planners to assume that the Green Belt could be applied around any city irrespective of local conditions. For certain, the variation allowed within the restrictive British Green Belt has widened its possible applications (Amati 2008).

Planners have always been able to modify the Green Belt to suit the perceived needs and challenges and as such it could be seen as a flexible planning tool (Freestone 2002). For example, the Seoul Green Belt was not designed for protection of rural areas or mitigation of urban sprawl, but rather for military purposes (Gallent & Kim 2001), and Melbourne Green Belt was seen as a zone saved for future urban development (Buxton & Goodman 2003). However, an example from Tokyo shows the importance of understanding the local setting. During the 1950s - 60s a Green Belt was implemented regardless of the land reform that was re-shaping the Japanese society. A top-down approach not addressing contextual differences results in a somewhat static planning tool (Amati 2008).

Urban developers of today are more aware of the contextual differences' importance for a successful planning and one single approach is no longer believed to work in all situations. The appropriate usage of the Green Belt strategy is a question of debate ever since it was acknowledged that regularisation policies require

an adaption to local conditions, culture and history of encompassed settlements (Fernandes 2011). It is said that general guidelines should not be given as it stops the creativity and as all countries have different conditions to take into account (Diniz 2014).

An example of a Green Belt implementation where local conditions have been greatly considered can be found in Beijing. Unlike the traditional Green Belt, planned as a larger green area outside the city, the Green Belt of Beijing applies green wedges. With greenery entering the urban structure, urban residents get increased connection points with nature and people are no longer required to cross the rural-urban fringe in search for nature, as the greenery conversely is let into the city. Furthermore, the Beijing Green Belt is designed to encompass diversified nature, carefully adapted to existing conditions for greater environmental achievements (Li et al. 2005).

The belief that planning should be based on the context in an area also applies to planning in the rural-urban fringe, where Allen (2003) argues that a more separate approach is needed as the systems and flows in the fringe are significantly complex.

3.3.2 Need for a separate approach in the rural-urban fringe

The rural-urban fringe is recognized as a sensitive zone to the urban system, due to its linking functions between central city and distant suburbs (Mattingly 1999). When planning in the rural-urban fringe specific considerations are required as changes in ecologic, economic and social functions affect both the city and the countryside (Allen & Davila 2000). Thereto planning in the fringe is challenged by an institutional fragmentation, having many different sectors and institutions with diverse concerns overlapping.

This concept is particularly evident in nature protection where local governments have little incentive to protect nature not included within its boundaries. Regional governments have a more overarching view and can gather all affected parties (Mattingly 1999). Social systems in the rural-urban fringes change over time. This presents difficulties when establishing more or less permanent institutional arrangements, which deal effectively with the long-term management of natural resources and the enhancement of the livelihoods of those living and working in the peri-urban fringe (Allen & Davila 2000).

A coherent planning is even more challenging to achieve if the national government is fragile and inconsistent, as seen in many developing countries (Echeverri 2013). Top-down regulations and protections will have little impact in political unstable or low-income parts of the world. Instead, the visible and direct positive impact on the local livelihood is substantial in countries where the basic need of land for housing and livelihood takes precedence over nature protection strategies (Weller & Hands 2014).

Elson (1986) describes how the competition between different land uses and the economic pressure on land tend to be highest in the rural-urban fringe and state that a nature protection planning method, such as the Green Belt, needs to address the existing dynamics of economies in the fringe. A restrictive and centralised planning system has previously been a prerequisite for the Green Belt strategy (Tessin 1976, see Gailing & Kühn, pp. 413-16). However today, an on going deregulating of planning practices and the rapid growth in the rural- urban fringe puts pressure on the Green Belt strategy to redistribute the power from regional to local planning practices. To prevent that the Green Belt strategy from being weakened and diluted as a planning tool, Gailing and Kühn (2008) describe how the future planning strategy needs to secure rural-urban land and green structure through a bottom-up approach based on the features and requirements on the local scale.

3.3.3 Changes in the approach to urban development

The setting for the Green Belt as a restrictive tool for urban growth has changed since the days of the garden cities (Habitat 1996, see Lupala s.29). The original British Green Belt intended to control the growth of cities in industrialised countries. Today cities are growing at unprecedented rates, sizes and densities in non-industrialised countries. To address future urban sustainability in today's complex cities built up by economic, social, cultural, legal, political and natural layers in consistent change, the flexibility of a Green Belt is said to make it a suitable tool. The flexibility is a strength that can be of importance when planning a heavily populated area under development pressure (Tang, Wong & Lee 2007).

How to apply the restriction of urban development has differed between implementations of the Green Belt and is a question of debate. Green Belts started with a focus on recreation and agriculture catering for the needs of people rather than those of nature, but in recent years the purpose of the Green Belt has moved towards a nature conservation focus, which in some cases has further restricted urban development. Implementations of a Green Belt that more explicitly focuses on nature conservation are referred to as ambivalent and feeble (Tang et al. 2007). In the Green Belt implementation of Christchurch, the focus on rural land protection resulted in a strict prohibition on urban usage (Amati 2008). Even though, degraded rural areas and loss of biodiversity speak for nature conservation, planners in Hong Kong recognize a Green Belt to be vulnerable if it is left as an independent area. Based on the belief that nature conservation should not restrain the relationship between urban and rural land, they have promoted an integration of the Green Belt into permanent urban development plans (Tang et al. 2007).

3.3.4 Sustainability as a new focus

Climate change is presumed to be the result of a pervasive change in lifestyle around the globe, which additionally puts pressure on our global resources. Today cities act as magnets that attract people with employment and greater economic opportunities. Higher incomes result in increased average personal consumption. The current economic system is based on growth, which has led to an increased welfare but also to large depletion of natural resources (Rees & Wackernagel 1996). The measuring of how much area of biologically productive land and water it takes to support a certain lifestyle is termed the Ecological Footprint (WWF n.d.). Today the ecological footprint per person requires three planets to sustain today's lifestyle pattern (New Economics Foundation (NEF) 2011).

Climate change and natural disasters

Since the first Green Belt was implemented natural disasters have become more prominent; this is presumed to be a result of climate change. The traditional Green Belt promoted a clean-cut separation of urban and rural zones. Overlooking the potential for greenery inside the urban structure results in a strategy less adaptable to climate change. The increasing importance for a Green Belt to consider urban ecosystems continuing inside the built form has become more apparent. Green structure within the built form may extend beyond formal parks to informal small-scale greenery often inaccessible for public, such as residential gardens, green industrial land, abandoned land, road and railway strips among others (Boverket 2010). Bengtsson (2004) recognises the urban landscape to be dynamic and considers dynamism to be an important factor for the conservation of rich biodiversity, and concludes that static nature reserves are not enough to secure a long-term conservation of species.

Sustainable development requires biodiversity

With growing cities to supply and an increased focus on sustainability, the interest for well-functioning ecosystems has increased. Biodiversity is fundamental for a sustainable development as it underpins the delivery of a wide range of essential

goods and services (International Institute for Environment and Development (IIED) 2013).

The basis for the biodiversity of a city lies within its ecological infrastructure comprising surfaces of vegetation or water. The form and scale of the biotopes determine the richness in biodiversity. Not only do cities need large mosaic biotopes to increase the diversity of species, it is also important that the biotopes interconnect so that species can easily disperse (Stockholms Stad 2014).

A significant problem of current times is fragmentation and loss of biotopes, which mainly results from human exploitation of natural ecosystems such as forests or wetlands. Roads and railways are examples of barriers that may not only may kill cross-passing animals, but also can obstruct the movement of species (Triekol n.d.).

When biotopes are fragmented the amount of edges increases and the outlines of the fragments are exposed to sun, heat and wind, denominated "edge effects". Generally, edge effects are perceived negative to biotopes, as the "functional" area decrease; for example the composition of species will not look the same in the edge of a forest as in the core of it. In a fragmented agricultural landscape, the large edge effects are however seen to create important habitat qualities. Scientific studies have shown that small farms, especially those with an organic farming system, hold more birds and butterflies than large conventional farms. Smaller farms appear more likely to create a rich agricultural landscape, which can also be possible for larger farms by growing more varied and organic crops, reduce the field size and make sure all animals have the possibility to graze (Belfrage, Enlund & Olsson 2013).

For a Green Belt to improve biodiversity it is an important consideration for both locally and regionally existing ecosystems. The planning of greenery should involve different scales and assess the effects of fragmentation. Green links should be reinforced; ecological dispersal corridors can play a major role in maintenance of species' populations, and interconnection between fragments widens the chance for species to spread (Stockholms Stad 2014). Green Belts should also consider biotopes found in the manmade environments. Roads and railways, for example, have the possibility to form unique biotopes and dispersal corridors that can strengthen decreasing biotopes (Triekol n.d.).

Local production

This unsustainable model based on consumption is not the only challenge. Today the way production of goods is being configured to supply cities is unsustainable. Urbanisation and contemporary demands for higher living standards have resulted in ruptured local ecological production systems. The previous cyclic systems have now been submitted to global, disintegrated mass-production systems. Today most of the regional production exceeds the geographic limits and the surpluses are exposed to the global market. For a Green Belt to cater for sustainable development it needs to contribute towards self-sufficiency. In order to reduce the dependency on external flows, there must be a focus on rehabilitation of local natural capital stocks (Rees & Wackernagel 1996).

The Green Belt has the ability to manage a rehabilitation of natural local resources and focus on local production systems by the promotion of local agricultural land, forest and fisheries. Additionally, the connection between rural and urban land needs to be strengthened in order to easily facilitate a distribution of local food and goods.

Local farming

Today cities are not using the nearby rural land sufficiently but instead import most of their food from far distant land. Rapid urbanization and the development of informal settlements present a possible solution of a new and more complex food system. The system includes shorter cycles from production to usage, adaptability to fluctuations

in markets and environmental conditions, small carbon footprint and ecological fertilizing with urine. This food system is said to be a necessity to reach a future sustainable food supply (Summers 2011). This can conclude it important to consider farming within the Green Belt; an implementation of a Green Belt cannot restrict nature's capacity for food production.

Allen and Dávila (2000) state that when rural-urban land is urbanised or covered by nature protection or eco-parks there is a significant loss of potential local subsistence farming and the growing of valuable crops. The promotion of local farming is not just a question of a sustainable livelihood for people in the rural-urban fringe but also of the future resilience of cities, which relies on a productive surrounding landscape.

With urbanisation and an increased population living under harsh conditions, the provision of food becomes a more important question for the Green Belt strategy to address. Urban and peri-urban agriculture (in the rural-urban fringe) is already applied around the world and could be combined with land use planning of protected nature. Agricultural Organization of the United Nations (Food and Agriculture Organization of the United Nations (FAO) 2014) explains that urban and peri-urban agriculture is essential when discussing a reduction of hunger and poverty, for food security, to promote local governance and to positively develop the urban environment. Urban and peri-urban agriculture has in many cities become the key to reduction of the ecological footprint of the cities and to manage urban organic waste but also as a tool to contain urban sprawl, increase biodiversity and to reduce the dependency on the global market (FAO 2014).

The Green Belt should, instead of forcing a change in lifestyle, see to the lifestyle patterns of all citizens and incorporate land uses that support livelihood strategies. An example is to include productive land, such as farming, within the public domain in the Green Belt.

3.3.5 Conclusion: suggested main ideas of a contemporary Green Belt

Based on the above discussion it can be concluded that in current times a more adaptive approach is required in the design and implementation of Green Belts that takes into consideration different contexts and parameters. For the Green Belt strategy to continue being a successful planning tool for nature conservation and mitigation of urban sprawl it requires a more resilient approach that seeks to establish a stronger link between the city core and the rural-urban areas, as well as combining top-down governmental policies with local conditions and requirements.
We suggest the following improvements to the strategy, as a complement to the aforementioned main concepts of a Green Belt:

- Make use of the Green Belt as a structuring element
- Work for a variety of landscapes with diverse habitats
- Combine human activity and nature conservation
- Mitigate natural disasters
- Provide multifunctional green areas and public spaces
- Develop a stronger linkage between the rural- urban fringe and the city core
- Promote local cyclic production systems
- Improve the ability to livelihood strategies, especially farming within public green areas
- Focus on a Green Belt that has direct positive outcomes for livelihood
- More context based approach that considers local features and requirements of the local people

3.4 INFORMAL SETTLEMENTS IN THE RURAL-URBAN FRINGE: A MATTER FOR THE FUTURE Green Belt

In recent years the world has faced rapid urbanisation. In order to understand how Green Belts and informal settlements can benefit each other and contribute to more sustainably planned cities, the following text examines the conditions and needs of an informal settlement. A particular focus is put on the specific dynamics and living conditions in the rural-urban fringe, as that is the zone for the deployment of a Green Belt.

3.4.1 Background to the emergence of informal settlements

A driving force in the relocation of labour force from rural areas into the city is the difficulty that smaller private businesses experience developing profitable practice when globalisation has liberated and opened-up markets to external demands (Tokman 2007). In 2007 more than half of the world's population lived in urban areas and the fast developing trend has presented challenges in terms of housing demand (UN-Habitat 2012). In many developing countries the planning sector fails to meet the demand for housing which results in wide scale housing shortage. The urgent need has led to development of various informal settlements around the globe (UN-Habitat n.d.). Today the world has more than 200,000 informal settlements, with the highest proportion found in and around large Asian and African cities, but also in great extent in Latin America (Davis 2006).

Location

The informal emergence of settlements can be allied with great danger. Globalisation has resulted in increased land prices making poorer urban dwellers unable to access the formal housing market, which drives people to adopt residual land that is unsuitable to build on. Close to the city centres, where land prices are high, informal settlers are seen to live in precarious areas prone to flooding or landslides, on steep slopes or along highways, railways and riverbeds (UN-Habitat 2012). Many times, extensive deforestation is taking place due to the rapid urbanisation, which presents greater risk of flooding and mudslides, thus increasing the risk imposed on informal settlements (International Federation of Surveys (FIG) 2010).

The term "informal settlements"

Each setting of an informal settlement has a different origin and development pattern, can vary in size from a few huts to thousands and can be situated in the city centre or in the rural-urban fringe (UN-Habitat 2012). Due to the varying contexts, informal settlements could be expected to vary from place to place. Hence the difficulty of developing a generalizable concept of informal settlements becomes apparent (Huque 1982). The term "informal settlement" can yet be said to refer to a variety of settings with poor living conditions. The United Nations has defined informal settlements to include inadequate access to clean water, inadequate access to sanitation, poor infrastructure and quality of housing, overcrowding and insecure residential status (UN-Habitat n.d.). In legal terms informal settlement also refers to a common violation of the legal order with regard to land use planning, registrations, buildings and taxations. Informal settlers are seen to illegally occupy private land but also public and communal land that typically lacks formal registration of ownership. Some occupants purchase lots from parcel owners or previous occupiers (Fernandes 2011).

3.4.2 Development pattern: the rural-urban fringe is pushed further away

With land in the urban periphery gradually being occupied by newcomers, many smaller informal settlements in the outskirts of cities have merged together and created large mega slums in the form of continuous belts (Davis 2006). The largest mega slums can be found in Latin America and the Caribbean, in cities such as Mexico City, Caracas and Bogota (Davis 2006). Continual urbanisation results in an outward shift of the rural-urban fringe from the city

centre (The World Bank Group 2000) and subsequently agricultural land in the vicinity of cities are transformed for urban uses. In India, for example, 600.000 hectares of agricultural land was over two decades transformed into urban land, corresponding to an area 20 times the size of Bombay. The rapid increase in land demands applies not only to cities where mega slums expand but also small and medium sized cities (Dowall & Clarke 1996).

Less consolidated informal settlements
Experience from Latin America demonstrates that informal settlements become consolidated over time (Fernandes 2011). Instead of demolishing the illegal settlements, cities that lack affordable housing policies retain them and provide them with infrastructure, e.g. road networks, public transportation, piped water, electricity and sewer, space for common use, among others (UN 2009). Because of this, settlements become legalised de facto (in contrary to de jure), meaning that the acknowledgement of rights to the land increases as time passes by. Settlements in the periphery of a city that have not yet been consolidated are correspondingly less equipped with urban infrastructure, services and solid building construction (Fernandes 2011).

Particular dynamics in the rural-urban fringe
The rural-urban fringe is described as presenting either a lack of "urban" attributes or the loss of "rural" aspects. Urban attributes include, among others, high density, accessibility, services and infrastructure. Rural aspects comprise fertile soil, agricultural land and natural landscape to name a few (Allen & Davila 2000).

Rural-urban fringes should not just simply be perceived as circular zones around built up areas with a mixture of agriculture and non-agriculture uses, but instead complex spatial entities, characterised by rapid changes in economy and land uses (Satterthwaite & Tacoli 2002). The emergence of informal settlements and their morphology is heterogeneous, as the process is influenced by multiple factors in constant fluctuation (Chiesa 2013).

3.4.3 Physical environment

The process, by which informal settlements are formed, is variously described as incremental housing. A family creates a single room, to which others are added over time, both horizontally and vertically. Generally the houses become one or two stories high and mostly they do not exceed four floors due to construction restrictions. This keeps the urban setting small-scaled (Melbourne School of Design 2012). Soon some moderate retail and services often develop in response to local demands, making the initial spontaneous settlement more complex and organised (UN 2009). The services are mostly confined to the ground floor. Occasionally a rough grid plan is staked out prior to construction with narrow lanes between rows (Melbourne School of Design 2012), but more often the street pattern is organic (Glass, Morkel & Bangay n.d.).

Urban density
In urban planning, high urban densities are perceived more sustainable and UN-Habitat has stated a basic principle that there should be at least 15,000 people per km² (UN-Habitat n.d.d.). The lower buildings in cities with expanding informal settlements imply a relatively low population density. Where urban density is said to be high in informal settlements, it may be referring to consolidated or old settlements with taller buildings that have the potential to house more people (Lupala 2002), but is more likely referring to informal settlements that are densely arranged within lots. The latter is characteristic of many informal settlements and most mega slums (FIG 2010). The size and shape of lots plays an important role in determining the size, coverage, floor space ratio and orientation of buildings and the amount that can be built up (Lupala 2002).

Problems relating to dense informal settlements could have direct

implications not only locally but also in other parts of the city. Narrow lanes introduce difficulties when responding to natural disasters, which in turn expose residents of a wider city to potential risks (FIG 2010). An informal settlement improvement program from South Africa suggests that firebreaks be introduced between shacks where thoroughfares are not present (Brillembourg & Klumpner n.d.).

When land is scarce and settlers occupy riverbeds it has effects both at source and downstream. Urbanisation introduces changes to the channel bank stability, water quality, stream flow characteristics and the water balance equations (Harriden 2011).

Buildings and identity

With increased tenure security, residents are more likely to invest in their homes, i.e. use permanent materials (such as bricks, stones, concrete or timber) to improve the local environment. Buildings constructed with permanent materials, do not necessarily meet building standards (UN 2009). Even with consistent use of certain building materials in informal settlements, the facades can shift in appearance due to large scope for personal design and decoration expressing individual and community values. However, in mega slums it is common with a loss of buildings reflecting cultural heritage or of local historic and architectural value (FIG 2010).

Urban expansion patterns in Asia, Africa and Latin America have shown that villages can continue to exist within the city if a rural-urban fringe overlaps traditional rural villages in city outskirts. The engulfed peripheral villages often retain their distinct identities and the area upholds a complex mixture of formal houses, shanties, rural huts and other dwellings (Simon, McGregor & Nsiah-Gyabaah, 2014). This suggests that informal settlements in such areas can hold cultural heritage, however the inherent and original one rather than the one of the settlers occupying the area.

On the larger scale, an area can lose parts of its inherent identity as expansion of informal settlements induces radical changes to the landscape. In an example from the Kathmandu Valley in Nepal, green rice-fields have nearly disappeared, the river is heavily polluted and the Himalayan peaks are hardly visible due to a haze of pollution. As a consequence, UNESCO is considering declassification of World Heritage List sites that are affected in such a way (International Centre for Integrated Mountain Development (ICIMOD) 2007).

Orientation

The informality of urban development leaves imprints in the streetscape, not only houses but also the scale of lanes and streets can differ and create many

Illustration 3. Street patterns often differ in the formal and informal city.

shifting characters (Melbourne School of Design 2012). In a formal city road grids are favoured and help facilitate orientation (Carmona, Heath, Oc & Tiesdell 2010). In contrast, an organic road layout is common in informal settlements, see illustration 3, and no clear street hierarchies exist (Melbourne School of Design 2012). As a result orientation can become problematic. It is however likely that the variant expressions in the streetscape could assists with orientation, just as landmarks are said to help (Carmona 2010).

Urban planner Kevin Lynch describes landmarks as defined physical objects that can be of different scales. A landmark may be a large hill or mountains in the distance symbolising a constant direction. It could also be something with a unique identity, only visible in certain areas, like a special tree or a rock (Lynch 1964). In a flat landscape, where hills are absent, other vertical objects can become increasingly important as landmarks.

Disconnected settlements

For people that live in a distant fringe but that work in the city, unreliable basic infrastructure services create long commuting distances (Durand-Lasserve 2006). Journeying on foot is common for informal settlers, as financial reasons make it difficult for many urban poor to pay for transport (Heinrichs 2014). Lack of sidewalks can however impede on the usage of the streets, as traffic makes them dangerous for pedestrians (Gabriel Montoya). With narrow streets and no parking lots within dense settlements, traffic congestion is an evident problem (FIG 2010). Discontinuous road layout and few major roads leading out from the settlement might also hinder the accessibility (Hersh 2014). As a result, settlers in the fringe might feel disconnected from the formal city. This is evident with the many informal settlers that confirm they have not been able to visit the city centre, sometimes for up to a year (Heinrichs 2014).

3.4.4 The public realm

Places that encourage social life are more than often lacking in informal settlements (Chawla 2002). A qualitative public realm should provide environments that encourage people to live and work, with the possibility for further development of an area. The public realm can be defined as any "publicly owned streets, pathways, right of ways, parks, publicly accessible open spaces and any public and civic building and facilities" (ARC n.d.). Very little open space on a site and only occasional widening of laneways can be the case within settlements (Melbourne School of Design 2012). Much of the public life and activities in informal settlements take place on the streets. There is a sense of domestic, social and economic activity spilling from entrances out to the laneways and streets; hence domestic space is integrated with public space to a greater extent than in the formal city (Lupala 2002).

The intensity of social activities differs from street to street. Streets that are narrow might present problems with poor light or ventilation, which in turn has impact on the location of social activates (Melbourne School of Design 2012). Lack of sidewalks can moreover impede the usage of streets as public places, as traffic makes them dangerous for pedestrians (Gabriel Montoya). Climate also has impact on indoor and outdoor activities. In cities with hot humid tropical climates, the presence of shades from plants is of vital importance to improve microclimate that enhances comfort living (Lupala 2002).

Insecure public places

Insecurity due to violence and illegal activities is often a challenge in informal settlements. The absence of formal control attracts criminal groups that direct and control the use of public space and make it difficult for people to move into the public domain carefree (Un-Habitat 2013). This results in decreased use of public domains and a lessened locally anchored informal control (UN-Habitat 2003). A restrained use of public spaces restricts the connections to the formal city, which reinforces the spatial and social segregation of informal settlers (UN-Habitat 2012). In the UN-habitat's Safer City Program,

public spaces are identified as a vital in developing urban safety (UN-Habitat 2011). Mitigation of crime and violence should be the planned and desired outcome of upgrading interventions in informal settlements, not just a positive consequence (UN-Habitat 2012).
Where public places are perceived unsafe, lightning can help. It is, however, not a question of a lot of light, but rather that the entire setting must be elaborated given the patterns of movement and lightening should be appropriately placed in the environment (Östlund 2013).

Lighting alone may not be enough. Social rules and norms can create abstract spatial divisions in the city restricting people's usage of public space, as such space may be perceived as being prohibited to enter. Prohibitions are a kind of agreement between people about the use of public space (Lefebvre 1991). In informal settlements, drug cartels use the public places for their recruitments (Gabriel Montoya). It is likely that their presence contributes to informal and invisible boundaries that restrict use of the public domain.

Greenery in public space
Dense settlements where residents encroach on green areas have led to a lack of large cohesive green areas (Chawla 2002). However urban farmers contribute to the small-scale greenery within the built structure through cultivation of available vacant land. They often perform their farming on steep slopes, riverbanks, school grounds, industrial lots and along roads (Mougeot 2006; Smit, Nasr & Ratta 2001). A lack of greenery strongly impacts informal settlers as many such settlers live in precarious areas where natural disasters are predicted to increase with on-going climate change (FIG 2010). Geotechnical stabilisation through plantation of trees can be successfully employed to mitigate landslides and soil erosion (El Centro de Estudios Urbanos y Ambientales (Urbam) (the Centre of Urban and Environmental Studies) 2012).

The effect of greenery on human wellbeing has been well researched, as it is believed that greenery can help ease depression (Grahn & Adelsköld 2002). The positive effects of greenery on people could be assumed to become significantly helpful in deprived areas with high unemployment rates, where depression is a prevailing issue (Backhans, Lundin & Hemmingsson 2011). The lack of greenery in public places has a great impact on children as they see the public spaces and the dilapidating environment around them as a reflection of their own value (Chawla 2002). The lack of greenery and public places can moreover hinder integration of informal settlers in the city. A development of new qualitative green areas and public spaces that provide new connections with the city core might however increase the social status of the informal settlement and improve integration (Fernandes 2011).

3.4.5 Social environment: interaction, tensions and conflicts

The informal settlements' physical form is closely aligned to social networks, micro-location and livelihood activities, which upgrading interventions have to be aware of (Huchzermeyer & Karam 2006). The social composition in the rural-urban fringe is heterogenic and may comprise many different stakeholders. Informal settlers can co-exist with small farm businesses, industrial entrepreneurs and urban middle-class commuters in the same area. The different stakeholders often have dissimilar interests and practices. Consequently, the rural-urban landscape is highly affected by the flows of materials, energy and workforce, demanded by the different rural and urban systems (Allen & Davila 2000).

Social tensions within the settlements
Sharing a common space for living and working does not automatically cause intermixes of people. In an example from India the settlers still segregate themselves in quarters according to religions, castes and sub-castes, places of origin and occupations (Panwalker 1998 see Gruber, Kirschner, Mill, Scharch, Scmekel, & Seligman, p. 9). Social tensions can be detected within the informal settlements. Women and youth are the most vulnerable groups

in an already exposed group of people. The youth in informal settlements face exclusion from the political, social and economic life and many find it hard to enter labour market. Their vulnerable situation makes them easy targets for recruiting to illegal groups (UN-Habitat n.d.a). Women in informal settlements are highly affected by unsecure land tenure as customs and traditions normally prevent them from owning land and from participating in decision-making regarding land use (UN-Habitat n.d.b).

With the above in mind, it can be argued that interventions or upgrading programs should examine the possibilities to improve informal settlers' access to livelihood strategies, specifically addressing vulnerable groups within the informal settlements.

Lack of recognition causes insecurity

A fundamental challenge is the lack of political recognition of informal settlements by national and local authorities (UN-Habitat 2012). The neglect of informal settlements derives from the idea that such settlements are illegal and short-term. This approach is still present today where ignorance or active harassment of inhabitants in informal settlements is prevalent (UN-Habitat 2003). Informal settlers become victims which creates a ripple effect of escalating violence (UN- habitat 2012).

It has been noted that in cities where governments have neglected informal settlements, new power structures established by criminal groups have imposed worsened living conditions through fear and insecurity (UN-Habitat 2012). Socio-economic vulnerability, based on income, education and occupation (Kawachi, Subramanian & Almeida-Filho 2002), coupled with lack of secure land tenure within informal settlements allows exposure to illegal activities such as drug cartels and organized criminal groups, particularly visible in Colombia, Mexico and Brazil (Fernandes 2011). This could explain the statistics on violence, crime and lawlessness in developing countries with urbanisation wherein 60% of the total urban population have been victims to crime and violence within the last five years (UN-Habitat n.d.).

Since the 1970s upgrading approaches have become more focused on protecting the rights of informal settlers and the improvement of their living conditions. In recent years a new upgrading strategy called Participatory Slum Improvements has demonstrated positive effects. It is a holistic approach that considers both social, cultural, ecological, livelihood and gender aspects of the informal settlements. The strategy has only been implemented on a small scale or as pilot projects and would need to be further demonstrated on larger scales (UN-Habitat 2003).

3.4.6 Livelihood strategies

A consequence of diverse character and lack of formal control in informal settlements is the presence of informal economies. Informal economies are defined by economies that are not covered by formal arrangement and are thus often related to poor employment conditions with unsafe working environment and the lack of social benefits such as retirement funds (ILO 2014). The informal sector is the main source of income for the settlers and many work in the garment industry, waste collection or in home based enterprises with customers both within and outside the informal settlement (UN-Habitat 2003). The scale and importance of the informal economy are large and it is said to cover two to three-quarters of non-agricultural economies in low-income countries (ILO 2014). Informal economies contribute to income, production and employment that account for up to 40% of the annual output of the GDP in developing countries (The World Bank Group 2013).

Although informal settlements are said to include informal economies in a great extent, the high level of poverty is a fact (UN-Habitat 2012). An exclusion from the formal labour market restricts opportunities to livelihood (Fernandes 2011). This has resulted in an unemployed rate around 30% of the population in low-income countries (FAO 2014). Instead of governmental

restrictions and structuring of the informal market, the ideal solution would be to remove the political obstacles and use the governmental initiatives and legal support in order to disembarrass and increase informal settlers' entrepreneurship within the competitive process where they utilize their talent fully (De Soto 1989). UN-Habitat explains how sustainable urban planning is based on a mixed land use, where at least 40% of the floor space is allocated for economic uses in any neighbourhood (UN-Habitat n.d.d).

Specific livelihood strategies of settlers in the fringe

The poorest dwellers spend most of their money on food and many are compelled to use available land for farming. Millions of people in developing countries practise horticulture in urban centres to generate income or to support their families. A large amount of the farming sector is thus seen to be informal - a kind of farming that can be both precarious and prohibited. (FAO 2014).

Urban agriculture is not only carried out as a temporary necessity by recent immigrants from rural areas, but does also include commercial operations producing food in greenhouses and other spaces. The products are usually processed and marketed by the producers and their families (Mougeot 2006). Urban agriculture together with thriving tourist industries are said to be exclusive land uses often found in the rural-urban fringe (The World Bank Group 2000).

Knowledge in farming can be related to the size of a city. In a smaller village or city, people can establish a connection to the soil and nature during their lifetime. In metropolises, knowledge about food production is not as prominent as the connection to it is not as widespread or engrained in larger societies. In rapidly urbanising countries urban agriculture is however increasing at least as fast as the urban population. This suggests knowledge in farming is higher in big cities of developing countries (Smit & Cheema 1996). In an example from Africa the livelihoods of people in the rural-urban fringe are said to depend mostly on five assets; the human resource, land, animals, housing and social networks. From this and previous text about livelihood strategies, it can be concluded that informal settlers depend on local cyclic ecological production systems (Rees & Wackernagel 1996).

Furthermore, small-scale and informal artisanal mining is particularly widespread in some developing countries of Africa, Asia and Latin America. Many large settlements of small-scale and informal miners have appeared in Bolivia, Brazil, Colombia, Peru and Venezuela. Because of the significant negative impacts on nature, governments seek to regulate artisanal mining but have problems with controlling the informal activity (Evidence and Lessons from Latin America (ELLA) n.d.).

3.4.7 Environmental degradation

Informal settlements develop in a multi-dimensional way that combines cultural and natural ecosystems. The complex relations to nature and constant alteration within informal settlements can be seen as ecological processes since eco-systems as well are in constant change and dependent on variation in the surroundings (Chiesa 2013). However, a challenge within informal settlements is the extended areas without formal control and related formal services such as waste management. This presents a low sanitation standard and pollution of natural resources engendered by the settlers (Fernandes 2011).

Artisanal mining is one example of an informal activity that causes degraded environments. Excavation of soil and damming of water can present problems with water siltation, erosion and degradation in rivers used for mining. Many artisanal mining operations take place in and around forests that are home to great biodiversity, so consequently they threaten conservation of forest around rivers (Hentsche, Hruschka, & Priester 2002). The livelihood strategies of settlers in the fringe are closely related to nature and

although the settlers depend on well-functioning ecosystems and local ecosystem services, the degradation of ecosystems implies a lack of care or awareness of their bearing.

3.4.8 Conclusion: a Green Belt adjacent to informal settlements

Living conditions in informal settlements in rural-urban fringes impose requirements on Green Belts and green structure planning. These same living conditions open up opportunities for what the Green Belt could become.

From the discussion on informal settlements it is apparent that the informality and fickleness in the fringe zone can make a Green Belt implementation difficult to organize. The Green Belt has to consider new dynamics, for example the settlers' close relation and dependency on instant land for livelihood strategies. An implementation equally has to consider the settlers' lifestyle, which together with the lack of governance often infers a great loss of valuable nature. A Green Belt implementation should be based on the local needs and conditions.

Diverse and heterogenic morphology within informal settlements often present weak linkages and vague networks of roads and greenery. Green Belt implementation should therefore create or reinforce such important linkages, as well as address social situations. Constructing an identity within a Green Belt implementation allows social tensions to get bridged. The following section discusses nine strategies for Green Belt implementation that consider the dynamics of informal settlements in a rural-urban fringe.

CHAPTER 04

SYNTHESIS

SUGGESTED MAIN FOCUSES OF A CONTEMPORARY GREEN BELT ADJACENT TO INFORMAL SETTLEMENTS

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SUGGESTED MAIN FOCUSES OF A CONTEMPORARY GREEN BELT ADJACENT TO INFORMAL SETTLEMENTS

CONTENT. The following text describes 9 possible improvements of the green belt as a planning concept given its likely future extensive use in cities with informal growth. The presented improvements are a result of literature studies on green belts and informal settlements in the rural-urban fringe. The improvements are referred to as strategies which offer guidance in the implementation of a green belt in connection to informal growth. The strategies seek to achieve equal benefits for the ecology, the informal settlers and for the city as a whole.

ENABLE RURAL AND URBAN CONNECTIONS THROUGH QUALITATIVE GREEN AREAS AND PUBLIC SPACES

Informal settlements in fringes are said to be cut off and segregated from the surroundings, so a green belt strategy should work for an improvement of the connection between rural and urban land. The natural connections and meeting places within a green belt would provide a platform for acceptance and integration of settlers in an informal settlement. Public spaces within green belts can link settlers through incorporation of both rural and urban activities. Furthermore, the various activities presented can have educational functions.

Improved connection between rural and urban land is also important for a sustainable development of a city. People in informal settlements are more directly dependent on nature, and increased unsustainable consumption requires actions supporting healthy local cyclic production systems. Green belts can help improve connections and facilitate flows of materials and food between rural and urban land. This is fundamental in sustainable development of local production systems.

Example - Farmers Market

Photo 5. By allowing farmers markets or the selling of locally produced goods in the city center the connection between rural and urban living is strengthen.

Example - Måløv Axis in Denmark

Photo 6. Public space in Denmark bridges a highway and links to disconnected neighborhoods with different socio-economic status.

IMPROVE EQUAL ACCESS TO QUALITATIVE GREEN AREAS AND PUBLIC SPACES

As described previously, informal settlements often present a dense structure with little presence of public green space. The few public spaces presented are commonly controlled and appropriated by a certain group, often with illegal intentions. As a result fragmentation of a neighbourhood is often visible in the public domain. Therefore it is important that green belts hold public spaces open and inclusive for everyone. Investment in a green belt that gives equal access to more public green areas can increase the status of the informal settlement, as its inhabitants are being recognised by the interventions. Having access to green public space should be every citizen's right as it has positive and healthy effects on people, especially in deprived areas.

Example - Left Over Space

Photo 7. Use the left over green space to enable public meeting and facilities.

Example - Streets as Public Space

Photo 8. Recognize streets as important space for spontaneous public life. The street design should encourage activities and meeting opportunities between neighbors. The public spaces need to be placed on a strategically important location, beneficial for different groups in the society.

PROVIDE SPATIAL IMPROVEMENTS IN DISORDERED URBAN STRUCTURES

When green links and corridors are important for biodiversity they can also be used as tools to improve urban structure in disordered settlements. Green belts adjacent to informal settlements could entail significant spatial improvements and contribute to orientation by using planned or existing greenery to create landmarks and sightlines. Using greenery as a structuring element involves wider street structures and more open space which in turn can promote urban safety and accessibility.

Spatial improvements can also be achieved by using not only green elements, but also significant cultural or historical elements. Generally speaking, landmarks that have significance for the people should be promoted as they can strengthen a site's identity.

Example - Landmarks

Photo 9. Use natural landmarks such as topography, impressive rock formations or large trees to help guide the people in informal settlements.

Example - Street Hierarchy

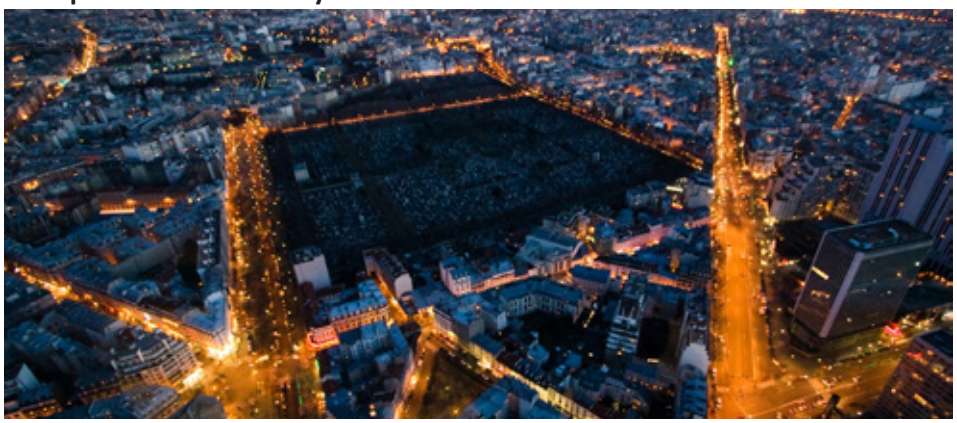

Photo 10. The work with different hierarchies on streets can improve the readability of the public realm. It is important to use the fundamental concepts such as a wider, well-kept street mostly lead to something of importance as a public square, the hospital or library.

COMPRISE DIVERSIFIED NATURE RESERVES COMBINED WITH HUMAN ACTIVITY

In a future urbanised city it will not be sufficient with a traditional large-scale nature reserve within the green belt. Nature reserves need to include different sizes, forms and habitats. Additionally, by looking at the potential for a nature reserve to continue within a built form and interact with human activities the number of nature reserves would increase. As previously discussed, dynamic nature reserves are important as they act as buffering zones during natural disturbances or disasters.

Informal settlements present a complex and dynamic morphology with an inherent ability to host smaller eco-systems and ecological processes. If a green belt implementation allows improvements and expansion of greenery in-between dwellings of informal settlers the supporting urban ecosystems subsequently grow in size. Such an implementation could also mean that informal settlements also benefit, as their importance is recognised as a contributor to the wider city's ecology. Combined human and nature reserves would thereto benefit settlers in informal areas since they cater for improved ecosystems and a richer biodiversity. Increased access to healthy ecosystems would strengthen life quality and livelihood strategies.

Example - Urban Ecosystems

Photo 11 &12. By acknowledging the urban ecosystems on different scales those can be strengthen by an attentive design. When studying the urban ecosystems new essential opportunities arise.

Example - Urban forest New York

Photo 13. An urban forest is one way to secure a larger green area in the city and to combine it with recreational and educational purposes. Here is a 500+ acres urban forest in New York with a mix of natural treasures and manmade prizes.

IMPLEMENT GREEN STRUCTURES THAT CAN WITHSTAND CHANGES IN LAND USE

With the rapid urbanisation and informal settlements occupying more land for construction of dwellings, green structural improvements are important to secure green links. Green structures are important to secure a future sustainable city that can provide ecosystem services to its growing population. Exploitation of nature with long lasting negative consequences can be prevented if green structures are planned and localised in the right way.

Greenery in itself has little possibility to withstand changes in land use and to resist urban growth, but the design and significance of the green structure can help secure prolongation.

Example - Significant Structure

Photo 14. The design of the green structure and corridors is important for the prevention of urbanisation. Here is an example from Östermalm in Stockholm where the outstanding alleys of trees would be hard for developers to demolish as it creates the identity of this area.

Example - Montreal Ecoterritories

Illustration 4.

By choosing a few larger important green areas to protect and by giving them a certain strategy it will emphasize the importance and facilitate long-term protection. In the Canadian city of Montreal 10 ecoterritories, with over 15 hectares, where selected for protection. They all comprised core and buffer zones as well as ecological corridors. They include both existing protected and non-protected land with mixed private/public ownership

DESIGN FLEXIBLE PUBLIC AREAS WITH MULTIFUNCTIONAL USAGES

A traditional green belt intends to restrict the growth of cities. In developing countries urban sprawl is said to be a prerequisite for poverty alleviation, as it triggers economic growth and increases the health status of the citizens. Hence, the primary intention of a green belt should not be to restrict growth of cities but instead aim to encourage sustainable urban growth; it must cater for environmental fulfilments and the needs of the inhabitants.

Green belts see to the public interests and should hence combine recreation and increased bio-diversity with a design that addresses the needs of the inhabitants living in the rural-urban fringe. To address the interests of both visitors and residents, public areas have to be flexible and hold multifunctional usages. A green belt's potential to secure land from urbanisation would increase if the public places are locally anchored or of direct value for the locals. The settlers' appreciation of positive outcomes could protect further land from being built-upon.

However, informal settlements in fringes are fickle and undergo rapid changes in land use. Hence, a planned green structure has to open up for multifunctional usages valuable for both visitors and residents. Additionally, a green structure has to be flexible by adapting and/or adjusting to changes in land use.

Example - Recreational wetland

Photo 15. The wetland plant in Flemingsberg, Stockholm provide the city dwellers with greenery. It is both a popular recreation area and a contributer to a rich bioderversity. The wetland plant purifies water locally and the refined design of the plant brings many visitors to the area.

7

INCLUDE PRODUCTIVE LAND USE IN THE PUBLIC DOMAIN

Urbanisation and contemporary demands for higher living standards have resulted in ruptured local ecological production systems. Previous cyclic systems have been submitted to global, disintegrated mass-production systems and valuable peri-urban farmland has been lost. Today the urban food supplying process is unsustainable.

A green belt should enable a sustainable food supply by protecting farmland and incorporating it in the design. Farmland should be valued as highly as other land uses within a green belt. A green belt implementation should take advantage of informal settlers' potential to depend more on local cyclic ecological production systems, and production systems should be included into public domains. This could increase awareness of local production systems and ideally encourage more locally produced food and products. If the settlers have the opportunity to farm, their previous knowledge from rural areas could be utilised. A green belt that is beneficial for the settlers in the fringe would also be more locally anchored.

A fringe does not have endless available land for farming so many farmers would share limited rural land within a green belt. If a green belt were to benefit the poor, small-scale lots would be easier to implement and maintain. Multiple small-scale lots can increase versatility of food supply to a city so should be encouraged as it aligns with the idea of a diversified landscape supporting biodiversity.

Example - Urban Farm NY

Photo 16. Urban farming and horticulture could easily be incorporated in the left over space in the urban areas. Such places could be roofs, walls, sideways etc. Here is an urban farm in New York with an additional value as an installation.

BASE THE DESIGN ON LOCAL CULTURE, TRADITIONS AND KNOWLEDGE

For a green belt to develop and sustain it is vital for the green belt to be based on local culture, traditions and knowledge. The visible and direct positive impact on the local communities is significant in countries where the basic need of land for housing and livelihood takes precedence over nature protection strategies.

The green belt strategy is a governmental approach to planning the growth of informal settlements, however these settlements present dynamics that are small scaled and driven by the local population. To best consider and incorporate settlers' needs and wishes, a top-down tool has to be combined with a bottom-up approach. This increases the chances for an implementation to succeed and survive as top-down regulations and protections are said to have little impact in politically unstable or low-income parts of the world.

Example - Uluru Cultural Centre

Photo 17. The interventions within a green belt should seize on the local history and culture of a place. One example of a design that achieved that is the Uluru Kata Tjuta Cultural Centre in Australia. The design of the center carefully addresses the joint indigenous and non-indigenous management of the landscape.

Example - Forte Werk, NL

Photo 18. The design could also highlight something forgotten in history that has contributed to the formulation of a neighborhood. The fort in The Netherlands mark where the old bunkers and bombproof buildings were during the wars.

RESTORE DEGRADED ECOSYSTEMS

The lifestyle in informal settlements is in many ways closely linked to nature, demonstrating the importance of well-functioning eco-systems and local eco-system services. Informal settlers also contribute to a degraded eco-system, so it is therefore important to identify the sources of pollution and systems that are lacking. At the same time, a green belt should strive to improve degraded ecosystems and design nature areas and public spaces that the locals deem worth caring for. The recovery of degraded eco-systems can have a positive effect on the settlers. A green belt implementation that invests in qualitative green places could, as a side-effect, also encourage people to become more environmentally conscious.

Natural disasters are predicted to increase with ongoing climate change, which will likely affect informal settlements more than formal settlements. Protection and restoration of eco-systems can however mitigate the effect of natural disasters, as an improved and extended green structure can cater for the effects of climate change. Greenery can reinforce soil in areas a risk of landslide, lower temperatures, provide shade, conserve gas emissions and treat storm water. Hence, a green belt should work towards both restorations of nature and, as relevant, mitigation of the risks of natural disasters.

Example - Bioengineering

Photo 19. By the use of high technology bioengineering many natural disasters can be prevented. Areas where such knowledge is of high importance is on steep slopes and river beds.

Example - Storm water solutions

Photo 20. Treating stormwater from hardsurface areas and restore river beds is one of the most important actions to restore ecosystems. The design should incorporate swales, retantion ponds and wetlands.

CHAPTER 05
MEDELLIN GREEN BELT

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MEDELLIN GREEN BELT

CONTENT. This chapter begins with an introduction to Medellin and its current challenges from an urban planning perspective. Medellin's green belt (CVM) and its five directives are then presented and studied in further detail.
The chapter concludes by outlining the main strategies that Medellin uses in order to meet the five directives.

5.1 MEDELLIN CONTEXT

Medellin has been a migration magnet since industrialization and grew rapidly from 1950s to the beginning of 1980s due to career and education opportunities. A large part of the city has grown informally and by the turn of the 21th century 30% of the city's neighbourhoods had grown in an informal manner (Betancour 2007).

Together with nine adjacent municipalities, Medellin forms the Metropolitan Area of Aburra Valley. The Aburra Valley is bisected by the Medellin River, and positioned in the centre of the valley the four most populated municipalities, Medellin, Bello, Itagui and Envigado, form the urban zone. By 2030 the metropolis will be home to near 4.5 million inhabitants, placing the conglomerate in the group of medium-sized metropolitan areas in Latin America (Alcaldía de Medellín 2011). In contrast to Medellin´s surrounding municipalities, Medellin itself has a higher growth rate in the urban-rural fringe than in the city centre. The urbanisation causes problems for the Municipality of Medellin regarding land use and sustainable growth. The most affected areas are the rural townships San Antonio de Prado and San Cristóbal, where the current rapid increase in population is expected to continue.

However, urban growth continues in all surrounding townships of Medellín and presents problems regarding land use planning. A common issue for all townships is the diminishing but remaining presence of criminal groups and illegal activities due to Medellin's history of drug wars. During these drug wars informal settlements in the rural-urban townships around Medellín became places of significant danger where the drug cartels conducted most of their recruitment (Betancour 2007).

5.1.1 A city in the valley

One of the main restrictions to urban growth in Medellin is topography; as showed in photo 21, Medellin lies in a valley surrounded by steep hillsides. The growth of Medellin is restricted to the more accessible land along the river. The department of planning in

Photo 21. A city in the valley

Illustration 5.
Colombia with the Pacific Ocean in the west and Caribbean Ocean in the north.

Illustration 6.
Department of Antioquía is one of 32 departments in Colombia.

Illustration 7.
The Department of Antioquia constitutes 9 regions, of which one is Aburra Valley.

Illustration 8.
Aburra Valley is a central region in the Andes Mountains and in the middle lies the Municipality of Medellin.

Medellin has directed the new growth to flat land in the city centre and there is ongoing work converting former industrial sites in the city centre to private housing and commercial buildings. However, demand for land exceeds what the city can offer and as a result the hillsides have been occupied by relocated settlers from the countryside, as seen in photo 22..

The hillsides hold fragile eco-systems and are sensitive to changes due to urban sprawl (Alcaldía de Medellín 2011). Many scattered settlements on the hillsides have low and sometimes dangerous living standards. Some settlements are located in areas that at high risk of landslides. In some locations such risk is inevitable, however where it is possible to mitigate it most likely requires a relocation of the dwellers. High-risk areas can also be found along the stream corridors where many settlers live under the risk of flooding (Medellín Cómovamos 2013). Urbanisations in the mountain regions create high environmental pressures with landslides, contaminated waterways and soil erosion the result (UN 1992).

Additionally, forest reserves and agricultural areas are unsustainable and are suffering degradation. An overall result is inaccessible and dilapidating areas of cultural and historical value. The informal settlements on the hillsides of Medellin moreover present a substandard public realm. Public facilities and public places, such as parks, playgrounds and pedestrian paths, are few and of low standard, disconnected and degraded. All challenges found on the hillside are stressed by the constant urban growth and pressure on land (Medellín Cómovamos 2013).

5.1.2 Control of urban growth

Medellin has during many years worked with different projects related to urban growth. One of the most famous projects is PRIMED, a slum-upgrading program that commenced in 1993. The program aimed to incorporate the informal settlements, physically and socially, into the city (Betancur 2007). The current green belt project, CVM, is another attempt to control urban expansion and to improve the environment. The project constitutes a 75 km long nature area surrounding the city and targets many of the present challenges in Medellin Empresa de desarollo urbano (EDU) 2012).

Illustration 9.
Townships of Medellin.

5.2 CVM - THE GREEN BELT IN MEDELLIN

The Medellin green belt, CVM, is a municipal project described to be a long-term strategy that aims at controlling urban growth as well as securing a balanced territory in the rural-urban fringe. Today the urban and rural land is divided by the rural-urban border presented in the comprehensive plan of Medellin. The city of Medellin has grown since the last comprehensive plan was formulated and in the new plan the rural-urban border will be revised. Urbanised rural areas have shifted in character and present dynamics more similar to those in the urban areas (Medellín Cómovamos 2013). In the Planning Department's description of CVM it is described how the rural-urban border is to be seen as under constant fluctuation. Hence, the CVM seeks to address a wider area on both sides of the rural- urban border.

5.2.1 CVM as part of the regional central park of Antioquia

CVM aims to create conditions and opportunities for an integrated and sustainable development in the rural-urban fringe. An improvement of environmental conditions, improved habitats and better accessibility is asked for. A desirable result of CVM is a trigged sustainable economic growth and an increased respect for a balanced nature (Medellín Cómovamos 2013).

Together with the previously mentioned objectives, CVM also relates to the broader Metropolitan Aburra Valley. Included amongst the Green Belts components is an environmental and rural fringe that will extend along the hillsides of Aburra Valley, forming part of the greater regional nature protection project called Central Park of Antioquia, PCA (Parque Central de

Photo 22.From the cable car the valley with Medellin River in the middle is visible.

Antioquia) (EDU n.d.) CVM works as an extension of the guidelines in PCA and an instrument for its implementation.

CVM answers to the directives of PCA concerning:

- integrated management of the municipal tutelary hills
- agro-ecological transformation on the countryside
- promotion and development of nature tourism
- generation of more green public spaces for the strengthening of civic environmentalawareness(EDU2012)

5.2.2 Configuration of CVM in Medellin

The CVM aims at using a multidimensional method, analysing environmental, social and urban aspects on different scales in order to understand the phenomenon visible in the rural-urban fringe. The project additionally seeks to have an inclusive participatory work process where the local perspective should be visible from planning to realisation of the interventions (EDU n.d.) The Enterprise of Urban Development, EDU, is the main actor in the transformation of the city and manages the resources of the municipality of Medellin allocated for the execution of public works. However, design interventions on detailed scale and execution of the project have only been made in pilot areas in Medellin. The pilot projects are currently developed and should be finished by 2015. CVM will be implemented through a set of programs and projects that involve different sectors such as regional and municipal planning departments, the municipal ministry of environment and also local social organisations (EDU 2012).

Categorised land

During the development of CVM the planning team became aware of the importance to address urban dynamics. The urban growth in Medellin presented new challenges that the regional Central Park of Antioquía or the metropolitan part of CVM could not address. Within CVM a more focused strategy called Jardin Circunvalar was developed. This strategy is the part of CVM that addresses the dynamics in the rural-urban fringe and is, as the map shows, located next to the urban areas of Medellin. The Jardín Circunvalar is one of the first partial projects to be realized and is currently under construction. The land encompassed by CVM is divided into three categories; the consolidation zone, the transition zone and the protection zone. The three different zones will hold different types of interventions, such as relocation of settlers, public facilities and rural restoration (Medellín Cómovamos 2013).

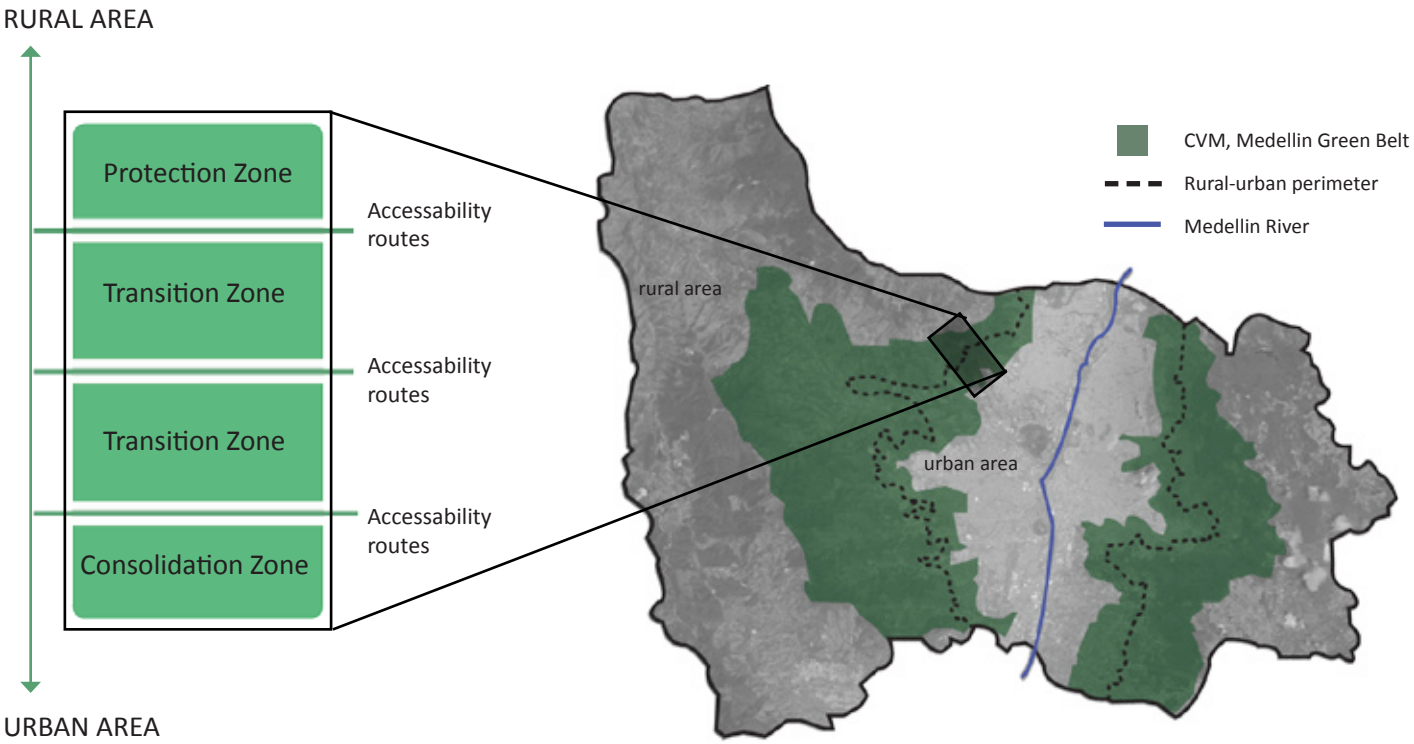


Illustration 10. The Medellin Green Belt, CVM.

5.3 THE GOALS OF CVM

In order to achieve the main goals of CVM and to contribute to the broader region, five goals are presented in the work with CVM. The main goals of CVM are: to control urban growth, to secure a balanced territory in the rural-urban fringe, environmental recovery, integrated improvements of living habitats and civic- pedagogical urbanism.

1. **Control of urban expansion**
2. **A balanced territory in the rural-urban fringe**
3. **Environmental recovery**
4. **Integrated improved living habitats**
5. **Educational civic urbanism**

CONTROL OF URBAN EXPANSION

CVM is the main tool to control urban expansion and to reach the regional goal of a sustainable region by a promotion of compact and diverse urban areas. Methods of control of urban sprawl in Medellin include encouraging different population densities, restoration of degraded areas and new options for settlers in informal areas. Improving settlements or relocating families in high-risk areas are essential in Medellin with extended sprawl of unsafe dwellings (Area Metropolitana del Valle de Aburra (AMVA) 2003). The areas along Medellin River and the hillsides are of most concern when considering occupation and sustainable development. CVM focuses on mitigation of urban sprawl on the hillsides but acknowledges the importance of concurrent densification projects along Medellin River, which is further addressed in Medellin master plan (Alcaldiá de Medellín 2011).

The hillsides face high pressures on both informal and formal expansion, which is why comprehensive future planning is considered important. That includes an increased physical, institutional and social control (Alcaldiá de Medellín 2011). One of the objectives of CVM is to increase the governmental presence in the rural-urban fringe (EDU n.d.)

The scattered informal settlements on hillsides also constitute the basis for a prevailing visual contamination (Alcaldía de Medellín 2008 and 2009). The propagation of informal settlements is described by David Emilio Restrepo (forest engineer and municipal planner) as restricting the ability of orientation and understanding the surrounding rural landscape, as the natural green areas progressively becomes less apparent. In the Medellin master plan the hillsides are described to be an important framework to identify the scenic Aburra Valley, and restoration of landscape values should therefore be prioritised (Alcaldía de Medellín 2011).

CVM focuses the work on protection of rural land and green corridors, but when new interventions are required it is also important that they are visually integrated into the surrounding landscape of the hillsides (Alcaldía Medellin 2009). Studying a recently constructed modern library on the hillside of Cerro Pan de Azúcar, it can be questioned whether the city picks up on this recommendation (further discussed at the end of this section).

Apart from the visible visual impact, CVM also acknowledges the low living standards presented in the scattered informal settlements. Many settlers live on high risk land with geological constraints so CVM strives to relocate such dwellers to safer sites within the neighbourhood. The consolidation zone, an area that covers the already densely developed city fringe, includes most of the relocation projects but there is also improvement of public facilities and linear parks along the stream corridors (EDU n.d.) In the example pictures of the relocation projects within the consolidation zone CVM advocates high-rise buildings in a compact layout. CVM uses the Juan Bobo relocation project as a reference project; this project aimed to relocate all settlers living along flood-prone streambanks to new safer high-rise buildings. As can be seen in the picture the public area surrounding the high rise building is small, which is just one of many reasons why Juan Bobo is questioned to be suitable reference project (Alcaldía de Medellín 2011).

In the transition zone CVM advocates compact, low density villages with incorporated public facilities and communal farming areas. There will be some relocation projects in this zone, but there is a stronger focus on rural interventions, e.g. Metropolitan parks that provide platforms for extreme sport, or ecological farming and farmers markets. Focus lies on a

public-private partnership in order to strengthen the sustainable economic markets. In this zone tourism is also emphasized through interventions providing lookout-points and eco-parks. The overall goal is to mitigate the risk of natural disasters and to protect cultural, educational and sport facilities (Medellín Cómovamos 2013).

Furthest away from the city core is the protection zone. Interventions in this zone are very much related to conservation and restoration of natural habitats, where stream corridors, already protected areas and forestry are prioritized. Hence no densification projects are needed or desired in this zone (Medellín Cómovamos 2013).

In efforts to control and direct urban growth CVM also utilises structuring elements such as ecological corridors and mobility systems (Area Metropolitana del Valle de Aburra (AMVA) 2006). In the transition zone a mobility corridor will be constructed in order to create longitudinal connectivity via an environmentally friendly transport system. The proposed tram, referred to as the Monorriel, will link to current network of accessibility and mobility in the city. In addition to the tram, two paths are proposed with a focus on leisure and cultural experience. Situated next to the city centre in the transition zone the Route of Champions is a wide paved trail suitable for bike and wheelchair users. This trail aims at creating social inclusion through a set of rest areas, lighting, parks, security cameras and public facilities along the trail. In the intervention zone a paved pedestrian walkway, called Path of Life (Camino de la Vida), is planned to mark the lower limit of rural and environmental protections. The trail will contribute to the organization and participation within the rural communities, improve the physical environment and living conditions and generate jobs by linking the labour in the community to the construction of the trail (EDU n.d.)

Illustration 11. The proposed Monorail.

The proposed corridors should mark rhythms of occupation and protection, as well as places where both aspects coexist under different forms of management (Alcaldía de Medellín 2011). The ecological corridors should include environmental barriers that can obstruct the development of new informal settlements. Such barriers could include tree planting and management of watersheds and water sources (Alcaldía de Medellín 2008 and 2009). The ecological corridors could also hold mobility and transport systems that can help improve today's messy road layouts that are designed to meet individual needs. A discussion on mobility systems can guide, contain and shape the occupation on the hillsides in a sustainable way (Alcaldiá de Medellín 2011). Additionally,

improved mobility systems are said to be of significant importance for the social integration, territorial balance and accessibility to workplaces within the region (Area Metropolitana del Valle de Aburra, AMVA 2011).

In order to control urban expansion CVM aims to:

- Achieve a higher population density in the consolidation zone
- Relocate settlers only when necessary
- Integrate new projects visually into the surrounding landscape
- Use mobility systems to guide, contain and shape occupation
- Add environmental barriers such as tree plantations and management of water sources

Concerns regarding the control of urban expansion

Some critics claim that control of current urban growth in Medellin cannot be achieved with CVM 's proposed implementations. It is believed that CVM might even encourage urbanisation and densification as the provision of public services within CVM may attract newcomers. The paradigm is between how to mitigate the risk for the protection of lives without generating incentives for informal occupation (CTP 2013).

It has also been questioned for whom CVM will be implemented. The previously mentioned modern library on the hillside of Cerro Pan de Azucar has received a lot of attention in the last few years. The library was constructed as part of the social urbanism projects that aim at achieving social benefits in upgrading programs. The library, with its strong architectural expression, received plenty of positive commendations in social media, but the general opinion amongst the residents in Cerro Pan de Azucár is quite different. The design of the library has little connection to the local culture and it is by no means visually integrated in the surrounding landscape. Some residents observe the construction of the new library as just an architectural show off, instead of a project destined for the locals.

In the same mould, the project of Juan Bobo, as with many other relocation projects, seems to lack consideration of the individuals and their cultural history. People that previously live in the countryside are now placed in a high-rise building with their chickens living on the balcony (Álvarez). Local culture and customs are sparsely considered and some of the relocation projects have had a cumulative effect on the social exclusion. The insufficient public space surrounding the buildings does not encourage integration between the different settlers living in the new buildings. Another result of the relocation projects is the development of a "gated community" where the resettled inhabitants differentiate themselves from their former neighbours and want to be separated from the non-resettled inhabitants. Apart from the damaging social effect, the lack of consideration does not encourage or take advantage of local cultures and traditions.

Illustration 12. The path of Champions will alow movements along the hillsides and the city.

2 SECURE A BALANCED TERRITORY IN THE RURAL-URBAN FRINGE

In the work for control of urban expansion on the hillsides of Medellin, CVM strives to secure a balanced territory in the rural-urban fringe (Medellín Cómovamos 2013). The previously presented land zone categorisation (consolidation, transition and protection) is one way to address the different needs in the rural-urban fringe. Each of the different zones has a specific management and land use planning (Alcaldía de Medellín 2011).

Rural and urban characters to meet in the fringe

CVM is a way of structuring land, and while the strategy puts emphasis on fixed and defined rural and urban zones (the protection and consolidation zone), the suggested transitional zone is reserved for rural and urban characters to come together. A diversified fringe is said to create coherence between both types of land. Examples of how the fringe zone could be utilised are natural scenes, institutional centres, low density human settlements distributed sparsely, and sustainable productive activities (Alcaldía de Medellín 2011).

Prioritisation of rural land

There is an overarching will of Aburra Valley to, with respect for socio-economic factors, protect rural land and fertile soils (AMVA 2003). CVM emphasises the importance of productive and protected land in the protection zone. Projects in line with the occupations of people in the sector, for example the former project "Coffee of my neighbourhood", are desirable (EDU 2012). CVM also promotes a strengthening of rural activities that can add value to the settlers in the protection zone, as this open area would be home to many smallholders and agricultural estates.

The Medellin master plan recognises the advantages of large-scale land uses located in the larger protection zone, e.g. forestry, agriculture and bigger institutions (Alcaldía de Medellín 2011). Environmental headquarters are also suggested for this zone, as is ecotourism based on cultural, environmental or landscape values; this could in turn introduce an alternative income to smallholders. Moreover, the protection zone is advised to include agro-ecological land (EDU 2013). Agro-ecological initiatives are based on traditional local knowledge and often also intend to contribute to the city's food provision. The will to take advantage of the settlers knowledge, could be said to form part of CVM's and the city's will to save rural land.

Enforced rural-urban relations

The agro ecological food production system can be seen as a reflection of the desired rural-urban relation. For the crops to reach the market in the city, city and country are directly dependant on each other. The wish to tie rural and urban land together is also demonstrated as CVM aspires to put connect the city with its surrounding natural environment (EDU 2013). A green structure extending through both rural and urban land could be thought of as an element bridging and physically strengthening both lands connections. Likewise, a principal focus of the city is to link and extend the existing metropolitan and municipal green structure creating a metropolitan ecological network. The networks will concurrently become part of the greater land use planning initiative PCA on a regional scale, previously described in section 1.2.1 (Alcaldiá de Medellín 2011). CVM is the incorporative tool for planning directives of the city.

Included in CVM are ecological networks that seek to interconnect greenery mainly for the purpose of environmental recovery (EDU 2013). It is, however, suggested by the city that green corridors along road sections, watersheds and streams not only constitute ecological values, but also contribute to the urban and rural landscape structure. The structure is, as previously stated, assumed to direct future development of the city. The

ecological corridors aim at marking rhythms of occupation, protection as well as places where both these aspects can coexist under different forms of management. Hence, the city also seeks to capitalise on the potential of greenery to itself provide structure from which other public benefits can be developed (Alcaldía de Medellín 2011)

In order to secure a balanced territory in the rural-urban fringe, CVM aims to:

- Protect rural land and fertile soil with respect of socio-economic factors
- Develop the fringe with sequences of rural and urban characters
- Encourage sustainable productive land
- Create ecological corridors that comprise both rural and urban activities
- Create a network of accessibility by the use of streets and public meeting places

3 ENVIRONMENTAL RECOVERY

The decline of green areas and pollution of natural habitats in Medellin has brought about negative consequences for both humans and nature. Flora and fauna have decreased and risky unhealthy living conditions have emerged. This has prompted city to commence restoration (and integration) processes that create a functional continuous ecological network in both rural and urban areas (AMVA 2006). The city acknowledges preservation and conservation initiatives as being equally important in the work for environmental recovery and encourages restoration and preservation to comprise both well-kept ecosystems and those in poor condition. Planning documents promote guidelines for the identification of valuable greenery as well as highlight certain key areas of environmental importance for the city. Regional planning directives are also relevant to Medellin, as planning should be consistent on the greater scales. The city also acknowledges the importance of a comprehensive approach to greenery, which implies cooperation over the administrative borders.

Green areas and forests are greatly fragmented in Medellin so a focus is subsequently to link greenery throughout the valley through interconnected green corridors. Apart from the stream corridors, the hills surrounding Medellin are important components of the green corridors. The hills are called the tutelary hills as they additionally have a great cultural importance. The green tutelary hills hold strategic ecosystems that generate a set of essential goods and environmental services for the population, and as the city recognizes them to be of specific importance, it is ecologically and socially valuable to also integrate them into the green structure (Contraloría General de Medellín (CGM)2014).

The ecological corridors can include zones of different land use and also encompass private land (Alcaldía de Medellín 2011). CVM strives to unite landscapes, ecosystems and natural or modified habitats to facilitate biological flows from the surrounding region into the city as it is anticipated that this could maintain biological diversity and ecological processes in Medellin. The green corridors are intended to also address a desired continuity of parklands. However, it is not always possible to achieve absolute continuation of greenery throughout the city. Planning directives of the city therefore seize on the protection and sustention of the city's green areas and tree covers.

One of the easiest ways to create ecological corridors is to maintain the stream corridors running from the rural hillside down to the central Medellin River. The stream corridors provide continuous elements in the landscape, but unfortunately many of them are in the current state of degradation and pollution. There is also a possibility for the stream corridors to hold public places. Retention of important watersheds that contribute to Medellin River is encouraged on a regional scale and should be prioritised in land use planning. The watersheds also have the potential to link the protection zones of the borders to the corridor of Medellin River – this is another regional planning directive that CVM seeks to incorporate (AMVA 2006).

The valuable ecosystem along the stream corridors has led to the restriction of human interventions except from in areas at risk of flooding or landslides. CVM proposes so called linear parks along the streams. However, the interventions should carefully be conducted and focus should lie on the restoration of the natural habitats. Preserved green zones along waterways and roads also function as damping and regulators of water. The protection of forest and water bodies can enrich current important landscape values of the hillsides.

But it is not only the stream corridors that should be safeguarded. Many of the restoration and preservation initiatives seek to recover rural land, as it is a zone of high ecologic value. The rural protection zone, furthest away from the city core, is comprised of different regionally planned zones of conservation. If CVM is to correspond to the conservation zones, the strategy has to accordingly safeguard land related to important ecosystems, areas for water supply, areas preventing erosion and sedimentation as well as land with educational and recreational value. Slopes with an angle above 50% should also have a high restriction of land use (AMVA 2006).

Restoration and preservation initiatives are often focussed on streams and rural land, but may encompass also other types of lands. The restoration initiatives, such as reforestation, should be specifically applied in areas with vulnerable ecosystems in a state of degradation or in high-risk areas in the rural zone. The restoration initiatives should aim to repair and regenerate rural activities. Other activities could however be permitted as long as they do not compromise environmental recovery. To achieve a heterogeneous rural landscape, the agricultural and forestall activities should be alternated.

Placement of nature preservations should focus on areas of agricultural productivity, mineral resources and forestalls in risk of degradation. Severe preservation actions are proposed in areas with strategically important ecosystems or areas of forest protection. An active preservation implies an active management of natural exploitation and traditional use of land supporting a sustainable use that ensures a preservation of values and resources (AMVA 2006). Preservation initiatives should be based on nature's cultural, aesthetic and environmental importance in the city. Nature of heritage value, for example, could be valued by ecological uniqueness, naturalness, predominance of green on built area, ecological structure, successional stages, biotic connections and biophysical elements, among others. These assets are described to bring regulation to the microclimate, hold representative biodiversity of the municipality and to be of environmental quality in general. Additionally, green structure and its ecological qualities – represented in the composition, growth status and plant health – can be of heritage value as it bears witness of previous or current cultural land use (Alcaldía de Medellín 2009).

A more detailed design of CVM aligns with directives of the city and work for an interconnected ecological network should accordingly encompass listed things.

In order to achieve environmental recovery CVM aims to:

- Improve the status of the tutelary hills as ecological islands
- Protect forest and water bodies
- Improve and protect continuous parklands
- Improve and protect continuous green structures
- Combine pedestrian corridors and ecological networks
- Prioritize restoration and retention of watersheds and stream corridors contributing to the Medellin River
- Design for water regulation and improved microclimate along streams
- Improve and sustain a traditional productive land use

4 INTEGRATED IMPROVEMENTS OF LIVING HABITATS

With integrated improvements of the living habitats, CVM aims at securing the basic needs of the settlers and the right to stay in the area (Alcaldía de Medellín 2011). This includes interventions regarding public space, public facilities, participation, accessibility and mobility that encourage a safe, sustainable and integrated urban habitat. To achieve improved habitats CVM concurrently works together with other municipal organisations to improve the conditions for land tenure, ownership and regulation on the hillsides (Medellín Cómovamos 2013).

The project Jardín Circunvalar is the project within CVM that aims to improve the living conditions for the settlers through comprehensive integrated interventions (Medellín Cómovamos 2013). Jardín Circunvalar, as well as the Master Plan of Medellin, emphasises the importance of improving fragile settlements located in areas with a lack of public services and accessibility and how new additional land uses need to be of direct value to settlers (Alcaldía de Medellin 2011).

An important cornerstone for CVM is to improve the connections and accessibility to the hillsides. The strengthening of ecological corridors is also said to support the development of clean public transport systems and other public facilities (Alcaldía de Medellín 2011). As presented in the previous section discussing environmental recovery, CVM focuses on stream corridors as ecological corridors. The objective is for stream corridors to be structures connecting territories and supporting interaction between settlers (Medellín Cómovamos 2013). The Medellin Master Plan describes how, by the year 2030, slopes and ravines could be transformed into multifunctional green pedestrian corridors and how they could generate environmental and social benefits (Alcaldiá de Medellín 2011).

In order to achieve the Medellin Master Plan vision for the hillside the first important strategy is described to be the connection of ecological networks and public spaces. Selection of which public spaces should be restored and protected should always be based on the ecological and scenic values of the hillsides (Alcaldiá de Medellín 2011). CVM also demonstrates how less intended structures can hold public qualities, such as how streets can promote for social meetings. The streets do not only increase the accessibility on the hillsides but also constitute a dynamic public space generated by its inhabitants (Medellín Cómovamos 2013). The will to diversify and increase the amount of public spaces is presented in the Medellin Master Plan, as well as the importance of places that encourage encounter between human and nature (Alcaldía de Medellín 2011).

The nine tutelary hills surrounding Medellin are important in CVMs work with the integration of human and nature, as they are considered holders of both cultural and ecological values. CVM promotes an establishment of activities that support culture, nature and recreation, such as eco-tourism (Medellín Cómovamos 2013). Aditionally, the tutelary hills works as dominant landmarks as they are highly visible in the landscape. The use of culturally significant and eye-catching attributes is said to be integral in improving orientability in the urban landscape and also strengthening collective memory (Alcaldía de Medellín 2009).

Included in CVM's work towards safe and integrated urban habitats is the use of nature's ability to improve the health of settlers. An active use of vegetation in the public domain is desirable in order to mitigate air pollution, absorb noise, noxious gases and particles that are detrimental to human health and to regulate water infiltration and reduce temperature through shadow effects (Alcaldía de Medellín 2008).

In order to secure integrated improved living habitats CVM aims to:

- Improve accessibility and public services in fragile settlements
- Prevent new settlements in high risk areas
- Use edges of slopes and ravines as public meeting areas
- Combine ecological network and public spaces.
- Location of public spaces should be based on ecological and scenic values of the hillsides
- Install facilities for recreation, culture and nature tourism on the tutelary hills
- Use landmarks as landscape references
- Design streets to encourage public life
- Include in public places interventions that counteract effects of climate change and improve living environments

5 CIVIC- PEDAGOGICAL URBANISM

Local participation is important in the implementation of CVM. The Civic Pedagogical Urbanism strategy (estrategia del Urbanismo Cívico-Pedagógico) aims to help the public administration prioritize direct participation of the recipient population (Empresa de desarollo urbano (EDU) n.d.a). The strategy is based on the will to firstly communicate ongoing CVM projects and ideas to the public, and secondly connect and educate the citizens (Medellín Cómovamos 2013). Within the education initiatives CVM answers to the regional guidelines of the Central Park of Antioquía, which states that, public green spaces should be promoted for the strengthening of civic environmental awareness (EDU 2012). Finally, Civic Pedagogical Urbanism intends to motivate local participation, which can be seen in Social Urbanism projects included in CVM.

Social Urbanism is a set of already implemented projects which aimed to address the underlying issues relating to poverty, security, housing and livelihood. Local authorities invested in grass root communities in order to show attention and inclusion of residents in informal settlements into the broader city. A number of innovative projects were completed to create a sense of self-esteem and belonging (Aponte 2012).

Eco-parks such as that in the township Cerro Pan de Azúcar are currently under realization within CVM. As can be seen on illustration 13 and 14, the mobility project Path of Life leads up to the Eco-park of Cerro Pan de Azúcar, which includes smaller eco-farms, recreational and sport facilities.

Illustration 13. An example of the disposition of land within CVM, in Pan de Azúcar.

The existing settlements in the area will be connected to the eco-park by new paths and roads.

The promoted eco parks are considered to bring social meaning, which is important when CVM promotes a development of programs that integrate families and communities. Eco-parks should cater for integration between human and nature through the incorporation of environmental, social, educative, cultural and tourist aspects (Alcaldía de Medellín 2008). Within the eco-parks CVM attempts to incorporate eco-cultural events, such as poetry, dance, film shows and conversational conventions in order to encourage understanding the surrounding environmental context and memories (Alcaldía de Medellín 2009). Educational ambition is also demonstrated in the proposal for creation of pedagogical planting schools within established eco-parks, and by establishing programs for tree planting and tree composition at the educational institutions in the city (Alcaldía de Medellin 2008).

Eco-parks said to be not only of interest to locals, but would also promote nature tourism. CVM uses the example of the existing Park Arví that includes eco-tourism programs, nature trails, outdoor auditorium and environmental centres. In this way eco-parks can not only improve the environment but also generate a local income and promote integration between the urban and the rural parts of the city (Alcaldía de Medellín 2008).

Illustration 14. Sport and eco-park on the hill Cerro Pan de Azúcar.

The City of Medellin recognises the importance of heritage values in public spaces as they contribute to the identity of a site as well as educating visitors and creating meaningfulness. Heritage values can be presented in parks, squares, gardens and ancient roads (Alcaldía de Medellín 2009). CVM's work with Civic Pedagogical Urbanism includes a focus on local context based interventions. CVM refers to the municipal guidelines stating that all new interventions should comply with the surrounding urban design and the historic and cultural values within the area. It states that elements that, through design or inappropriate interventions, do not comply with the valued characteristics in a built public place should be recomposed (Alcaldía de Medellín 2009).

CVM focuses on site identity in order to locally anchor their projects. This concept is particularly evident in the Path of Life where the focus is on the awareness of local culturally and historically significant sites. In addition to dedicated historical and cultural paths, CVM seeks to include a stronger cultural and historical

significance in all public spaces (EDU n.d.) The City of Medellin explains that the most important cultural and historical assets in the landscape can be defined by: representativeness, permanence over time, symbolism, relation to other locations, type of ownership and social heterogeneity. Even ecological processes can hold specific heritage values defined by land morphology, layout or significant vegetation. For example, the City of Medellin advocates conservation of vegetation with a representative history, culture and ecology and that can contribute to the landscape identity and bring uniqueness to the city (Alcaldía de Medellín 2009).

In order to achieve educational civic urbanism CVM aims to:

- Generate collective construction of the city by a locally rooted design
- Promote environmental awareness through public spaces
- Integrate programmed environmental, social, touristic, educational and cultural aspects in public space
- Use physical attributes with cultural and historical significance to create or strengthen site identity

Concerns regarding civic-pedagogical urbanism

Throughout the discussion on CVM, the importance of participation of local dwellers is emphasised. But even this was CVM's intention, many communities are said to feel disconnected at not being consulted and not enough informed about the project (CTP 2013). An appeal made by the people illustrates the feeling of exclusion, saying:

"The mountains embraced us when the city turned us its back. Now they talk about life quality while we fight for human dignity" (Medellín Cómovamos 2014).

The intended "bottom-up" approach has been questioned by several non-governmental organisations. Even inside the municipality concerns are expressed regarding the implementation in areas with a long history of independent local participatory planning and with the absence of governmental presence. There is discussion around whether it is possible, through social programs included in CVM, to address local needs within the implementation or if the social programs are insufficient (CTP 2013). As mentioned, CVM emphasises the importance of the inhabitants' participation before, during and after the green belt is implemented. The guideline also encourages the consideration of site-specific traditions and culture as they could strengthen the community and simultaneously contribute to a diverse city. One example of CVM's intention to integrate nature, culture and humans is the three different transit routes where the Path of Life leads up to the tutelary hills. But one can question whose cultural or historical memories are presented and how will the cultural education aspect of CVM relate to ongoing land occupation in the area? The proposed eco-parks can also be questioned as they have little relation to the local history or culture. Understandably questions arise about how the existing settlers will be integrated in the eco-park. Their lifestyles might have to change when their backyard is converted into a public eco-park visited by many people passing by on the Path of Life. And how will the regulations and restrictions following the new nature protection affect the settlers? (Medellín Cómovamos 2013)

Moreover, the developed Master Plans do not include a comprehensive approach to cultural values. All territories within the pilot projects are planned with few or only one usage per space, and they allow for little flexibility. This can obviously be a result of the large scale planning and the result might look different when planned in detail. Apart from the focus on the tutelary hills, one can question on cultural values.

5.4 DISCUSSION- CVM RELATED TO FRAMEWORK

There is no doubt that CVM is a contemporary green belt strategy that seeks to cover more than the traditional protection of rural land and control of urban growth. CVM follows many of our nine extracted guidelines (presented in Chapter 5) for design and implementation of a contemporary green belt. The study of CVM has deepened our understanding of the implementation stage and important considerations. However, some of the implementation methods and focuses can be questioned as they do not align with with our nine proposed strategies. In the following section we will discuss the intentions and strategy of CVM with respect to of our nine strategies.

1. ENABLE CONNECTIONS BETWEEN RURAL AND URBAN LAND THROUGH QUALITATIVE GREEN AREAS AND PUBLIC SPACES

CVM's strategy presents a comprehensive explanation on how Medellin aims to connect rural and urban land. As our guideline suggests, that should be implemented using series of public meeting places with ecological value. CVM aims to develop the rural-urban fringe into a zone with a mix of rural and urban activities. CVM specifically points out the slopes and hillsides of the river corridor as suitable zones for public places and rural/urban activities. Interventions in these zones should also house ecological restoration which is in line with the strategy 9 (presented below).

Transport systems can be used as connections between rural and urban zones, but it is important to carefully understand the impacts of proposed connections. CVM have received criticism of the intentions with regard to the proposed connection tram Monorriel. Critics questioned whether it was designed as much for the urban settlers to visit the rural landscape as for the rural settlers to connect to work and market opportunities in the urban centre.

The primary lesson from this critique is that connections should be aim to address the needs of the inhabitants. Additionally, CVM suggests that connections containing public places should be founded on ecological and scenic values of the hillsides.

2. IMPROVE EQUAL ACCESS TO QUALITATIVE GREEN AREAS AND PUBLIC SPACES

This strategy has its origin in the unequal distribution of, or lack of, public meeting places in informal settlements. The green belt has a chance to address this issue through smart incorporation of public facilities. CVM presents a complete understanding for the importance of public space, demonstrated in the main project Jardin Circunvalar that intends to construct public places on the hillsides of Medellin. Many of the proposed public facilities are of a formal character with special areas dedicated to sport activities or parks. It can be questioned if more informal public places are needed in order to improve the equal access. There is also potential to incorporate streets and vacant lots, that currently being used as public places, into the distribution of public facilities on the hillsides of Medellin

3. PROVIDE SPATIAL IMPROVEMENTS IN DISORDERED URBAN STRUCTURES

As presented in the previous section, green belts can and should also provide a network of accessibility by the use of streets and public meeting places. Another important strategy for a contemporary green belt to consider is the ability for the green belt to improve the physical structure

in dense living habitats. The CVM primarily attempts to distribute the population and relocate settlers into new safer grounds. Another important concept is to use the greenery within a green belt to improve the orientability in the city. In Medellin CVM focuses on the tutelary hills to be important landmarks, but also to act as green lungs as they hold important ecosystems.

4. COMPRISE DIVERSIFIED NATURE AREAS COMBINED WITH HUMAN ACTIVITY

This strategy proposes a green belt that includes protection of small scale urban nature, not just larger rural protection zones. The strategy proposes a new attitude towards nature conservation. Human awareness is essential in elevating the status of urban ecological systems. CVM tries to bridge the gap between ecology and humans though combined ecological networks and public facilities. CVM seeks to promote environmental awareness through designed public places; the majority of the public places communicate the importance of the natural area using obvious mediums (signposts, information boards etc.). More subtle methods of education should not be ignored; discovery of the values of natural areas through informal interaction can also strengthen environmental awareness. A challenge for Medellin is the stigma associated with 'wild' nature that historically has been home to guerrilla groups.

5. IMPLEMENT GREEN STRUCTURES THAT CAN WITHSTAND CHANGES IN LAND USE

The fifth strategy suggests that the contemporary green belt should implement strong green structures that not only shape occupations but also secure the future health of the city despite urbanisation. The strategy nominates the use environmental barriers, which CVM implements through reforestation programs and the ecological stream corridors. The CVM concept discusses but does not visibly demonstrate the improvement and protection of continuous parklands. CVM planning is not yet at a detailed level, so it is difficult to completely understand what these parklands entail. However, in the current state one could suggest that protected parklands within CVM should also include the local important green areas.

6. DESIGN FLEXIBLE PUBLIC AREAS WITH MULTIFUNCTIONAL USAGE

Controlling urban growth can be difficult and not always desirable, so a contemporary greenbelt should instead focus on securing green and healthy cities. The green areas and well-functioning eco-systems within the urban areas are important, as is vast rural land for future food production. It is however stated that the green areas cannot be preserved without a common will from the settlers. CVM includes many interventions that combine human activities and nature preservation. Many of the interventions are located on the tutelary hills where recreation, culture and nature tourism are promoted. Yet the critique towards CVM highlights focus on tourist attractions instead of important local interventions. Many critics argue that local interest and responsibility in the upkeep of locally situated eco-farms will not be encouraged if the underlying intention of CVM is to satisfy tourism from the city centre. Instead, public protection zones and nature conservation should be founded on local needs and the priority should be essential activities for livelihood. This said, tourism is still important to bridge the gap between rural and urban settlers as well as being educational.

7. INCLUDE PRODUCTIVE LAND USE IN THE PUBLIC DOMAIN

As the cities expand the demand for a sustainable and reliable food supply increases. The seventh strategy addresses future need for more productive land incorporated into the city structure. Within CVM there exists a focus to protect rural land and fertile soil. Most of the protection initiatives are located in the protection zone, furthest away from the city. Large scale food production is important but is said to be insufficient with today´s rapid urbanisation. Therefore, CVM should use the opportunity to incorporate productive land into the urban structure. This would also address another focus within CVM –

encouraging traditional productive land use. This implies a continuation of traditional small-scale production within urbanity. However, many of the traditional production methods in Medellin are said to be unsustainable so focus should therefore be on education and encouragement of sustainable practices.

8. BASE THE DESIGN ON LOCAL CULTURE, TRADITIONS AND KNOWLEDGE

The eighth, and most comprehensive of the strategies, describes the importance of a locally anchored green belt. Without local anchoring and connections the sustainability of the grren belt would be vulnerable. CVM acknowledges the importance of a locally based green belt, which stands CVM above other green belt strategies. Through Civic-Pedagogical Urbanism, CVM strives for bottom-up approaches where the local voices help formulate the implementation of CVM. In CVM it is stated how the physical attributes with cultural and historical significance should help create site identity. The interventions within CVM should also strive to be visually integrated into the surrounding landscape. Another important cornerstone in Civic-Pedagogical Urbanism is to only relocate settlers when needed. Even if many critics question the success of the Civic-Pedagogical Urbanism it is apparent that the intentions of CVM truly seek to base the design on local culture, traditions and knowledge. One can however always question the form of bottom-up approaches and if all aspects are covered successfully. The next step for CVM should be to clearly demonstrate how implementation will impact the local scale.

9. RESTORE DEGRADED ECOSYSTEMS

For the contemporary green belt to be of direct value to the settlers in informal settlements the first priority should be to improve degraded ecosystems. Many settlers depend directly on well-functioning eco-systems, such as stable land for house construction or clean drinking water. In Medellin the polluted waterways are prominent and thousands of houses are affected by landslides. The understanding of the acute state of degraded eco-systems in Medellin has given CVM a strong focus on nature protection and restoration. CVM prioritises restoration and retention of tributaries of Medellin River. The interventions within CVM are said to focus on protection of forest and water bodies and on the improvement of the microclimate along streams.

MOST IMPORTANT TO CONSIDER:

From the chapter, following stands out as particularly important to attend when implementing a regional Green Belt on the intermediate or local scale:

The critique regarding CVM mainly focuses on the level of local considerations. The importance of a locally based Green Belt is one aspect also mentioned in the nine strategies. It can be understood that such aspects are lost or difficult to address at a regional scale. It should therefore focus on that at the intermediate or local scale of an implementation.

Another theme for the critique is CVM's ability to restrict urban growth. The nine strategies do not focus directly on a limitation of urban growth as it stated that a contemporary Green Belt primarily should focus on green connections and sustainable urban growth.

Other important aspects to consider in the implementation are the specific requirements in Medellin. An implementation of CVM should primarily focus on;

- Develop the tutelary hills
- Prioritise water bodies for restoration
- Use edges of ravines as public meeting places

CHAPTER 06
CASE STUDY
LA LOMA

Photo 40.

CHAPTER 06

LA LOMA

CONTENT. This chapter contains the case study of La Loma, Medellin. Like the site study, the chapter is split into in three main topics that are believed necessary to understand the area: the social, natural and built environment of La Loma. Following the discussion of each topic, a SWOT-analysis summarises and analyses the findings. Strengths, weaknesses, opportunities and threats are listed. Illustrative maps show the most comprehensive problems and opportunities identified in La Loma, having major impacts on people and nature. The chapter concludes with a synthesis of the outcomes of the SWOT- analyses. It forms the basis of the strategy for improvements in La Loma.

6.1 WHY LA LOMA

Interventions within CVM concern the rural-urban fringe in Medellin. Illustartion 15 shows how La Loma is a suburban community in the rural-urban fringe and hence covered by the green belt plans. A master plan has however not yet been developed for La Loma, which is why it can be of interest to study alternative ways of designing the interaction between the community and a green belt.

The complex dynamics in La Loma make it a valuable study area. A concern for the local context challenges the designs and insists a refined translation of the knowledge gained from the literature studies. As seen in photo 23, La Loma presents both rural and urban dynamics and is further complexified by a strong presence and history of criminal conflicts in the area. The changes and dynamics in the rural-urban fringe have created tensions in land use, occupation and appropriation of land, generating a crisis when it comes to culture adaptation among the traditional settlers. Moreover, La Loma is facing pressures from development and mining interests, and also a high presence of illegal armed groups wanting to control the area (Alcaldía de Medellín 2011b).

Photo 23. Green and urban structures in La Loma.

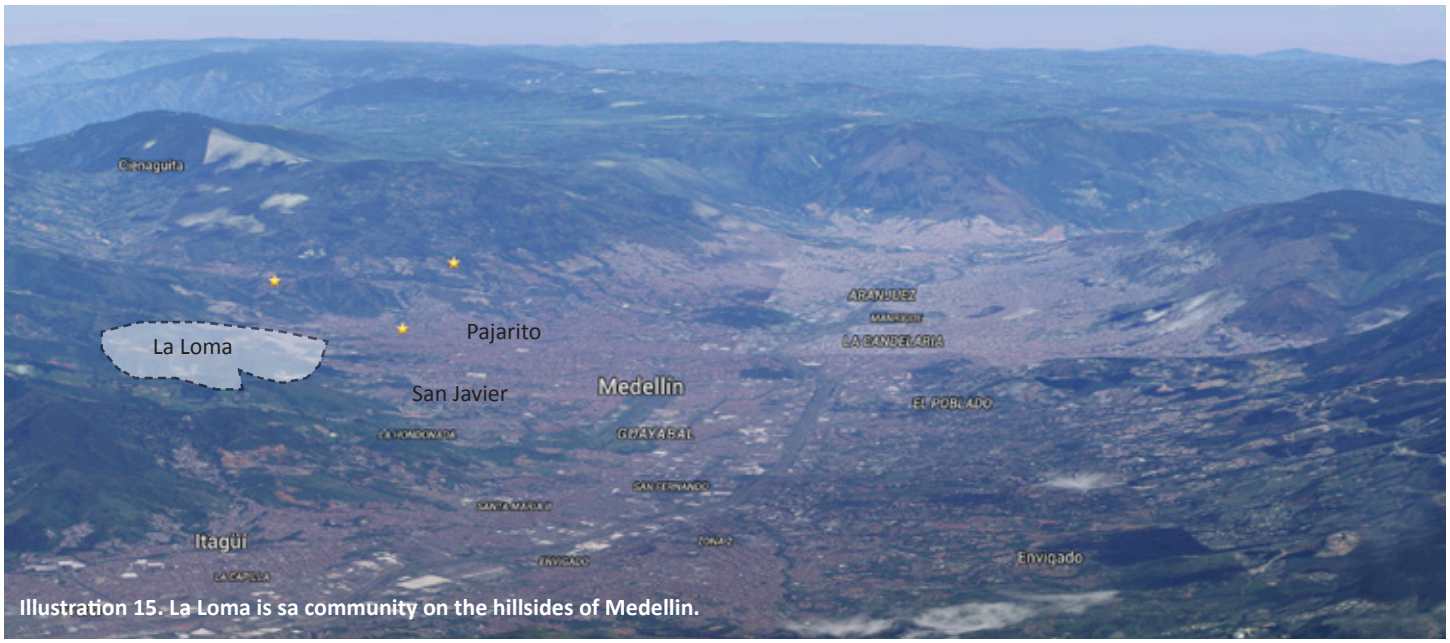


Illustration 15. La Loma is sa community on the hillsides of Medellin.

6.2 DIVISION OF LAND IN LA LOMA

La Loma is a community on the west hillside of Medellin and forms part of the township San Cristobal. Located on the central mountain range in Colombia, the site presents a dramatic landscape. The mountain range is broken into different canyons with smaller valleys and steep slopes and streams. The centre of la Loma, San Vicente Ferrer, lies in the neighbourhood Loma Hermosa and holds a church and public library. It connects to the main centre of San Cristobal, La Cabecera, via a main public transport route of buses. The route also connects to San Javier, an urban community further down the valley, where many job opportunities can be found. The main access point to La Loma is through San Javier, which is why the relationship between the communities has been strong since early on (Alcaldía de Medellín 2011b).

Illustration 16.
La Loma in north-west of Medellin.

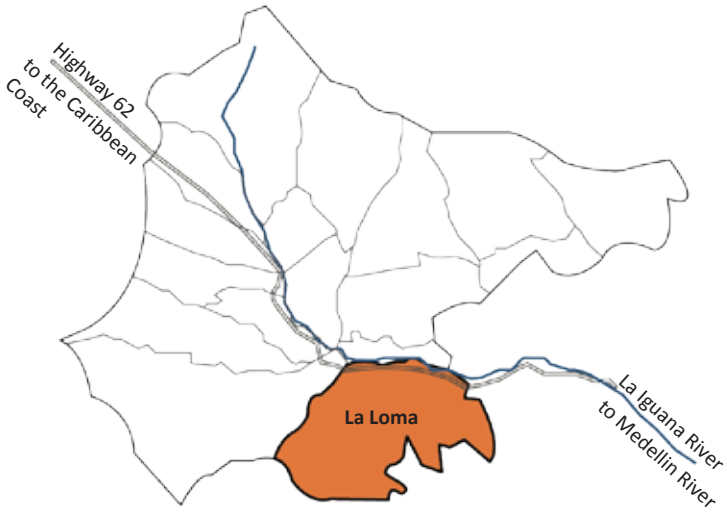


Illustration 17. The community La Loma lies in the southeast part of the township San Cristóbal.

6.2.1 Divisions and neighbourhoods

There are no political and administrative divisions within La Loma, but the government and illegal groups have defined eight neighbourhoods primarily based on the church's congregations (Vanegas Montoya 2014). Housing is more clustered towards Loma Hermosa, lower Barrio Nuevo, La Gabriela and Primavera. More dispersed housing of a more rural character can be found in

Illustration 18. Loma Hermosa is the centre of La Loma.

the San José, San Pedro, San Gabriel and Bellavista Alcaldía de Medellín 2011b).

The neighbourhoods are important in La Loma and the inhabitants closely identify themselves with the neighbourhood to which they belong (Alcaldía de Medellín 2011b). The local leader, Beatriz, describes tensions between the different neighbourhoods as the result of illegal activity and membership of illegal groups. Invisible socio-cultural borders were also disclosed when listening to how the inhabitants themselves describe an area:

"From the shop of Mr. Zapata, to the house of Mrs. Cruz Maria Rueda, from there the district continues up along the driveway to Garsona and then down to the house of Mrs. Zoila. Follow the house until the road up to the left, until you reach the store of Don Jesus, continuing down the steps to the Orange District, bordering the area of Bellavista" (Alcaldía de Medellín 2011c, translated by the authors)

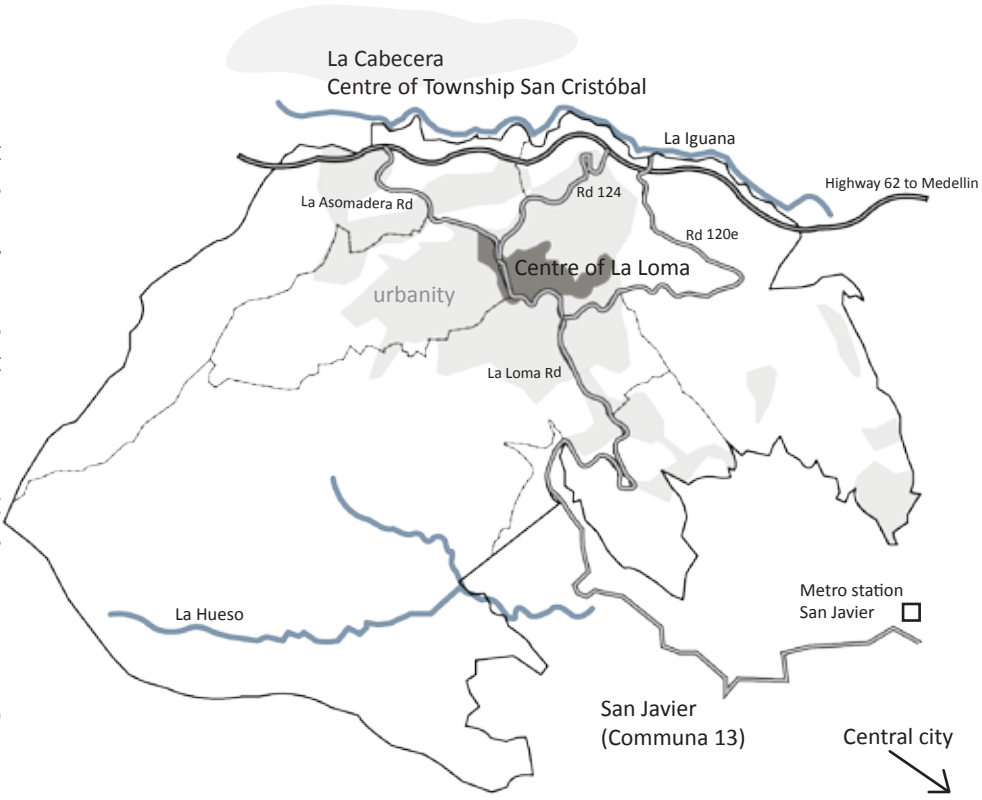


Illustration 19. The main roads in La Loma.

6.3 URBAN DEVELOPMENT AFFECTING LA LOMA

Urban development in La Loma relates to both formal and informal processes. The territorial planning model, used by the City of Medellin, affects the development in La Loma. In the current Comprehensive Plan of Medellin, POT, La Loma is accounted for as a suburban and rural zone as it has historically primarily been associated with workers, artisans and miners, as well as some agricultural practices (Alcaldía de Medellín, 2011b). Today La Loma presents more urban dynamics. With a high occupancy pressure in Medellin, the outline of what is considered ”urban” is under revaluation for the whole city. Hence, La Loma might be classified urban instead in the next POT (Eugenía, M., 2014). Irrespective of the different dynamics in La Loma, the city has up until now used an urban territorial planning model (Alcaldía de Medellín 2011b). The lack of consideration of rural dynamics within planning has come to influence the livelihood for the traditional settlers in a way that the social and cultural structures and manners are lost in favour for urban interests (Alcaldía de Medellín 2011b).

6.3.1 Recent projects and changes

La Loma is constantly affected by the urban expansion in Medellin city centre, and more recently by larger interventions in the community’s immediate vicinity. The construction of a new tunnel and Highway 62 in 2004 has generated different dynamics of spatial configuration and regional rural-urban relationships in the region (Alcaldía de Medellín 2011b). Not only has the new tunnel accelerated urban expansion, but it has also made La Loma a target for control by illegal groups. The new tunnel is the fastest connection out to the Caribbean Coast where most of the exportation of drugs and importation of weapons takes place. Illegal groups aim to take control over the areas along the highway and therefore exert pressure on the inhabitants of La Loma (Álvarez 2014).

Another recent and on-going project initiated by the city that is also having an impact on La Loma is the extension of the metro cable car from the metro station San Javier. The new metro cable car is expexted to intensify the urban expansion in the rural-urban fringe. It will connect the city with two recent urban expansion projects, Pajarito and Blanquizal, located not far from La Loma (Alcaldía de Medellín 2011b). The metro cable car was initially planned to connect to the centre of the neighbourhood Loma Hermosa and would have facilitated transportation for the settlers in La Loma. The revised plans, however, have instead placed the station on the hill Loma Hermosa. The cable car will serve as a tourist route but make little differences for the settlers in La Loma (Vanegas Montoya 2014).

6.4 SOCIAL ENVIRONMENT

Through old family tradition and the history of a rural village combined with an invisible pressure of control and power, La Loma has become trapped between the former rural traditions, fast urbanisation and criminal activity. The demographic changes are a result of a migration of rural population to urban centres leading to high pressures on the urban-rural edge with informal sprawl expected to follow (Alcaldía de Medellín 2011b). To understand the social environment in La Loma, the following discussion will focus on the history of the site and account for the different groups that live and work in the area.

6.4.1 History

The eight neighbourhoods of La Loma are historically associated with smaller settlements of workers, craftspeople and miners with smaller agricultural businesses for self-sufficiency. Illustartion 20 from 1817 shows how La Loma and the township San Cristobal have a long history. It commencing with with the pre-Hispanic settlers living on the hills. In the early days there were just a few landowners, but with immigration the land became subdivided into smaller lots - a development still continuing today (Alcaldía de Medellín 2011c). The area experienced a real upswing with the mine owners who moved to La Loma in search of new mining sites. The demand for brick and tiles made La Loma an important part in the trades, thanks to the many mineral deposits (Alcaldía de Medellín 2011b).

In the mid-nineteenth century the cultivation moved from maize, beans, bananas, sugar cane combined with pig farms to include more attractive crops with a higher market price such as coffee. The coffee culture was reinforced with the construction of a new railway running to the coffee farms in the southwest of Caldas. Even the brick industry received a boost in the end of the nineteen century when the first brick factory was constructed, making bricks the most common building material in the area (Alcaldía de Medellín 2011c).

In the period from the 50s to the 70s` the process of urban growth meant rethinking how to plan not only the City of Medellin, but also the Aburrá Valley. The rapid growth of local population and political violence resulted in a displacement of population to rural areas. Gradually occupants settled on the hillsides in a chaotic manner in areas lacking services, urban perimeters, green networks and with geological constraints (Alcaldía de Medellín 2011c).

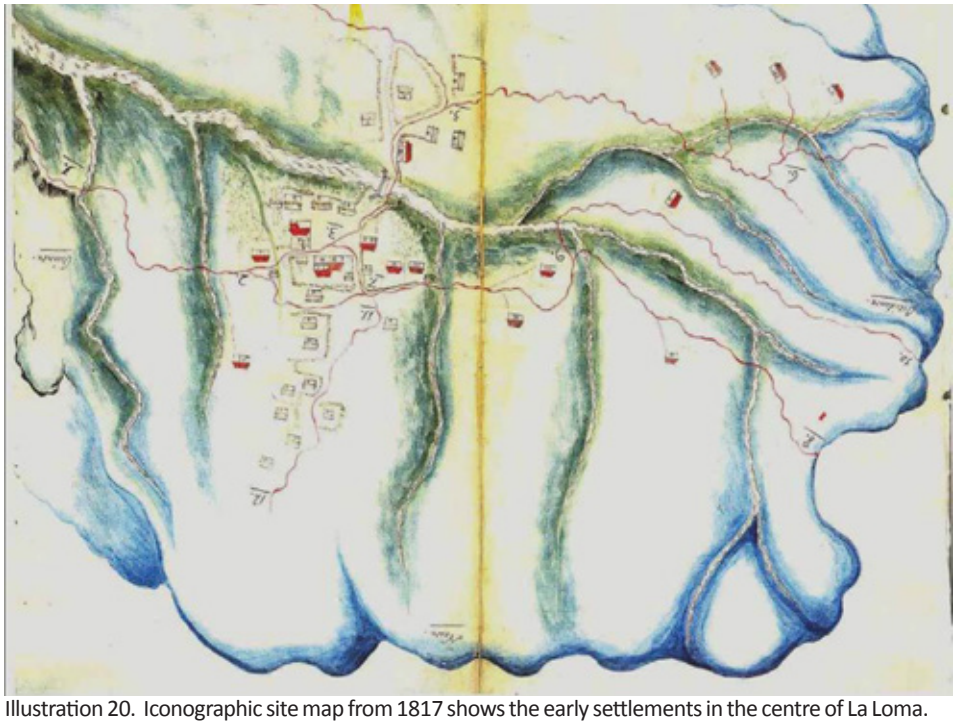


Illustration 20. Iconographic site map from 1817 shows the early settlements in the centre of La Loma.

Insecurity in La Loma

La Loma's geostrategic location between the centrality of San Cristóbal and Comuna 13 led to an unwanted involvement in the formation and operation of armed groups. Such groups use the territory as a corridor in which it exercise the ongoing dispute over its ownership and control. This implies that those illegal armed groups do not only preform armed clashes in the area but also inflict constant fear upon the settlers of La Loma. The control over the area involves constant threats, extortion and forced recruitment of children and teenagers, free movement and killings. This, of course, determines the permanence of families in La Loma who sometimes have to move to other areas or neighbourhoods in Medellin. Conflicts arise within families to the point which households, organisations, social and community networks get deconstructed (Alcaldía de Medellín 2011c).

The previous decade of violence in Colombia has strongly influenced La Loma by threatening local development and safety. This violence reached its peak with the so called "Operation Orion" 2002 (Alcaldía de Medellín 2011b). "Operation Orion" was a military offensive in Community 13 by the police together with paramilitary groups in order to remove left-wing rebels from the area. The operation was successful but critics point out that the operation was carried out in a densely populated area with approximately 100,000 inhabitants trapped in the battle; many civilians were injured. Some claim that the operation merely managed to replace one armed group with another, as the Para-military group BCN (Bloque Cacique Nutibara) is currently controlling the area (Colombia Reports 2012).

6.4.2 Today's migration

Most of the 6,954 dwellings in La Loma have existed for some time, however in the last decade the market economy has accelerated urban expansion and a large wave of immigrants has moved to La Loma. Between 1985 and 1995 the migration process brought many settlers to the riverbanks of La Iguana River where they settled in informal dwellings. It is estimated that 38,4% of the rural population in La Loma arrived during the last nine years (Departamento Administrativo de Planeacion Municipal (DAPM) 2006). The township San Cristobal, including La Loma, is the second most populated township in Medellin and has an average of 704 inhabitants per square kilometre. This figure is driven up by dense informal settlements along the hillsides and streams. Despite that, La Loma has more rural land with less dense dwellings than the rest of San Cristobal (Alcaldía de Medellín 2011c).

Photo 24. Operation Orion was a military offensive, which affected and threatened local development and safety in La Loma.

Photo 25. Graffiti artists El Perro and Rek has painted the memories from operation orion.

La Loma is not only facing an immigration of settlers but also a high number of young people emigrating to other townships or cities in the search for job opportunities and studies. Some emigration is unfortunately caused by social exclusion.; the estimation tells that 6,3% of the total amount of all expelled people in Medellin came from La Loma and San Cristóbal (DAPM 2006).

The illegal forces work their way from Cauca Valley through San Cristóbal and Loma Hermosa down to the more urbanized Communa 13 in order to take control over the area. Many people have to move from their unprotected homes and settle in other areas in La Loma. This results in tensions between different sectors which leads to a high presence of trafficking, drugs and weapons, as can be seen San Gabriel and Barrio Nuevo (Vanegas Montoya 2014).

6.4.3 People in La Loma

La Loma has a long history as a settlement and today a mix of families from different origins live side by side. La Loma has a high presence of mulattoes, mestizos and also African American inhabitants that contribute to the cultural traditions in La Loma. Even though the identity of La Loma is based on the cultural richness, the differences in origin and complexion are causing tensions between the different groups (Álvarez 2014).

Photo 26. Children in La Loma.

Large family tradition

La Loma is one of the most densely populated neighbourhoods in the township but there are only a few families represented (Alcaldía de Medellín 2011c). La Loma is a neighbourhood build up by a traditional family structure and most have lived in the area for over 100 years. Because of the tradition of large rural families surname is important and can let you in or prevent you from entering an area in the neighbourhood (Vanegas Montoya 2014 and Álvarez, B. 2014).The tension in La Loma lies in the old traditional families meeting the new settlers (Vanegas Montoya 2014).

The youth in La Loma

Despite the emigration of young people due to lack of employment, they are still the biggest group in the township, where 38% are under 18 years old. The development plan for the township discusses the importance of interventions focusing on the needs of young people. It describes how recreational, cultural and educational interventions are not enough and that there is a need for more job opportunities and housing (DAPM 2006).

Community groups

When it comes to gender distributions, there are only 2 % more men than women (DAPM 2006). The females' position in La Loma is strong and the females are distinguished in the many community groups (Beatriz). There are 8 community groups that work for improvement of the living area but few groups that actually focus on

the integration of settlers between different sectors. The church and the community library in San Vicente Ferrer (photo 27) are the only institutions working with the integration problem (Vanegas Montoya 2014).

In the work with the community groups the culture play an important role and the groups collaborate with the local schools. The regions many afro-colombians brought music to the area and today La Loma is recognised in the township and all over the municipality for its richness and diversity of artistic and cultural expressions. (Alcaldía de Medellín 2011c).

One example is the musical group called The Traditional Band Paniagua who have been playing music for 120 years (photo 29 and 30) and are a living heritage of La Loma and important for the cultural history of Medellin (Alcaldía de Medellín 2011c). There are many cultural events throughout the year, the most popular being the kite festival on the hills of Loma Hermosa (Vanegas Montoya 2014). The culture is said to strengthen the sense of identity and belonging (Alcaldía de Medellín 2011c). A local community leader and settler in La Loma describe the cultural events as a way for settlers to continue caring for their public areas (Álvarez 2014).

Photo 27. Young people in La Loma gather at the Library, where internet is offered.

Photo 28. ConVerGentes is a community organisation working with practical tools to strengthen the social environment in La Loma.


Photo 29 and 30 . The oldest music group, Paniagua, has been playing music since before the 1920s

6.5 LIVELIHOOD

La Loma has a population with very low economic resources and only 29.33% of the population is economically active (which means to have a reported income). The population in La Loma has had few opportunities for income and does not seem to have benefitted from the municipal socioeconomic development (Alcaldía de Medellín 2011c). The fact that 10-30% of the population earn less than a minimum wage contributes to the economic vulnerability, together with an illiteracy rate of 9.4% and the dropout rate of 5%. (Alcaldía de Medellín 2011c and DAPM 2006).

The agricultural tradition in La Loma survived the industrialization in Medellin during the twentieth century. This industrialization increased building activity, giving rise to a high demand for building materials. By 1940 the township became the leading provider of building materials such as sand and gravel. Today the quarrying and sand mining can be seen in the riverbeds of La Iguana, San Francisco and Arenera (DAPM 2006).

Today the sources of income derive from agriculture and also trades such as construction, masonry, housekeeping and a small amount also work in the coffee industry. To meet the basic needs of the population, neighbourhood retails and small production and service circuits are developed. Most of the informal jobs take place in private abodes giving the dwellings a character of mixed use. Even though most of the marketing circuits are associated with the centre of San Cristobal or San Javier, a large sector focuses on the business in downtown Medellin (Alcaldía de Medellín 2011c).

Since La Loma has continued to be an important supplier of agricultural products the traditional agriculture practices are still present in the area (DAPM 2006). Agricultural patches are linked to dispersed family settlements in flat and sloping areas. Land is often intensively cultivated with the use of crop rotation. The cultivation patches

Photo 31. Clay for the extensive brick industry is the result of mining activities and is mainly produced in La Loma.

are small which encourages the inappropriate use of agrochemicals and soil erosive practices (DAPM 2006).

Today the community works extensively with development and education in sustainable cultivation of land. There is a group of farmers that are currently working with the implementation of the Japanese cultivation strategy called Fukukoa (Vanegas Montoya 2014).

The term refers to natural faming using no chemicals and where the farmer is encouraged to observe local conditions and develop a closed system of cultivation (Wikipedia, n.d.). Sustainable farming practice is not the only area targeted for improvement in La Loma; the community also teaches multi-cultivation and new cooking options to counter problems relating to the implementation of multi-cultivation. This issue results from families that have a strong cultural tradition of the cultivation of a specific crop (Vanegas Montoya 2014).

Photo 32. Farming on a steep slope, not far from the urbanity San Vicente Ferrer.

SWOT ANALYSIS SOCIAL ENVIRONMENT

STRENGTHS

- A strong identity through the old tradtions and rich culture
- Rich cultural life, with people from different countries
- Deep rooted cultural events that unite people and make them care for public place
- Strong sense of belonging over generations
- Many young people present a strong workforce
- Many community groups with strong and active women
- Library and church in San Vicente Ferrer are strong drivers for social change and social meeting points
- Diversity in income sources

WEAKNESSES

- Lack of employment making young workforce emigrate to other townships
- Scattered families, due to tensions caused illegal activities
- Insecure society due to violence and high presence of illegal activities
- Low faith in the government
- Tensions due to people with different origins
- Social exclusion of non-related settlers
- Lack of essential public services
- Emigration due to social exclusion
- High social tensions between San Gabriel and Barrio Nuevo
- Low economical resources
- High illiterate and dropout rate

OPPORTUNITIES

- Teach and implement sustainable farming practices
- Change traditional mono cultivation towards a more difersified use of crops
- Increase qualitative public spaces
- Promote inclusion of settlers
- Stimulate education in the public realm
- Promote stronger relationships between sectors through meeting places
- Use the strong cultural tradition to improve the relationship between new settlers and traditional

THREATS

- Violence threatening the society
- Immigration put pressure on traditional families
- Lack of job opportunities resulting in emigration of workforce
- High illiterate and dropout rate
- Low economical resources
- Insufficient work towards an integrated neighbourhood

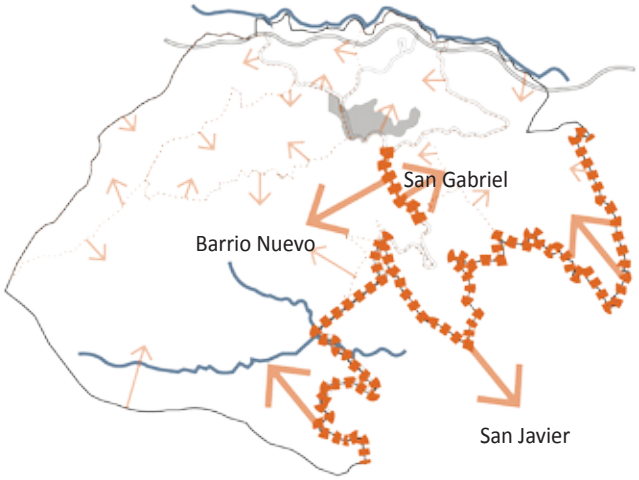


Illustration 21. Problems in social environment. A SWOT analysis of social dynamics in La Loma reveals big problems with social tensions between the different neighborhoods but in particular between San Gabriel and Barrio Nuevo and between La Loma and San Javier due to illegal activity and membership of illegal groups.

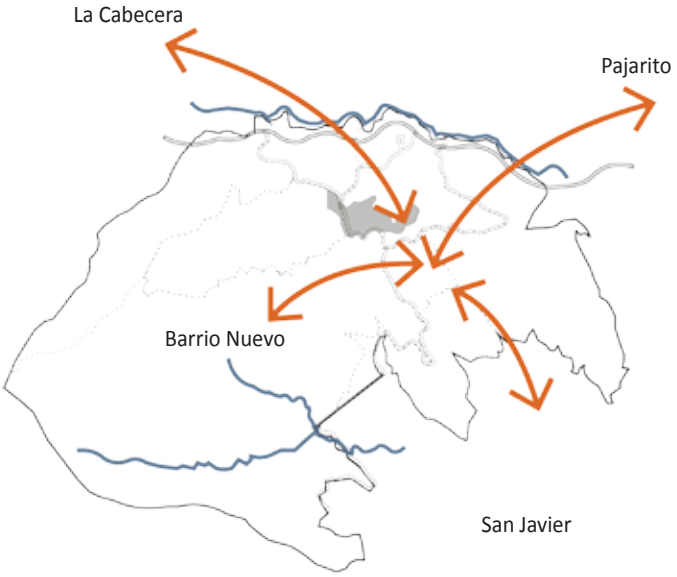


Illustration 22. Opportunities in social environment. A SWOT analysis of social dynamics in La Loma shows the potential to improve the frail relations to San Javier. That can be done by taking advantage of the existing main road from San Javier to La Loma. The overall relations across neighborhood borders could be improved by linking Pajarito and Barrio Nuevo to central parts of La Loma. Through the interaction between new settlers and deeply rooted residents the social tensions may get counteracted. Cultural meeting places that open up for the exchange of ideas, is a way of creating the conditions for such meetings. An example of possible locations for meeting places is marked with dotted circles on the illustration above.

MOST IMPORTANT TO CONSIDER:

- Improve relations between neighbourhoods and link urbanities.
- Increase interaction between new settlers and deeply rooted residents.
- Create platforms for cultural and economical development.

6.6 NATURAL ENVIRONMENT

In order to help understand the natural environment of the mountainous La Loma, the following text explains the physical characteristics of the most notable natural elements. Land uses in La Loma are described, as they contribute to the landscape setting but also illustrate the settlers' relation to nature and the effects on ecological functions in La Loma.

6.6.1 The mountain system

Ridges and hills are some of the most notable natural elements in La Loma that structure the environment. The hill Loma Hermosa and the ridge Los Arrayanes pose two principal geo-form elements. The hill on photo 33 is called Loma Hermosa and is a "tutelary hill " of prominent significance to the city.

An evaluation of landscape "units" in La Loma (where land coverage, current land use and production systems are evaluated as they determine the ecological processes) has shown that Loma Hermosa holds important ecological functions. Other notable natural structuring elements in La Loma are zones of environmental concern, such as Baldías y Padre Amaya.

Some ridges and peaks are important as they provide La Loma with qualitative public space and natural viewpoints from where the landscape can be appreciated. These include Altos de Virgen, Cuchilla Loma Hermosa, and viewpoints Mirador San José, Mirador Bellavista and Mirador San Javier La Loma – San Vicente Ferrer.

Pendings, soil and landmass movements

The mountainous area has inherited characteristics from geological processes and has a diverse climate and vegetation. These aspects have impacted over time to give rise to different kinds of soils. Generally, the soils in la Loma are acidic, have a low natural fertility, good physical properties but are difficult to handle in agriculture due to stoniness. Big rains, wind and steep slopes in the mountain areas favour erosive processes. Where agriculture is conducted, cultivation of clean crops (e.g. flowers or Welsh onion) accelerates the erosion processes. The risk for landmass movements in La Loma is at most parts no threat but some dispersed places can be found where the risk is high.

Photo 33. The tutelary hill Loma Hermosa is of particular importance to the inhabitants of Medellin, including the inhabitants of Loma.

In the highest parts of the mountainous area the slope can exceed 60% presenting risk for falling blocks. Such areas are found in the ridges of Cuchilla de las Baldías, the hill el Cerro del Padre Amaya, Las Antenas and la Cantera de Loma Hermosa. Areas exposed to high-risk landmass movements have been identified in: the lower part of neighbourhood Primavera where the steeps to the left of the regional road Aburra Cauca uphold degraded and bare lands, often resultinn in landslides; the north of La Gabriela where quarrying activities are prominent in Loma Hermosa; the south of Barrio Nuevo in zones with dumps and exploitation of materials for construction.

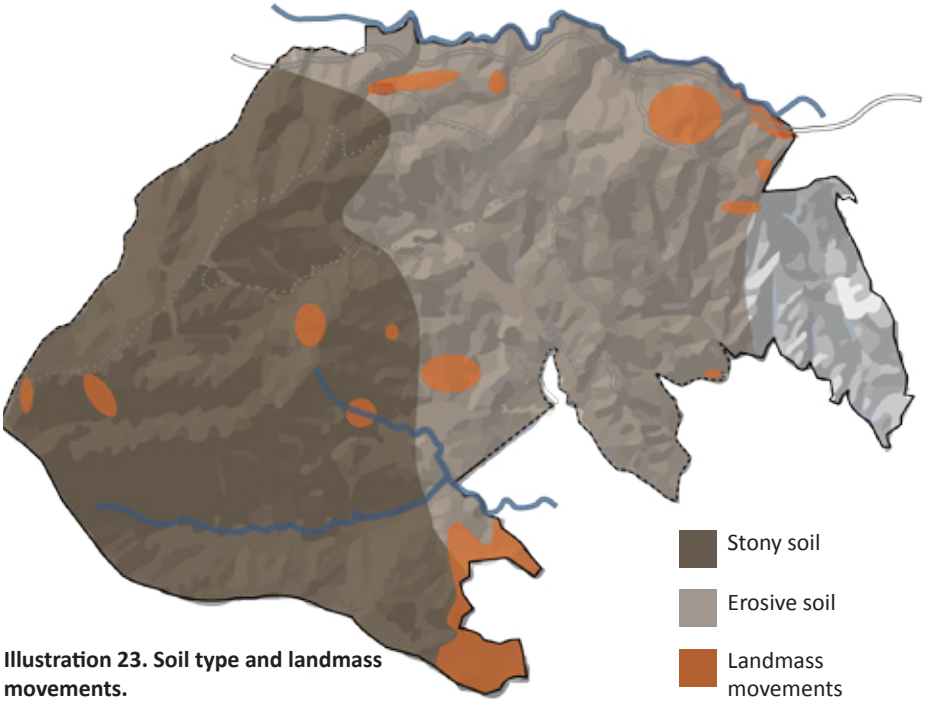


Illustration 23. Soil type and landmass movements.

Photo 34. Cattle in the foreground and more rural settlements further in the picture.

The great steeps in the mountainous area forms one of the major constraints to agricultural land uses, together with the stoniness in the soil, low fertility and erosive processes. In the central parts of the slopes the gradient lies between 25 to 50%, which is considered high. In the highest parts of the mountainous area with slopes exceeding 60% and as such the area is dominated by other activities, with forestry being the most prominent.

6.6.2 The water system

Other notable natural elements in La Loma are the watersheds of La Hueso and tributary streams to La Iguana that run through the community. These converge in the depth of Aburra Valley and contribute to Medellin River in the centre of the city. The streams and wetlands are low in quality and quantity. The lack of water forces people to divert from rural economic activities and instead draw from the urban water supply of imported drinking water. Inappropriate consumption is often generated, where land parcels and country houses use water for pools and watering of gardens or crops.

The high pressure on water resources in la Loma is a result of many things; rapid population growth, pollution, economic exploitation and climate change in the watersheds exacerbated by high logging. With imbalances in water availability, droughts and floods have come to affect crops in low,

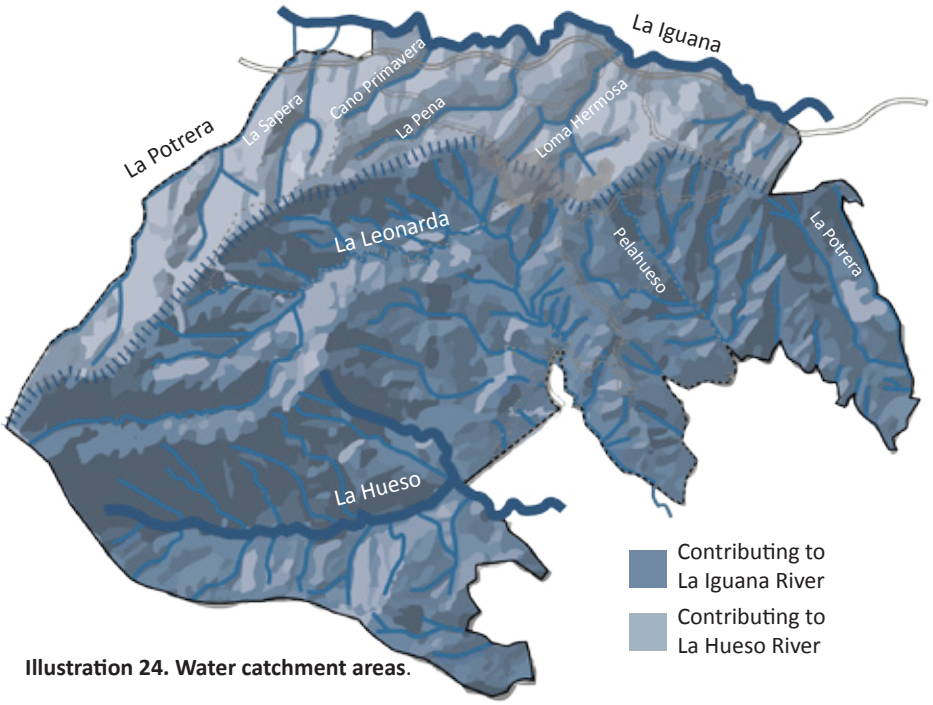


Illustration 24. Water catchment areas.

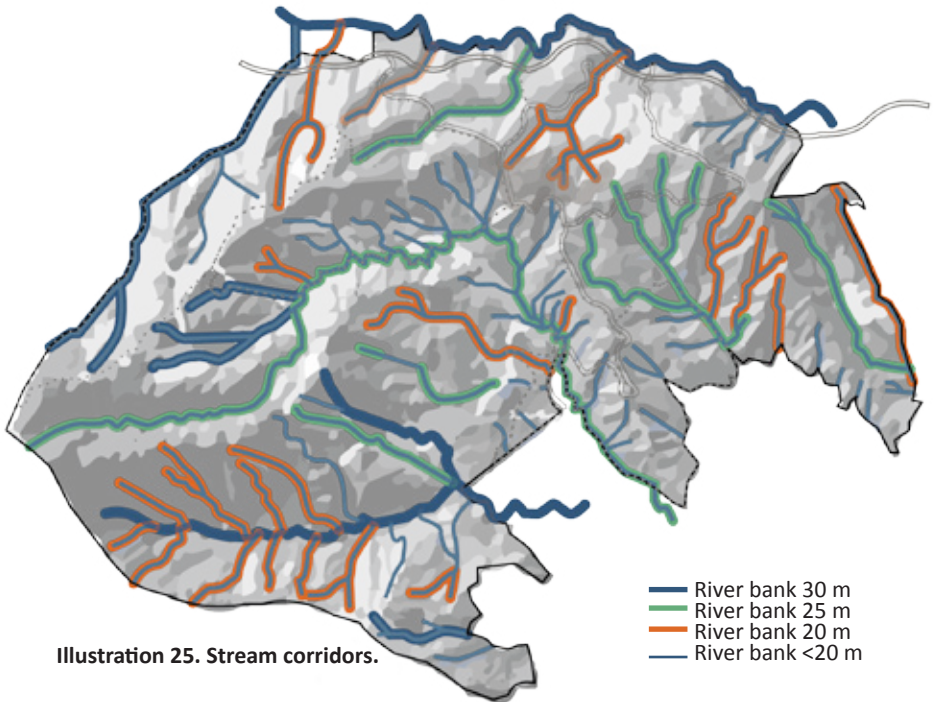


Illustration 25. Stream corridors.

frost and hail areas. In addition to the shortage of water in the streams La Hueso and La Iguana, drinking water is sometimes also lacking – this has become a serious problem for the rural water demands that involve agriculture. The main sources of water for human consumption in La Loma are streams San Fransisca and La Palma that supply Aqueduct La Acuarela.

The quality of the water in La Q. de Iguana is one of the worst in the municipality of Medellin. Micro-watersheds extending from the stream La Iguana (La Sapera, la Potrera, Caño Primavera and la Peña Baja) have low water flows in the upper parts but which increase further downstream as the sewage outlets from settlements in the middle and lower reach the watershed. The upper sections have very little vegetation cover and are mostly replaced by pastures, heavily grazed to the point that the soil is degraded, showing scars in the ground resulting from landslides. In the middle sections of the streams some farms with intensive farming are observed. The high tide zones are covered with low vegetation and grass stubble and buildings invade the lower parts of the streams.

Micro-watershed Q. la Leonarda, which extends from the stream La Hueso also has highly contaminated water since much of the wastewater from the village of La Loma is discharged into it. It is mostly a natural canal but some civil constructions exist where pedestrians and roads cross the waterway. Fragile areas of the upper basins of La Hueso and Leonarda affect the performance and environmental condition of middle and lower basins downstream and so should be protected. These areas have potential to be used as natural public space due to scenic attributes.

Photo 35. The peri-urban agriculture is visible in La Loma and many settlers cultivate and have animals in their backyards.

Photo 36. A house next to the highway have chickens in their backyard

6.6.3 Land uses and impacts on the environment

La Loma, like other former traditional areas with peasant agriculture in the boundary of Aburra Valley, has come to involve new types of operators working in coexistence with the traditional operators. The following text describes the current land use in La Loma and comments on the environmental effects.

Both traditional land use and changes in economic activities can contribute to

environmental degradation. Negative environmental impact is often result from the following: poor agricultural practices; extensive livestock farming; mining or quarrying; transport and industry infrastructure; abandonment of agricultural fields; inappropriate land use entailing deforestation, use of agrochemicals, contamination and erosion of land, waste and an overuse of water.

Forest and ecological connectivity

The forest in La Loma can be classified as productive, protective or original untouched forest. Productive forest for commercial use with introduced species (eucalyptus, pine and cypress) occupies 5,6% of the total land in La Loma and is located towards the highest parts of the hills in-between Barrio Nuevo and San José and in the slopes around the stream La Leonarda. Protected forest occupies 6,6% and is primarily located towards the tops of the hills and along the riverbanks.

In La Loma most parts the original forest have disappeared, but some remnants can be found along drainages. The original forest is a type of vegetation most important in the community for the goods and services it offers, including protection and conservation of water resources, reduced surface runoff, providing habitat for wildlife area. The most important areas are found around the watersheds of La Hueso, with a protruding fragment along the stream

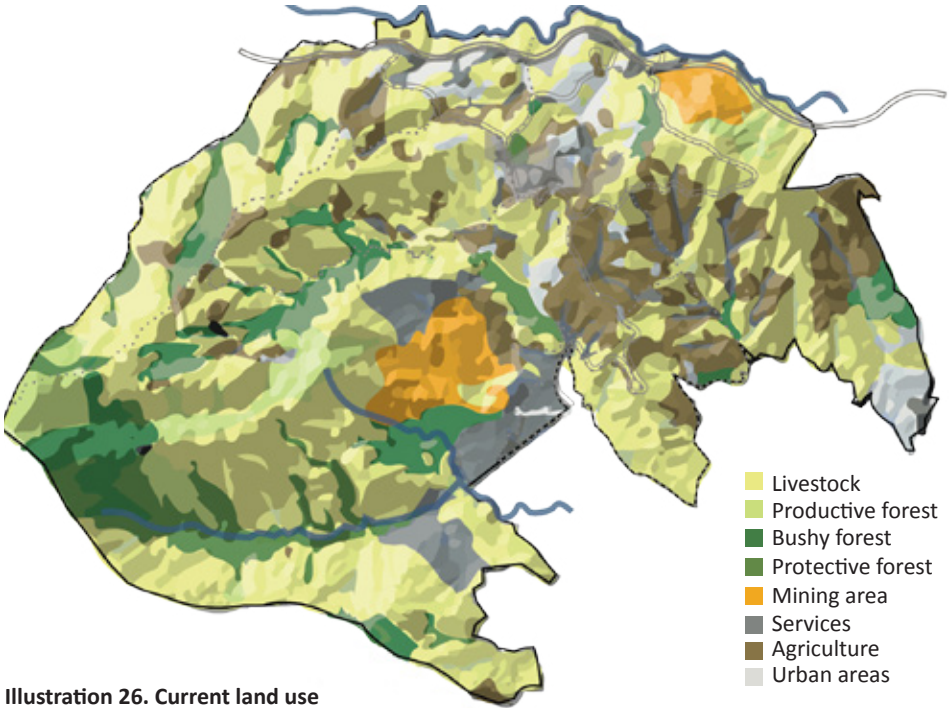


Illustration 26. Current land use

La Hueso. Fragments of natural forest are also found along the riverbanks of the stream La Potrera. Forest, more intervened and characterised by shrubs and bushes, occupies 7,9% and has yet not been classified as protected forest. Protruding fragments of such vegetation can also be found along La Potrera, and more so along the stream La Leonarda and El Salado.

Ecological connectivity is poor. The core areas of fragmented forests and shrubs are very small, adversely impacting the habitats for faunal and floral species due to edge effects. Only the fragment located between the streams La Leonarda and La Hueso promotes a core habitat that can be perceived as a node. The other fragments correspond to links.

Low connectivity in the area and absence of circuits that generate alternative routes for the movements of species, together with a very simple green structure and a single isolated node, make it necessary to consider the connectivity and the elements that are part of an ecological network of a larger area on the township of San Cristobal.

Agriculture and land for cattle

Pasture covers a large portion of the land in La Loma (50%). Weedy pastures with a more extensive usage can be found all over La Loma but are most

significant in Barrio Nuevo, towards the basin of La Hueso. The weedy pastures might be paddocks lying fallow where herbaceous and shrub species have developed. These lands could primarily be found in expansion areas of La Loma, where livestock use is less widespread and the land might not have any productive use. Cultivation of clean crops accelerates the erosive processes, resulting in the loss of organic and nutritious topsoil in a soil that already is of low fertility. Clean crops, located in Barrio Nuevo, San José and Bellavista, are used for grazing milk or beef cattle.

Agricultural land occupies 13% of La Loma. These activities are most evident in the watersheds of La Hueso in the neighbourhoods La Gabriela, San Gabriel, Loma Hermosa and the lower part of Barrio Nuevo. Agricultural lands include mainly productive systems of café, vegetables and fruits. Permanent cultivation is usually associated with the cultivation of café in different ways. Coffee combined with banana trees is the most common. Traditional management is characterised by intercropping; these management practices are poor and the productivity low. Intercropping is prominent in the lower part of La Loma, among the sectors Barrio Nuevo, San Gabriel, San Pedro, La Gabriela y Loma Hermosa. Annual crops are dispersed in the sectors of more pronounced agricultural use: Barrio Nuevo, San José and Bellavista, where they are embedded in a matrix of clean pastures, mainly monoculture of onion and to a lesser extent other vegetables and flowers. Significant tree cover from previous forestry plantations can be found immediate to La Cantera San Javier.

Fractioning of land

Medium sized lots are found around smaller lots in the central part of La Loma, demonstrating fractioning of lots into smaller sizes. Fractioning has effects on agricultural exploitation and the urbanisation processes. Unequal distribution in land ownership can be described in numbers: 1% of the total number of lots accounts for almost 70 % of the total area of La Loma. The eleven largest lots are found in the west and southeast of the community.

Photo 37. Mining area "la Cantera".

Mining

In La Loma exploitation in the form of mining is widespread and significant, and highly visible in the landscape (see photo 37). Mining provides occupation to 4,1% of the local inhabitants and supplies the local market. The mined and quarried products are largely destined use in the construction industry. The exploitation of minerals can be seen on the north side of Loma Hermosa, gradually destroying this valuable space claimed by the community.

The biggest quarries are found around the watersheds around La Hueso, and smaller quarries in the stream La Iguana in neighbourhood La Primavera and La Gabriela. In neighbourhood Barrio Nuevo there exists a great scar in the landscape due to the slagheap La ESSA. This is a dumping ground for construction debris and municipal, industrial and mining wastes. The shear size of it has made it a landmark for residents in the community.

Both old and recent landslides can be seen in the watershed of the stream La Hueso. The improper exploitation related to mining causes instability on the slopes. In attempting to recover degraded mining areas through reforestation, the ecological connectivity in the terrestrial system could be increased.

Constructions

Urban land use and mixed urban rural land associated with construction occupies 5% of La Loma.

An evaluation of the ecological network in and around La Loma states that many recent projects, like the tunnel and new development Pajarito, have deteriorated the environments and led to spontaneous colonisation of rural land.

SWOT ANALYSIS NATURAL ENVIRONMENT

STRENGTHS

- Loma Hermosa, Baldías and Padre Amaya are strategic ecosystems
- La Hueso and La Iguana contributing to Medellin River
- Diversed climate and vegetation
- Small scale agriculture promotes rich biodiversity
- Native forest at the river banks of La Huseo and La Potera
- La Aquarela (San Francisca and La Palma) supply settlers with drinking water

WEAKNESSES

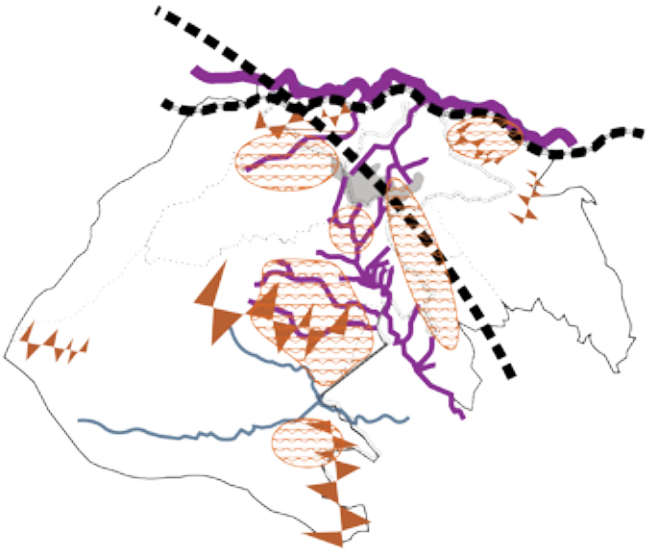
- High demand and pressure on strategic ecosystems
- Acidic soils with low natural fertility
- Eroded nutritious topsoil layers
- Landmass movements
- Natural and constructed steep slopes causing falling blocks and landslides
- Hard to cultivate on steep slopes
- Fragmented and scarce protective forest
- Insufficient complexity in green structure
- Poor ecologic connectivity with only one isolated small core area
- Low quality and quantity water bodies
- Dependent on expensive imported water
- Poor water quality
- Low water flows in upper parts of La Iguana watersheds
- Little vegatation cover in stream corridors for water filtration

OPPORTUNITIES

- Help the development of urban land where a high fractioning of agricultural landscape can be seen (infrastructure)
- Consider lower shrub areas for nature protection
- Consider and connect the green areas in La Loma to the large scale structure
- Reforest degraded mining areas to increase ecological connectivity
- Use vegetation in order to improve the water quality with the aim to make La Loma self-sufficient
- Combine the protection of fragile areas of the upper basins of La Hueso and La Leonarda with public space of scenic value
- Strengthen the complexity within ecological networks
- Introduce a diversified cultivation

THREATS

- Cultivation of clean crops accelerate the erosive process
- Mining activities
- Conflicts in Land use
- Inadequate land use such as deforestation and poor agricultural practices
- Commercial forestry increase the number of introduced species in place of native
- Fragmentation of land and housing development lead to a lack of favourable agriculture
- New development plans can come to generate spontaneously occupancy and fractioning of rural land
- High logging practices decrease the water holding capacity of soils leading to droughts and floods in the future
- Dumping of sewage water in middle and lower parts of microwatersheds extending from La Iguana



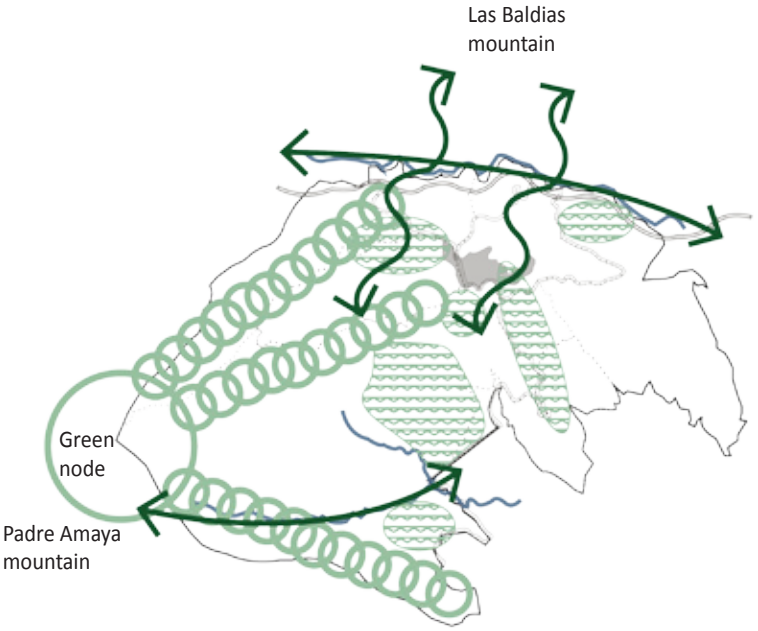


Illustration 27. Problems in natural environment
A SWOT analysis of nature in La Loma reveals big problems with polluted water ways in La Iguana and La Leonarda, shown in purple on the illustration above. Highway 62 and the urbanity of La Loma and San Ferrer, marked on the illustration as dashed black lines, make up a great barrier effect and divides the natural environment. The degraded land, shown as hatched areas on the illustration above, are due to mining activities, dumping and landmass movements. The risk for landslides, shows as pointy lines on the illustration, is large along the highway, close to the mining area and in parts that border San Javier.

Illustration 28. Opportunities in natural environment.
A SWOT analysis of nature in La Loma show the potential in connecting greenery on the less exploited shady sides of the mountains and to reinforce linkages to the important green node in the west. The degraded mining areas and deteriorated land can through reforestation contribute to the ecological connectivity, showed as hatched green areas on the illustration above. Waterways are natural linkages in the landscape that hold valuable but shattered forests. There is an opportunity to reinforce the rivers, showed as green straight arrows, as green corridors with a complex nature of different strata. The work with vegetation also holds the possibilities to improve the polluted water ways. The larger green area, Las Baldias and Padre Amaya, higher up in the mountains, could be connected with the nature in La Loma. In order to connect nature the link over the highway could be improved and the existing intricate nature in the urbanity of La Loma can be used to link larger important green areas.

MOST IMPORTANT TO CONSIDER:

From the SWOT, following stands out as particularly important to attend when doing design interventions in La Loma:

- Interconnect greenery, partially by making use of the river corridors and urban vegetation.
- Restore degraded land and contaminated waterways.
- Work with more complex vegetation.

6.7 BUILT ENVIRONMENT

La Loma, found on the hillside of Medellin, is characterised by windy, steep and narrow roads. The houses are often two stories and situated on the slopes. The on-going population densification and the fragmentation of farmland has induced an increase in agricultural production in suburban areas. These farmers are not only important for the provision of food but also for the web of kinship and characteristics of each sector (Alcaldía de Medellín 2011c)

There are several beautiful lookouts over the city where the schools or churches are located. Due to La Loma's long history of settlement, there is a vast mixture of historic painted building and newer rapidly constructed buildings. La Loma few architectural heritage sites that are of specific cultural value (Alcaldía de Medellín 2011c).

The most prominent building material is brick, sometimes painted but more often left with its ochre colour. The brick houses give a false impression of stability. A technical study showed that over 45% of the population live in unstable and unsafe houses. Building deficiencies often relate to unstable foundations, no sewerage system and unreliable housing constructions (Alcaldía de Medellín 2011c)

Photo 38.
In the larger scale La Loma gives a green and lush impression with many different vegetation

Photo 39.
There is a high level of attention to details in the public domain

Photo 40.
The walls in the center of La Loma are used for messages and signs

Photo 41.
Brick is the most common building material and is used both painted and as natural

6.7.1 Rural and urban areas

La Loma has the character of a rural-urban mixture and presents different dwelling types. The most urban area is situated in Loma Hermosa with public services and a bus stop. The area has an urban character with congested housing areas mixed with shops and public facilities. It gains its urban character from the level of structure and order, but essential urban attributes are lacking such as defined pedestrian and traffic routes, public squares and meeting places.

The centre of Loma Hermosa contains more informal settlements along the valleys or on steep hillsides. The houses are poorly constructed and are situated on unstable land with a high risk of landslide. Houses are often one to two storeys and connected to each other creating an organic morphology with no straight road network. The only limitation to sprawl of informal areas in La Loma is the physical constraints the landscape itself presents.

The denser urban areas are concentrated in Loma Hermosa and along La Loma Road. The rest of La Loma has a more rural character. In areas where the subdivision of land is high, suburban small-scale peasant lots are more common. The farming traditions continue in areas of more urban character but on smaller lots. Normally the farms occupy the slopes of ravines or lots between buildings. The families are normally not economically dependent on agricultural production, as families have other activities for their livelihood. The small farms are generally at the rear of the houses and maintained by the elderly or female relatives (Alcaldía de Medellín 2011c). The vicinity to the urban parts of La Loma is positive and many farmers sell their products on the streets or in the houses. The area of San José has a high amount of small-scale peri-urban farmers with a mixture of horticulture, coffee farms and smaller orchards.

Further outside the urban areas, in the valley of Barrio Nuevo, one can find more traditional larger coffee farms. The coffee farms are often adjoined to banana and food crop plantations. Such areas are visible in Gabriela, Loma Hermosa, San José and Primavera (Alcaldía de Medellín 2011c).

Photo 42. Rural and urban mixture.

6.7.2 Road network

The road network in La Loma is windy due to the topography and it does not allow for safe public movement. There are no pedestrian walkways, which makes it dangerous to walk around in public areas. Traffic incidents happen regularly, but most accidents happen in the sector Primavera, next to Highway 62, as a result of the absence of safe crossing for pedestrians (Vanegas Montoya 2014). There is only one option for the settlers in La Loma when they want to access the centre of the township, La Cabecera, through a bridge over the Highway 62. There are buses running frequently from La Cabecera to the centre of La Loma and in total there are four bus routes running though La Loma. The bus stops in La Loma are irregular and the main "bus terminal" in the centre of La Loma has no clear structure or

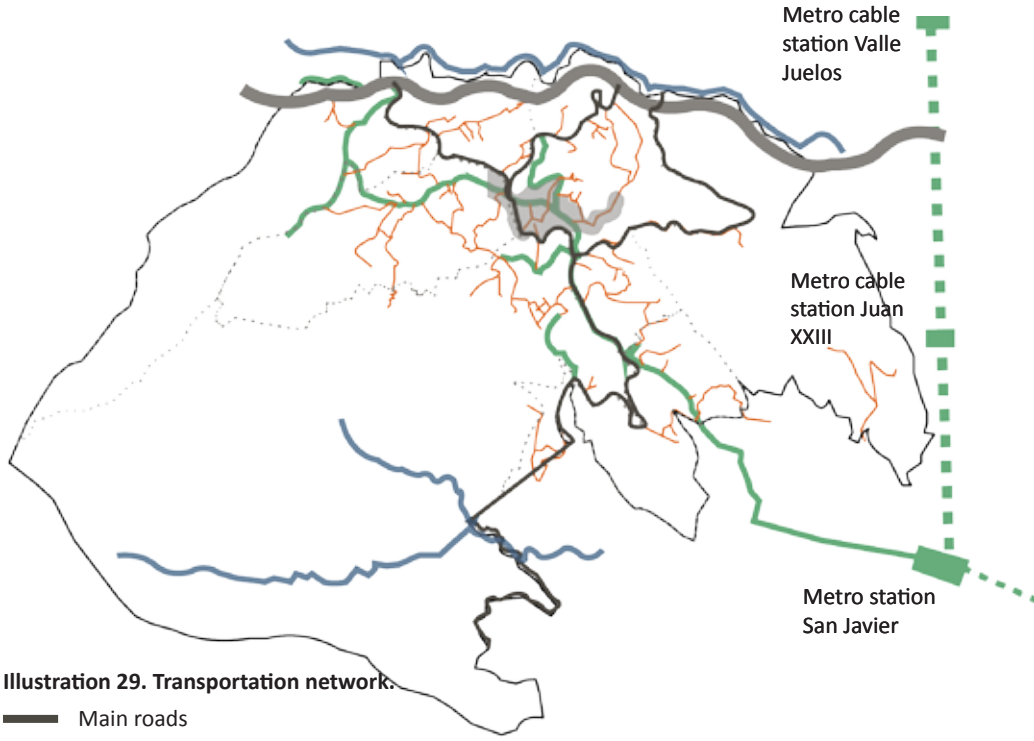


Illustration 29. Transportation network.

Photo 43. Busterminal in the centre of Loma Hermosa

Photo 44. The local hairdresser mixed witha private dwelling

Photo 45. Kids playing after school outside the local library

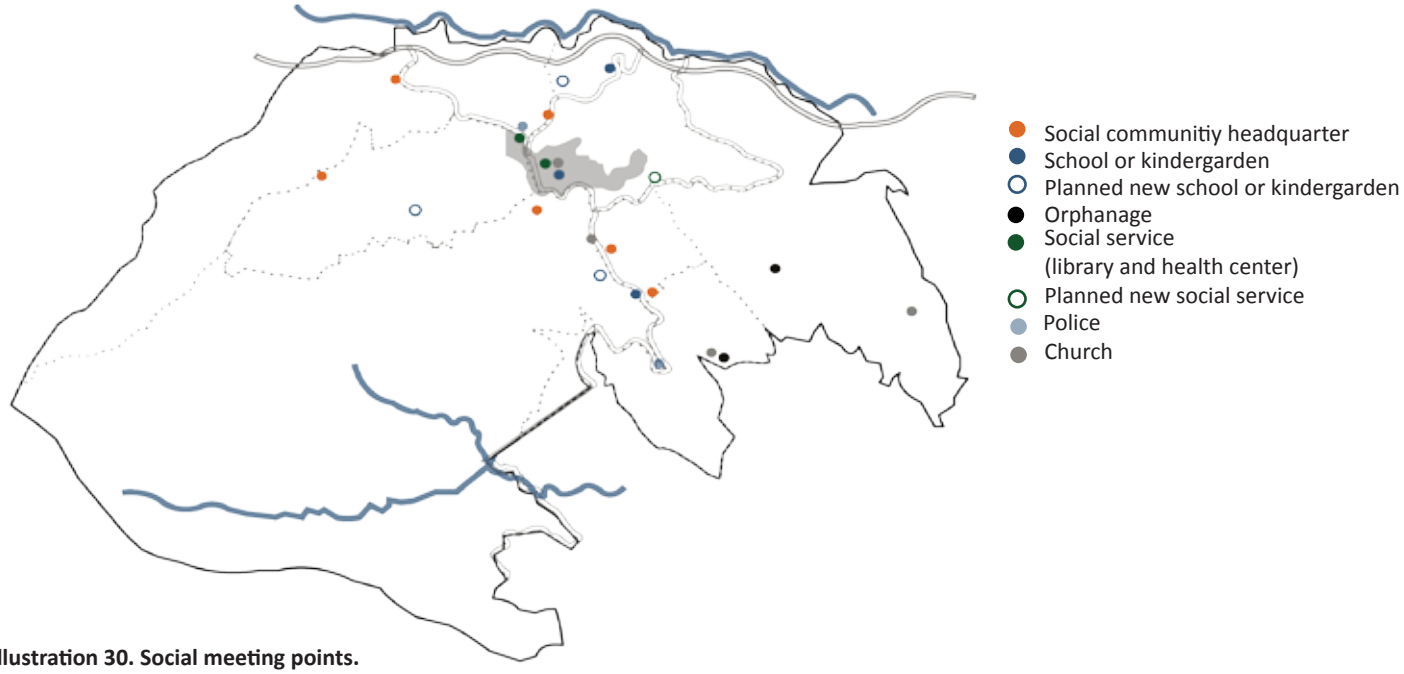


Illustration 30. Social meeting points.

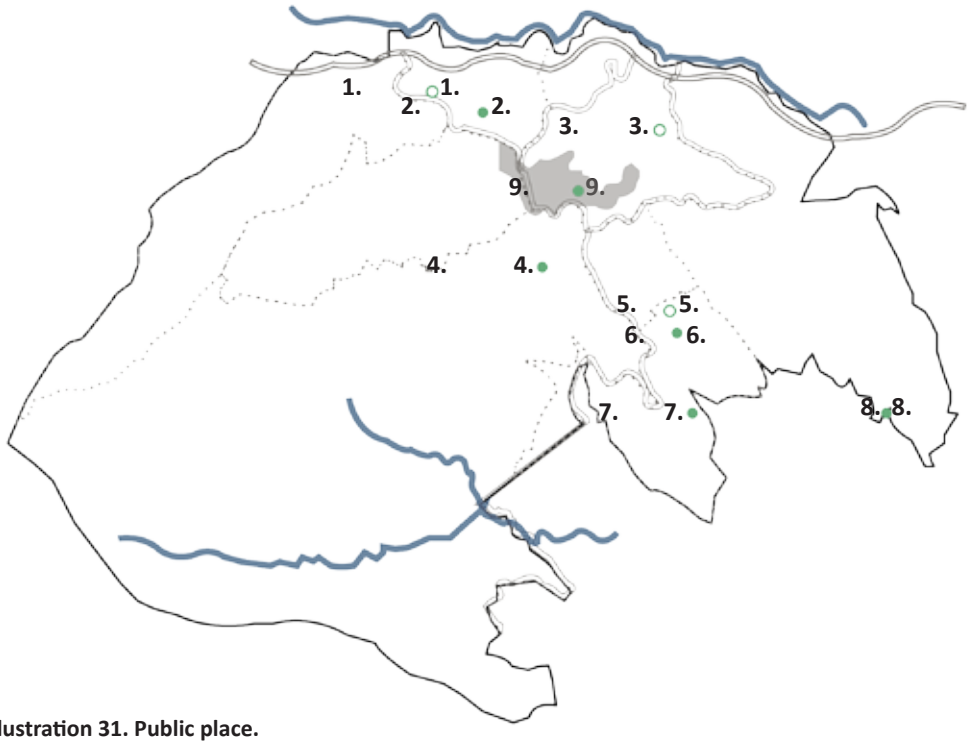
signposted waiting areas. Cars or public transportation by bus are the only ways to connect to the centre of Medellin. The busses run from La Loma to the metro station of San Javier.

The busses take you out of La Loma, but inside La Loma it is in generally hard to access the area inside La Loma. Small narrow paths winding between houses and peasant lots make up the most important way of everyday connection within La Loma. The lack of qualitative and safe public paths particularly affects older people or people with disabilities.

6.7.3 Public spaces

The spatial structure in La Loma does not include many public spaces. The few public spaces are often detached from each other and do not form a network that encourages integration and utilization. As a result, the public places are often inadequate and precarious spaces. This is evident in La Loma where "calle-canchas" are used for public recreation. These are improvised and dangerous spaces on roads that are used for soccer or other forms of social integration (Alcaldía de Medellín 2011b). The positive aspect of the so-called "calle-canchas" is that they arise where the need exists. They are often situated in areas where kids and teenagers naturally meet. Another aspect is that they are not programmed, meaning that there are no restrictions on what type of activities can take place, which allows a variety of activities.

There is no local market in La Loma so the settlers instead have to visit the centre of San Cristóbal. The lack of market might be due to the lack of public square and meeting places in La Loma (Vanegas Montoya 2014). The only larger square in La Loma is the square in front of St. Vincent Ferrer Church, which is also used as a playground for the school kids next door. Although this square is covered by mainly hard surface it is referred to as a public park – this shows the



1. Parque Deportiva Primavera (new sport park suggested by EDU)
2. Placa Polideportiva Chechinal
3. Parque Deportivo Loma Hermosa (renovation suggested by EDU)
4. Cancha Barrio Nuevo
5. Jardin Infantil San Pedro (new kids playground suggested by EDU)
6. Cancha San Pedro 2
7. Cancha San Pedro
8. Cancha El Morro
7. Kids playground

Illustration 31. Public place.

current status of green coverage in public spaces in La Loma. The lack of native species and the dominant presence of introduced species is another problem in public areas. Even though abandoned land and vacant lots can be added to La Loma's green public areas, the pressure and intensive incompatible uses make it hard to promote and sustain biodiversity (Alcaldía de Medellín 2011b).

Generally the urban public green areas are associated with open watercourses, but most of these heavily damaged by urban dwellings and in some cases there is no protective vegetation cover. The identified public areas are affected by the improper occupation, which generates loss or damage of nature and its existing flora (Alcaldía de Medellín 2011b). However, there are a number of sites with special natural and scenic attributes around La Loma with the potential to be future qualitative public places. The map shows current formal and informal public spaces and also the potential future sites for public recreation.

SWOT ANALYSIS BUILT ENVIRONMENT

STRENGTHS

- High aesthetic value with many scenic lookouts
- Architectural sites of importance for cultural heritage
- Mixed character in facades gives a strong aesthetic value
- Spatial quality in the diversity between rural and urban land
- Vacant lots promote posibilities for the settlers own appropriation of space
- Social dimensions and connections in the spatial layout give the impression of a more vivid neighbourhood
- Square San Vicente Ferrer as an important meeting point

WEAKNESSES

- Insufficient and dangerous houses
- Insufficient infrastructure for waste management
- Unreliable housing constructions
- Unclear functions in public space
- Few public spaces
- Road network does not encourage safe public life
- No pedestrian walkways
- No public spaces network
- No local markets
- Lack of public meeting places
- Lack of green recreational public places

OPPORTUNITIES

- Combine recovery of watercourses with recreational public spaces
- Use the potential sites (with scenic attributes) to create public spaces
- Develop safe public spaces based on the exsiting “Calle Canchas”
- Develop a local meeting point for exchange of ideas and products

THREATS

- Absences of safe crossings on larger roads, such as Highway 62
- Fast informal urbanism conditions organisations’ ability to improve spatial qualities

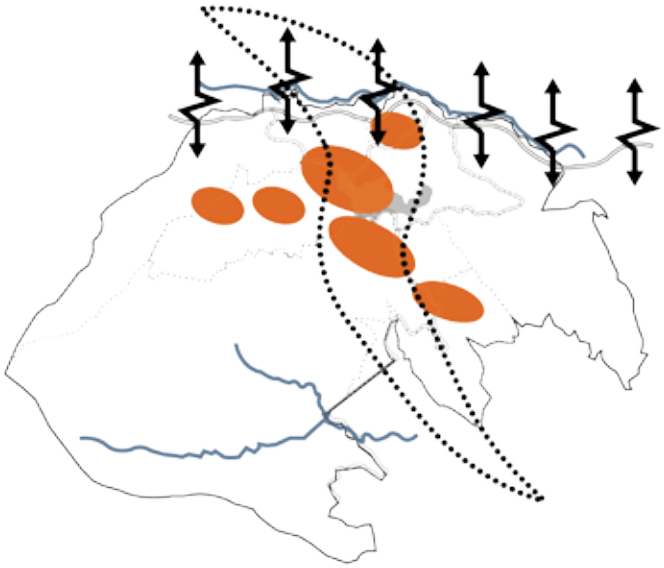


Illustration 32. Problems in built environment
A SWOT analysis of spatial character in La Loma reveals big problems with highway 62, showed with black arrows on the illustration. Many accidents occur when people try to cross the road. The pedestrian crossings are few and in poor condition. Overall the roads in La Loma lack pavements, which decrease the accessibility between existing public places, showed as orange areas on the illustration above, and exhibits public life. The densely populated areas in La Loma are in need of spatial improvements as the roads are disconnected and public place is lacking.

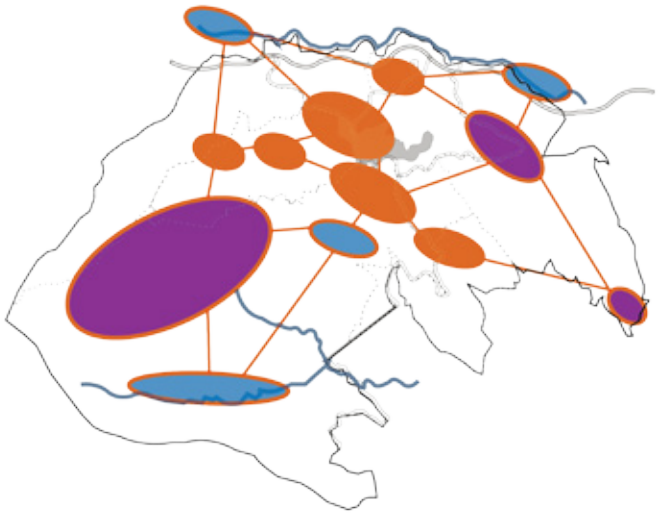


Illustration 33. Opportunities in built environment
A SWOT analysis of spatial character in La Loma shows the potential to include existing public places, showed as orange areas on the illustration, in a broader network. Lush rivers, showed as blue areas, and natural viewpoints in the landscape, purple areas, present a good basis for development of qualitative public place. The improved network could provide equal access to more public places in the community.

MOST IMPORTANT TO CONSIDER:

From the SWOT, following stands out as particularly important to attend when doing design interventions in La Loma:

- Improve the network of and accessibility to qualitative public places.
- Improve existent public places and focus on scenic values.

CHAPTER 07
A COMMUNITY OF SYNERGIES

CHAPTER 07
A COMMUNITY OF SYNERGIES

CONTENT. Chapter 9 begins with a presentation of three overall focuses for the interventions in La Loma and their relation to the nine strategies. Examples of specific design interventions on an intermediate scale are then presented.

7.1 A DESIRE FOR SYNERGIC INTERVENTIONS

In order to make significant improvements to the environment in La Loma and address as many challenges and opportunities as possible, the design interventions should focus on fulfilling multiple purposes. The interventions should also attend what is valuable to the city, as a green belt simultaneously is a strategy on a larger scale.

A contemporary green belt that incorporates the nine strategies (concluded in Chapter 5) addresses different interests and a wider group of users. Broadly speaking, the nine strategies aim to improve the natural and human habitat by establishing linkages and nodes. In La Loma a lack of connections is apparent. Human and nature are disconnected but at the same time the community presents multiple possibilities for improvements.

The challenge is to include the nine strategies in designs that specifically address what is most important in La Loma (see extracted points from the SWOT analyses in Chapter 6). With the intention to make a contemporary green belt where different dynamics interact, the focuses of the interventions in La Loma and the nine strategies should contribute to and compliment each other.

The nine strategies could be combined with what is most needed in La Loma, and in that way fulfil the overall intentions of the nine strategies. The SWOT-analyses and the nine strategies determine what interventions La Loma should focus on. These focuses are; walkability, linkage of urban parks, restoration of blue and green corridors, and nodes (for interaction and exchange of culture and knowledge). With these four focuses the interventions would link humans and nature separately, but also enable meeting points and interactions between human and nature.

The ambition is to attend to the needs on a local scale and simultaneously relate to the surroundings. The positive effects of small-scale interventions can be significant and contribute to a long-term transformation.

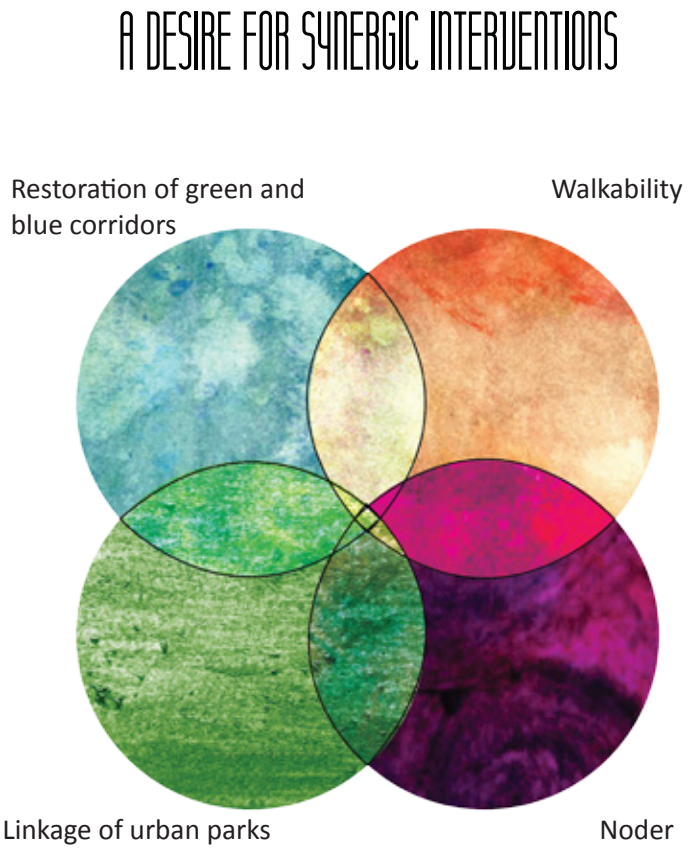


Illustration 34.

RESTORATION OF GREEN AND BLUE CORRIDORS

La Loma have larger green areas on the hillsides and along rivers but the ecological connectivity in La Loma is poor. The forests is in many places fragmented and waterways are polluted. The forests and vegetation along the streams is in some parts simple and hold little diversity.

Photo 46. Green an steep hillsides contribute to connectivity

Photo 47. Fragmented forests and bare lands threaten connectivity.

Photo 48. Canalisation of the rivers.

Main problems

The stream is heavily polluted and runs right through the most urban parts of La Loma. As photo 48 shows, most of La Peña is running canalised underground. There is little vegetation around the stream which limits the possible natural purification the water. Interventions in this zone would include a return to the natural water flow and vegetation of the stream bed. This would be difficult without the relocation of settlers.

Proposal

We therefore suggest a focus on two zones where the water can be purified. There should be one purification point at the middle of the stream and one situated just before the stream runs into the main stream La Iguana (which later on turns into Medellin River).

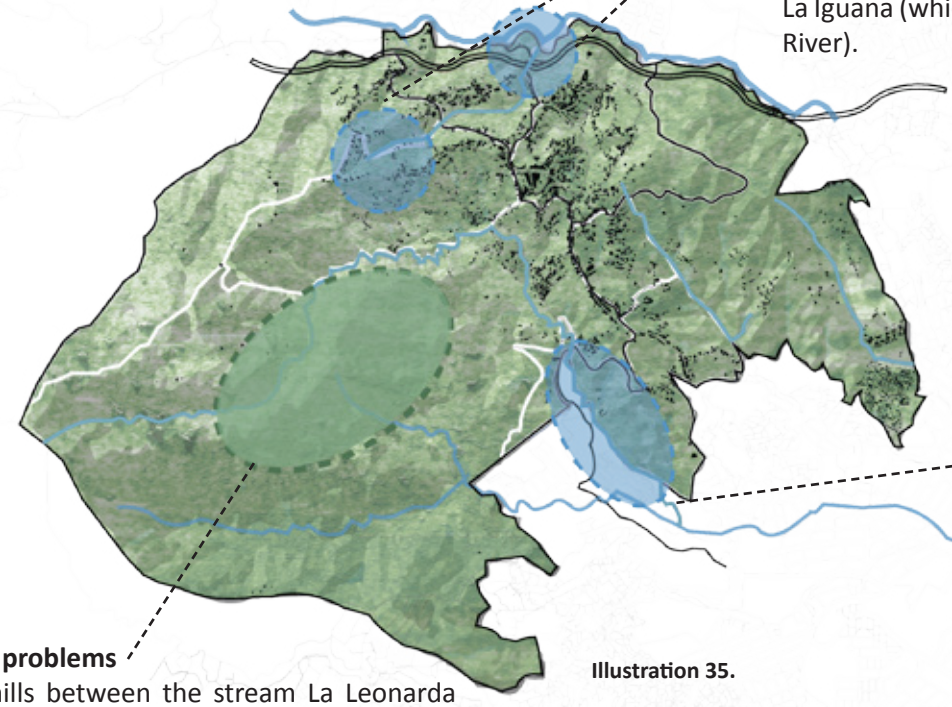


Illustration 35.

Main problems

The stream La Leonarda, which down streams turns into La Hueso is the most polluted stream running through La Loma.

Proposal

Water treatment interventions are needed along the stream. A possible area for a larger wetland would be a vacant lot between San Gabriel and San Pedro.

Main problems

The hills between the stream La Leonarda and La Hueso has lately been converted into a mining zone, photo 49. Especially around La Leonarda the forest is threatened as the coverage has decreased fast.

Proposal

The area is in need of reforestation and restoration. The most important would be to focus on a green corridor connecting to the protected forest in the northwest and the forest around the upper basin of La Hueso.

Photo 49. Mining area La Essa

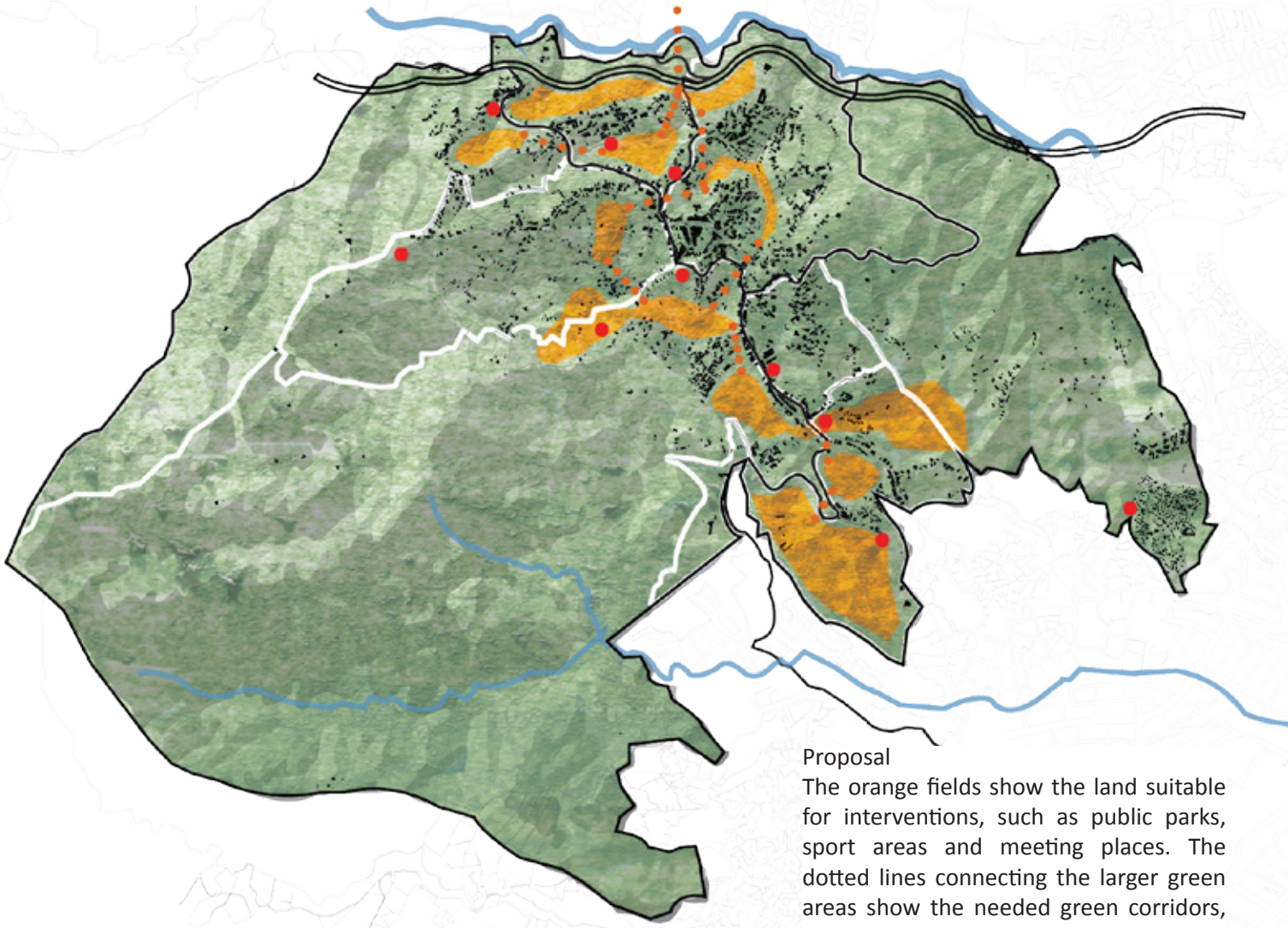
LINKAGE OF URBAN PARKS

La Loma is a community with a very young population, yet there are few public places that cater to them. The existing “calle-cancha”:s (football pitches), showed on photos 50 and 51, have a simple construction with few attractions. Only one small vacant lot provide with play equipment for smaller children. It is said that young people tend to appreciate their own value from the quality in the public domain. As the young people are the future of La Loma and the drive for the community’s development, the need for investments in the young pople is apparent. Also adults need recreational areas in the dense settlements, to move in and to meet at.

Photo 50 & 51. Football pitches, so called "calle canchas"

Photo 52. An over grown but still occasionally used playground

Photo 53. The public urban parks are of varying sizes.



Proposal
The orange fields show the land suitable for interventions, such as public parks, sport areas and meeting places. The dotted lines connecting the larger green areas show the needed green corridors, such as tree plantations along roads and paths through the settlements. The red dots show the existing sites used as public places. These should be incorporated into a new structure of urban parks.

Illustration 36.

The existing node San Vincente Ferrer has poor connection to surrounding centres as streets are steep and winding. Today the centre holds some few smaller shops but La Loma depends on the external centres.


Photo 54. A smaller vendos stall in La Loma.

Photo 55. Private forecourt used for selling juices to school children

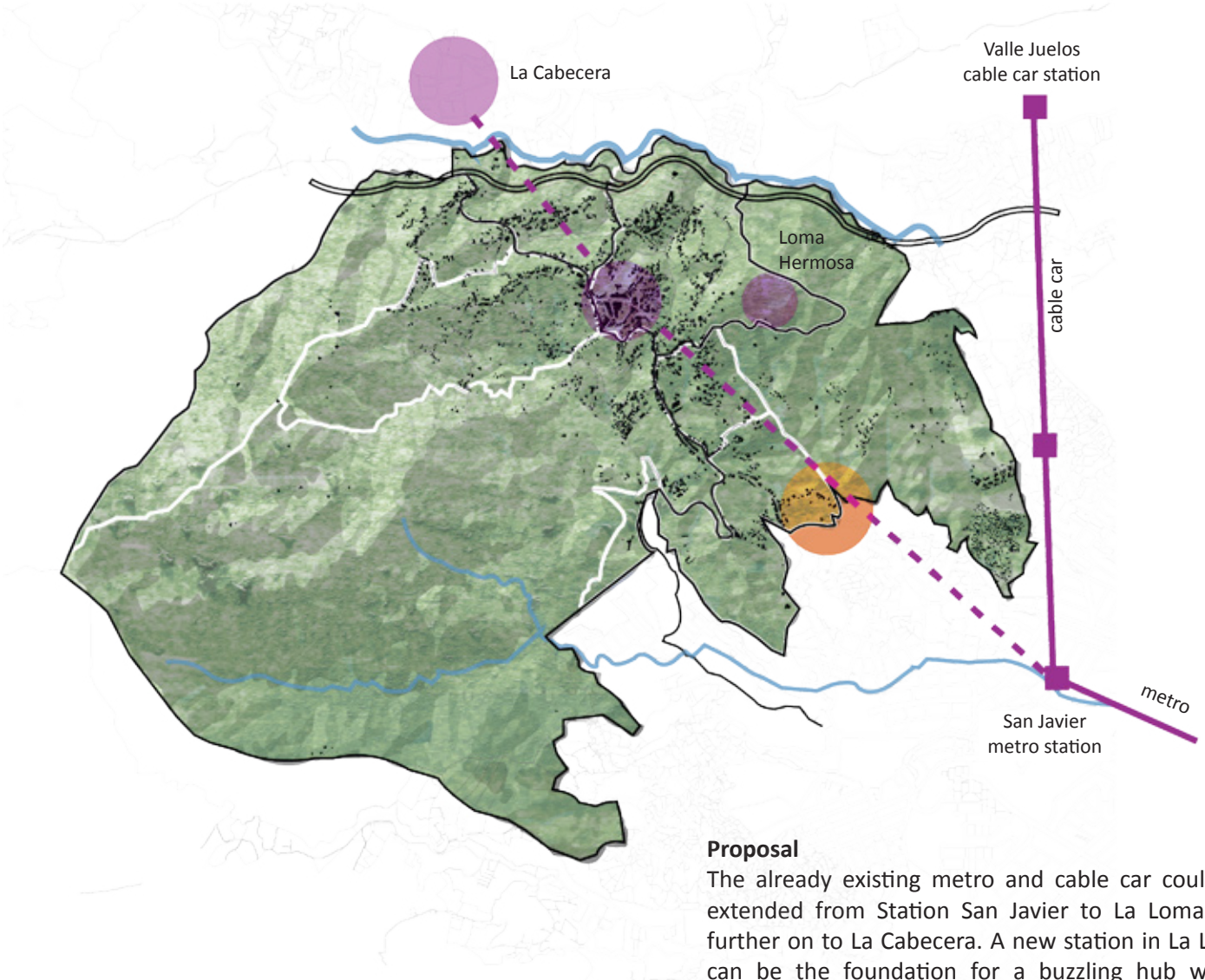


Illustration 37.

Proposal

The already existing metro and cable car could be extended from Station San Javier to La Loma and further on to La Cabecera. A new station in La Loma can be the foundation for a buzzling hub where different activities collaborate. There is also an opportunity to connect the new transport hub to the cultural important hill Loma Hermosa. Another suitable site for a cultural, market and knowledge node is the area between San Pedro and San Javier (orange mark) to encourage social interaction and to meet the urbanisation pressure from the north.

WALKABILITY

The road network is unsafe as it lacks safe crossings, pavements and lightning. Hidden rural paths and no clear street hierarchy complicate the orientation of the area. Winding staircases and long ramps make it difficult to move in the public domain.

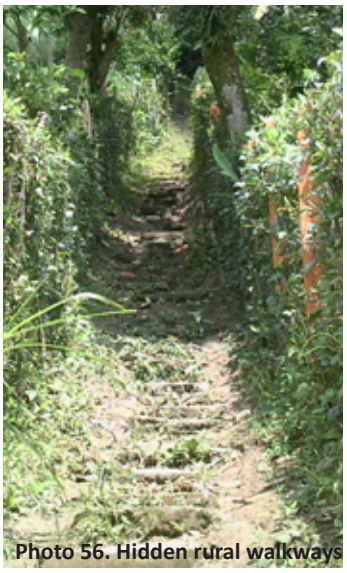


Photo 56. Hidden rural walkways

Photo 57. Steep roads with no sidewalks

Photo 58. Girl waiting for the bus on the unsafe road, due to lack of sidewalks

Main problems

The connections over the highway are few and often dangerous. Especially two crossings could be improved, marked with orange arrows on the map.

Proposal

The connections within La Loma, especially for pedestrians, and the connection down to the city centre of Medellin would be important connections to improve.

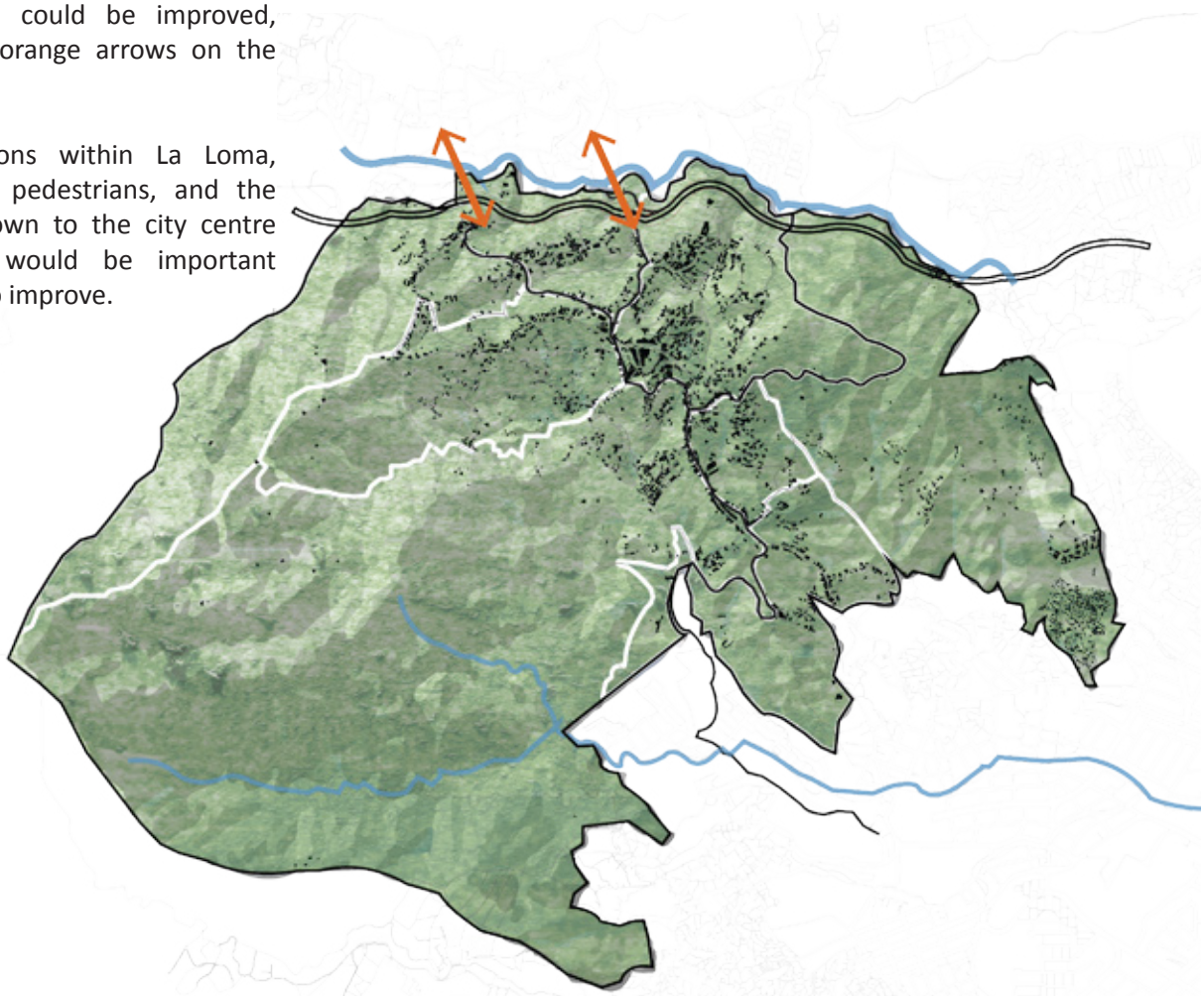


Illustration 38.

Photo 59. Half-finished zebra-crossing over the highway turns the pedestrian walk from La Loma to La Cabecera into a dangerous trip.

Photo 60. Only one pedestrian bridge crosses over the highway and connects La Loma to La Cabecera.

7.2 DESIGN PROPOSALS ON THE LOCAL SCALE

Illustration 39.

A YOUTH HAVEN

This intervention includes the development of a larger park adjacent to the centre of La Loma. Positioned near three schools, children and youth can easily access it. The intervention forms part of a broader network of urban parks, including smaller easily accessible parks along roads. Within the network it is important to implement safe connections to urban parks and attraction points, especially to those intended for use by children. Safe connections entail, for example, improved **walkability**. Walkability is one of the four focuses mentioned above. Greenery, applied in a **network of urban parks**, will improve the **green links** and ecological connections. This intervention is developed along a heavily polluted stream, where restoration objectives improve the **blue connections**. Situated close to schools, the restoration initiatives include educational aspects. The park is an attraction point for children, where knowledge can be exchanged. The library in the park is the main **node**.

BRIDGING

This intervention **links important ecosystems** and purifies the integral river La Iguana, improving its **blue corrido**r. The combined eco-bridge and wetlands provide **green space** and link people in the disconnected urban structure of La Loma, improving **walkability**.

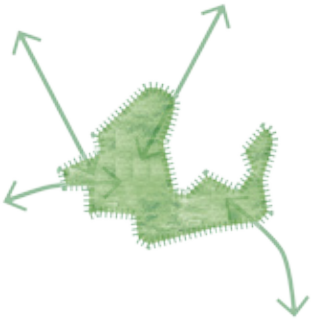
MARKET HUB

The selected intervention suggests a new **node** and meeting point in an area with great urbanisation pressure. The node holds market hubs and a plaza for commerce and exchange of knowledge and culture. The area constitutes the main entrance point to La Loma for the many people that pass from the adjacent San Javier, with which La Loma has strong relations. **Walkability** improves with safer and wider main roads. The market hub is connected to surrounding important nodes though improved transportation.

1. A YOUTH HAVEN

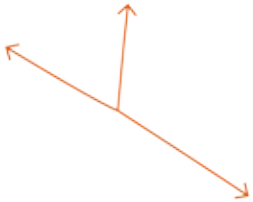
Illustration 40.

Around the existing Library a new qualitative public meeting place is proposed. A new node will add value to the larger urban park. It is important to develop existing nodes since La Loma has few obvious venues and there is a necessity to bridge social conflicts through public meetings.



The left-over large green slope can be used as a new public park. The public park should be part of a larger green network of urban parks and should improve and restore green corridors.

The polluted stream La Leonarda runs through the park area. The need for restoration initiatives can be combined with educational aspects, as the park lies close to shools.



It should be easy and out of risk for children to walk home from school and move between meeting points. By working with continues pathways, crossings, appropriate lightning, increased orientation ability and alternative routes, the access to public areas can increase and walkability can become safer.

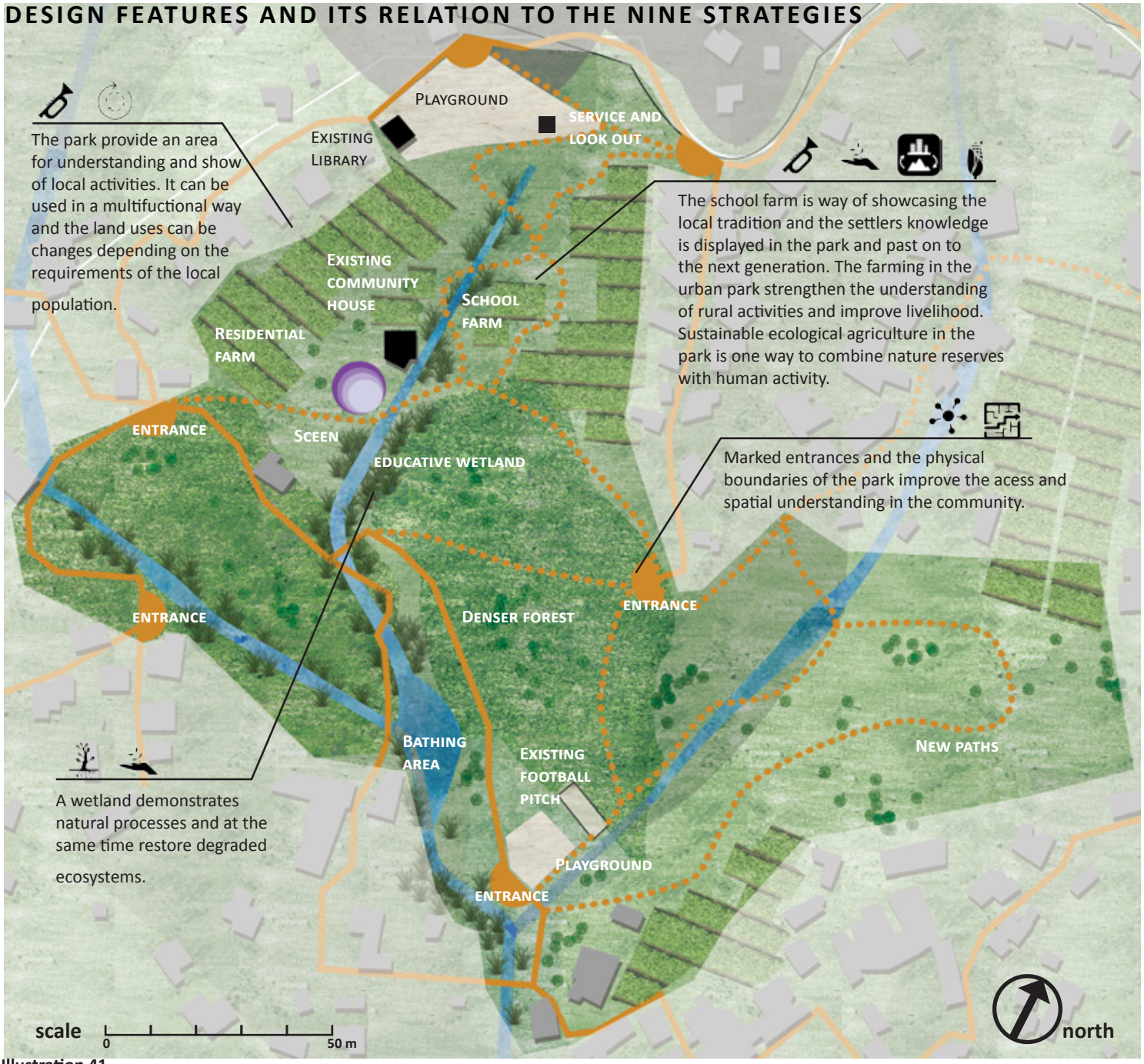


Illustration 41.

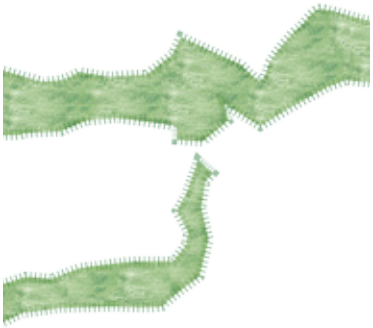
Description of project

The “youth haven” is a network of safe public space for young people in La Loma, both children and teenagers. Existing Community House and Library bring social groups together. The institutions and the new look out are situated on the higher part of the park and provide a sense of guardianship and a view over the landscape. Six marked entrances are located at existing road intersections. New paths have a similar apperance, to emphasize the physical boundaries of the park. The wetland plantation and reforestation are combined with educative activites. A new function; an area allocatesd for baths, is located in the lower part of the park. Here young people can find a new common interest. Around the existing football pitch a new playground is proposed. Situated close to residential houes the playgrounds are accessable to younger children. Larger nature areas enable play and experince of nature. School and residential agriculture is mixted in the public park, which combines private and public intrests.

- Enable rural and urban connections through qualitative green areas and public spaces
- Improve equal access to qualitative green areas and public spaces
- Provide spatial Improvements in disordered urban structures
- Comprise diversified nature reserves combined with human activity
- Implement green structures that can withstand changes in land use
- Design flexible public areas with multifunctional usages
- Include productive land use in the public domain
- Base the design oN local culture, traditions and knowledge
- Restore degraded ecosystems

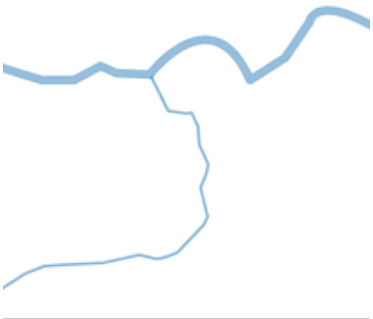
2. BRIDGING

Illustration 42.



The green corridors in La Loma are interrupted by the highway and does not connect to the larger green area north of La Loma. Through a green eco-bridge the linkage of urban parks and larger green areas can be improved.

The connections over the highway are few and often dangerous. The walkability within La Loma and the connection to the centre of Medellin, San Cristobal and San Javier are important to improve. Aswell improved connection to Pajarito would provide intercation between existing settlers of La Loma and newcomers.



The polluted stream La Peña contribute to the most polluted river of Medellin, La Iguana. The eco-bridge connects to purifacition plants and restore both blue and green corridors.

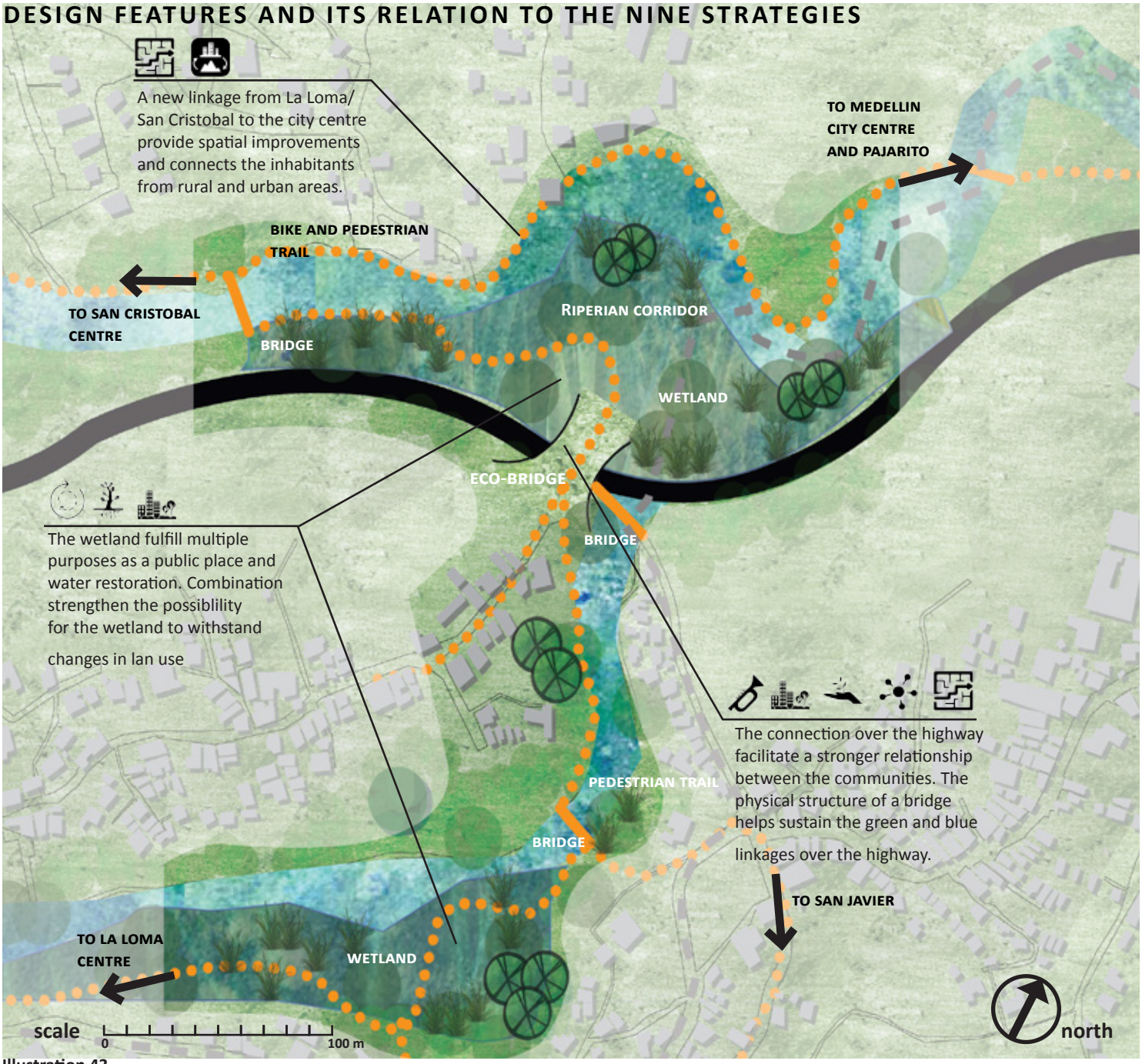


Illustration 43.

Description of project

By creating a second safe crossing on the east side the accessibility increases. The new crossing will be designed as a green bridge holding trees and shrubs and creating a green passage for flora and fauna. Underneath the bridge the stream La Peña runs through a tunnel that leads out to a wetland park.

Once on the north side of the bridge the pedestrian path goes through the wetland park that closer to La Iguana connects to the linear stream corridor path. From here the pedestrians can choose to walk to La Cabecera or all the way down to Medellin city. The bridge and connected stream corridor path provides a safe and calm track, separated from dangerous traffic, that can be used by pedestrians or bikers. supports the care for the environment that is being heavily polluted in La Loma. To increase awareness, the bigger parks include restoration initiatives of lands, like wetland plants and reforestation.

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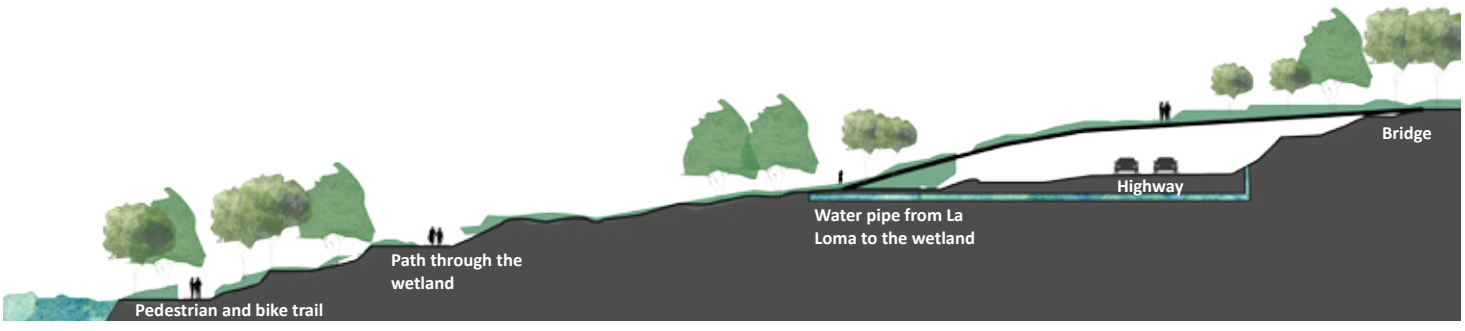
- Restore degraded ecosystems

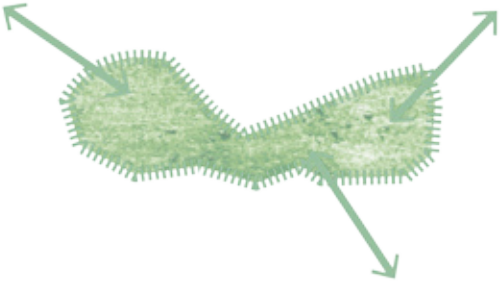
Illustration 44. The illustration show the suggested bridge over the highway. The bridge need to meet and follow the undulated landscape. Water from the mountain is collected in canals along the hillsides and eventually distributed into the wetland area.



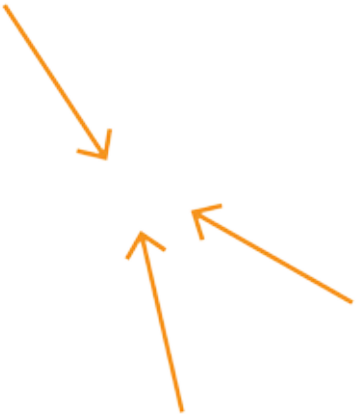
3. MARKET HUB

Illustration 45.

La Loma faces a great expansion pressure and is in need of well-functioning safe larger meeting places. In addition to an improved main centre, San Vicente Ferrer, a supplementary market hub is well-located close to the road intersection. There is a local tradition of farming and craftsmanship in La Loma and many community groups work with the exchange of knowledge and experiences. However, an allocated market site in the public realm of La Loma is missing. The closest market is in the neighboring community but with insufficient infrastructure it's hard to access. Additionally, the music and dance traditions are strong in La Loma and the expression of local culture should be enabled in the public realm and incorporated in the new node.



The node would also help to connect urban parks within La Loma. Green structures around the node help to mark its importance but also connects the visitors to the surrounding urban parks and nature areas.



The main road from San Javier and the centre of Medellin connects to La Loma in the southeast. The location of the node would mark the entrance to La Loma but also unify the surrounding neighbourhoods. The social tensions are high between La Loma and adjacent San Javier, but also the the newcomers in the western expansion area.

DESIGN FEATURES AND ITS RELATION TO THE NINE STRATEGIES

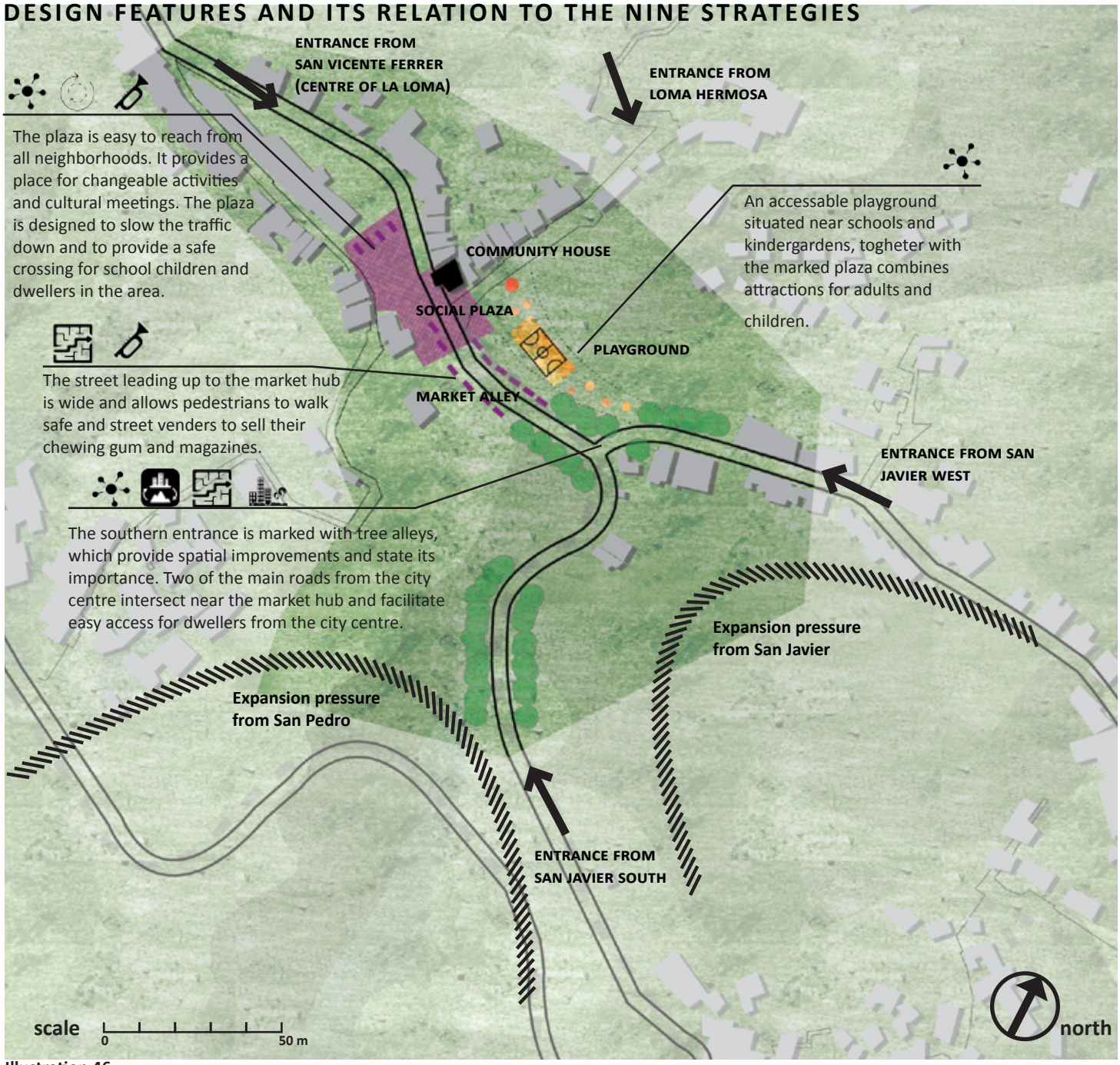


Illustration 46.

Description of project

The Market Hub is a connection point for the citizens of La Loma but also an attraction for settlers from other communities. The Market Hub is a dynamic place driven by the local groups and individuals. The core of the hub is designed as a square with seating and shelter. Here larger activities can take place, such as farmers markets on the weekends, handcraft seminars and music or dance events. The hub also includes streets leading up to the core zone where interventions would improve the possibility for day-to-day meetings and street vending. The streets provide allocated sites for street vendors and seating along the way. The design attend to the pedestrians with wider pedestrian paths.

- Enable rural and urban connections through qualitative green areas and public spaces
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- Restore degraded ecosystems

CHAPTER 08
DISCUSSION

CHAPTER 08

DISCUSSION

In this chapter the authors discuss the outcome of the thesis, the chosen methodology and the relevance. The chapter also addresses the teamwork and pros and cons of writing a masters thesis together. Finally the chapter presents what can be learnt from the thesis and future challenges related to the topic.

DISCUSSION AND REFLECTIONS

The study was structured in three parts and research questions. In the following section the findings are summarised in short and reflected upon. Thereafter some topics we found particularly interested are discussed.

1. How can a contemporary Green Belt strategy be developed to reduce environmental impact and improve living conditions in informal settlements in the rural-urban fringe?

The original Green Belt started with a focus on humans becoming more attentive to nature conservation. A Green Belt of today adjacent to informal settlements combines the interests of human and nature. To conclude how a contemporary Green Belt should be developed is difficult and a precise answer might not be desirable. The literature study concludes that it is preferable not to formulate guidelines, as it is said to hinder creativity, and to not promote universal solution to site-specific challenges. However, as a Green Belt is a coherent strategy for a larger area, an implementation requires some guidance and a “recipe” that can be repeated elsewhere. In the study we concluded 9 strategies that form our “recipe” for a contemporary Green Belt. The 9 strategies are broad and provide guidance but do not provide detailed solutions; rather they promote an understanding of the local context. We concluded that when implementing a green belt strategy near informal settlements it is important with a focus on livelihood strategies, safety and healthy living environments for the settlers in the informal settlements.

2. How can a Green Belt strategy be adapted to a regional context?

By studying the contemporary Green Belt in Medellin, we examined how a Green Belt can be adapted to the regional context. The Green Belt of Medellin is in many ways different from previously implemented Green Belts. CVM acknowledges the high urbanisation pressure in urban areas and is implemented with the intention to control urban growth. The specific focus of CVM is the living habitat in the rural-urban fringe and CVM includes strategies to address the local context. The fact that, despite the strong focus on the local context, CVM received critique related to its lack of local consideration shows how difficult it is for planning authorities to reach the local inhabitants through a large-scale regional strategy. The challenge lies in the organisation of implementation and communication on the local scale, especially when the growth dynamics are informal.

When studying CVM, we have discussed for who the Green Belt of Medellin is. A regional Green Belt was previously intended for central city dwellers. In Medellin the Green Belt has a stronger focus on the group of people in the rural-urban fringe that the Green Belt directly concern. Planners of CVM believe that improvements in the fringe will promote integration of the settlers, thus making the local residents feel included in the central city. Previously Green Belts only sought to integrate the central city dweller with their surroundings. Thus, CVM has a changed view on for who the city boundary is. Still, CVM seek to include the central city dwellers, but informal settlements can often be dangerous to visit for an outsider. Therefore, the regional Green Belt in Medellin includes places that particularly invite and cater for visitors. The sites have a "touristy" design and denote a distance between local residents and outsiders. Hence, the regional Green Belt of Medellin, adjacent to informal settlements, perhaps have a harder time making the fringe zone perceived as common area; the central dwellers are visitors and not strollers in their own city.

3. How can the regional Green Belt strategy of Medellin be implemented at a local site?

To identify the biggest challenges and problem areas in a city should be the first priority when finding suitable implementation areas within the Green Belt. The Green Belt can reach its full potential to protect nature areas and to improve living habitats

by careful studies of the local context, using for example the SWOT-analysis tool. The local context and challenges are part of the larger systems in the city. Planners that understand the relation between scales can contribute with cohesive sustainable solutions.

Our designs show how it is possible to implement a regional green belt that is context based; it closely relates and caters for the informal settlers in the fringe and simultaneously caters for the interests of the city. However, within our study we found it difficult to fully understand the local context. One of the main reasons could be cultural differences, but restricted possibilities to examine the area due to safety also played a part (it sometimes is too dangerous for outsiders to enter the informal settlements). To plan in such areas is likely to be a challenge also for local planners. The structure of regional planning may vastly differ from the administration, implementation and decision making processes in the informal settlements.

CVM involves local voices in decision-making processes. We believe that is the correct approach, but would like to add to the discussion the need of an increased trust in the local inhabitants' ability to take their own initiatives to urban development. Today planners promote a dialogue with locals but the land use disposition is still in the hands of planners. If planning strategies include areas where temporary designs can be initiated by the local inhabitants, the designs could be a direct answer to local needs but also suggest creative solutions to the planners.

Final lessons to contemplate

Lessons for the formal cities

The nine strategies aim to suggest sustainable solutions that take advantage of the dynamics of informal settlements. Sustainable solutions are always relevant and should be prioritised in developed countries to secure green infrastructure, functioning eco-systems and to include the social aspect into Green Belt planning. To be secured within a city, a green infrastructure needs to have social value by incorporating human usages. Informal settlements present living structures that can be seen as more sustainable than those of a formal city. The settlements' close relation to nature and smaller cyclic systems is a model for sustainable living.

The fundamental goal is to develop cities in a sustainable way. When applying the nine strategies in a formal city, the identified qualities of informal settlements could be learnt from and perhaps applied. For example, local production systems could be promoted in cities today. In Stockholm there are already some initiatives where vacant lots within the urban structure are used for local cultivation. It may not be a contradiction to plan for "unplanned" qualities. However, the sustainable solutions presented in informal settlements are a result of a lifestyle that involves absence of wealth and excess. For developed countries to have as little carbon footprint as informal settlements it would require a reassessment of our way of living. Therefore it is important to find other incentives for formal cities to sustain and promote sustainable systems. An implementation of a contemporary Green Belt in developed countries can provide structures that promote a change in lifestyle.

Who has the right to decide the use of land?

The nine strategies promote flexible public places with multifunctional usages. This idea arises from the fast changeable dynamics in the informal settlements but also from the many different cultures and traditions present. Multifunctional public places should cater for local inhabitants as well as for visitors. Even though we promote flexible and un-programmed places we understand that there is a need to secure certain interest of value for the whole city, which can be achieved by the programming of land. Such interests could be structures that promote a safe social lifestyle for all inhabitants and also structures that secure green areas important for the provision of eco-system services.

When identifying certain interests of importance, it is essential that the planner is observant on what selections that are made. The selection of certain interests may exclude interests of others. However, a natural selection happens in un-programmed places as well, where the interests of predominant social groups are presented. The interest of recessive groups, such as children, can be forgotten and it could be argued that it is the planners' responsibility to secure public places that cater for such groups.

Is the Green Belt still a suitable planning tool?

On numerous occasions during our study we have caught in discussion about whether the green belt is a suitable future planning tool or if it is obsolete and incapable handling the future planning of cities. Despite the uncertainty we still found it relevant to study the green belt as a planning tool as it is used in contemporary planning, in cities such as Medellin. Results from our study highlight the importance of connectivity within the green structure, which in turn promotes the commonly used planning strategies of green wedges/fingers. This is also included in CVM where the focus is on green connections that the stream corridors provide.

If planning of our future cities should promote sustainable and healthy cities, the functioning green structure within the built structure is important. This said, the idea of a green belt surrounding the city can feel obsolete and irrelevant. However, what is interesting with the green belt is how it is implemented in the rural-urban fringe, a zone that is different from the urban structure where green wedges/ fingers are implemented.

Cities today present a dense urban structure where restoration of green corridors can be difficult and take long time to accomplish. However, it is still important to implement a pro green structure within the urban tissue. The rural- urban fringe, on the other hand, presents vaster possibilities to secure green land as thanks to a less dense urban structure. If we believe that the control of urban growth is unachievable and not desired, areas that are rural-urban fringe today might tomorrow be part of the urban city core. By working with interventions that secure important ecosystems and green structures in the rural-urban fringe, planners can work one step ahead and, as such, set the framework which urban growth must relate to.

Personal reflections

This study has been a long journey for us and we can, after one year of study, say that we have comprehensive knowledge about the topic but we can also identify several challenges for the future Green Belt. The most significant challenge would be what form the Green Belt should take while also finding a balanced way to address the local needs.

Apart from a broad understanding for the topic of urban growth and the Green Belt strategy we end this study with a new county in our hearts. To get to know the Colombian people and the country has been not only a rewarding experience, but also the core of our study. To live and work in the local context was crucial to understand the setting and the lifestyle. During our stay in Medellin we met many new friends and also professional acquaintances. Conversations that we had while in Colombia were invaluable and led us to understand the importance to be attentive and curious to everything that is different and new. Whether working in Sweden or together with our colleagues in Colombia we hope to have the same open mind and to be curious and hungry for new understandings.

Future studies

If the contemporary Green Belt has a stronger focus on the green infrastructure and to secure eco-system services there is a need for a more comprehensive understanding about eco-systems among planners. Interest and discussion about eco-system services among planners is a fairly recent concept and, as such, an understanding about ecological processes is still lacking. How can planners know that the nature they chose to preserve is not susceptible

to external future threats, such as climate change or sea level rise? There is a need for more investigation of the systems that support eco-system services, especially among planners and architects working with the outdoor environment.

Another topic with scope for rewarding study is an investigation os suitable areas for green infrastructure in Medellin. The streams are said to be of ecologic and social importance and an intervention along the streams would be interesting to study from different scales. Overall there is a need for more creative studies on how the neighbourhoods in Medellin can be developed in order to achieve the goals set by CVM.

An important aspect related to the control of urban growth in Medellin is the need for densification in the city centre. An important case to study is the location suitable areas to densify and also possible places for public meeting and pocket parks within the city centre. There is a lot of work to be required regarding the urban park network in Medellin and the city would benefit if a sociotope map were developed.

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APPENDIX 1.

Interview La Loma
Gabriel Jaime Vanegas Montoya (2014-04-03)
Beatriz Álvarez (2014-04-23)
Spanish subject of interest– English subjects of interest

IDENTIDAD – Identity

Cuáles son las necesidades más importantes para la gente de La Loma?
Qué piensan otras personas fuera de la Loma, sobre la vereda?
Cuáles son los valores más positivos en La Loma?
Cuál es la identidad de la Loma?
Hay tensiónes sociales dentro de la verda La Loma?
Cúales son las necessidades más importante para la gente en La Loma?

SOCIO-ECONOMIA – Socio-economy

Que effecto tiene la alta proporción de mujeres en el uso de la tierra y el uso de los espacios públicos?
Hay personas que no puede encontrar un trabajo o una manera para sobrevivir? Cuantos son?

LA LOMA RURAL O URBANO – La Loma Rural and Urban

Cuando la Alcaldía dice que La Loma tiene dinámicas urbanas, a cúales piensa usted que se refieren?
Piensa que los habitantes de La Loma se identifican como campesinos o residentes urbanos?
Qué relación social y económico tiene La loma con La Cabecera?
Qué impacto tiene la población tradicional (antiguo) sobre por donde y como La Loma esta urbanizada?
Qué tensiones exsiste entre la población tradicional y nuevos colonos?
Qué poyectos de infraestructura son necessarios para mejorar la vivienda en La Loma?

ESPACIOS PÚBLICOS – Public Places

Hay algunos espacios publicos que contiene memorias colectivas, posesivos o negativos?
Hay algunos hitos (mojónes) en la vereda?
Cúales son los lugares más importante para la reunión de la gente en la vereda?
Donde va la gente si quiere hacer un manifestación?

Como usa la gente los espacios publicos? Quienes? Uso equitativo de los espacios publicos (edad/sexo/socio-economía)?
Como pueden usar los espacios publicos más?
Como influencia la historia del uso a los espacios publicos? (violencia)

SEGURIDAD – Security

Qué pasaron con las familias afectados por deslizamientos? Si son dueños de la tierra, cùales son los direchos?
Todavía hay mucha gente desplazados? Porqué estan desplazados (involucrado antes en la guerilla)? Por dondé estan reubicadas?

USO DE TIERRA – Land use

Cuáles son los tensiones más actuales con respecto al uso de la tierra?
Cual tierra esta ocupado por groupos para-militares?
Qué diferentes actores apropia en el uso de la tierra en La Loma?
Quien géstiona los espacios publicos y los calles?
Cuales son los factores subyacentes de los tensiones territiriales? (por ejemplo, actividad ilegal, cultural, uso del suelo, deslizamiento en “el Soccoro”)

AMBIENTE – Environment

Hay otros proyectos de ONG’s sobre la relación rural- urbana tratando del mejoramiento y protection de la estructura verde?
Usted puede valorar los servicios ambientales de una importancia desde 1 a 5 para las personas en la vereda:
Suministro de Alimentos
Sombra
Tratamiento del agua
La mitigación de la erosión del suelo y deslizamientos de tierra
Recreativa y de esparcimiento
La mejora la calidad del aire
La salud mental y física
Orientación
Educativo
Generación de los recursos naturales, utilizado para la economía de exportación

APPENDIX 2.

Interview EDU
Emilio Restrepo Montoya (2014-03-07 to 2014-06-19)
María Eugenia Gallego Urrego(2014-04-25)
Spanish question– English question

AREA DE TRANSICIÓN – Transition zone

Que esta incluido en los eco-parques y las eco-huertas?
What is included in eco-parks and eco-gardens?

Quien va a mantenerlos ?
Who is going to maintain those?

Como se va a implementar las ideas?
What are the thoughts of the implementation?

Cómo ha influido las condiciones locales del diseño de los elemento de CVM? (por ejemplo; algunos necesidades de la comunidad que podrían ser atendidos en los elementos de la CVM? Agricultura, cultivación, accessibilidad?) Hay algunos directrices incluido en CVM? O es una tarea para el escala de implementación?
How will the local conditions form the design of each element? Any guidelines in CVM?
Or only on implementation scale? (eg. any needs in the community that could be catered
for in the elements of CVM? Farming, security, accessibility)

GENERAL – General

Que tipo de estrategias se utiliza para el participación y el reconocimiento local?
What types of strategies are used for local recognition and involvement?

Que ha influido el emplazamiento de las rutas y caminos? Los directrices de CVM estan decidieron en detalle o es una tarea para la empresa que va a realizarlo? Porqué conexiónes horizontales? Hay más descripciónes de las rutas y caminos?
Why are the caminos places where they are? Any motives? Is CVM deciding the specific location or it is left for each implementer (EDU) to decide? Why horizontal? Are there any more detailed description?

Cual empresas o organizaciones implementa y realiza los directrices de CVM?
What other organizations/companies implement and realize CVM strategies?

Por ejemplo URBAM o UPB- Siguen las directrices de CVM?
Ex. URBAM- do they follow the guidelines of CVM?

Cómo funciona el urbanismo social, se relacionan con la CVM? O forma parte de la CVM?
How does social urbanism relate to CVM? Or is included in CVM?

Trabajar activamente con el urbanismo social?
Working actively with social urbanism?

Qué tipo de comunidades de base han sido incluidas en la estrategía de urbanismo social? Hay algunos proyectos relacionados sobre la naturaleza protegida / agricultura / horticultura ...?
Which type of grassroots communities have been included in the social urbanism strategy? Any project relating to protected nature/agriculture/ horticulture…?

Quien ha hecho los planes maestros? Cerro Pan de Azúcar?
Who has done the master plans? Cerro pan de Azucar?

Van a hacer un plan maestro para San Cristóbal?
Are there going to be a master plan or project in San Cristóbal?

Los ejes ambientales, que se muestran en los planes maestros, se incluyen parques lineales a lo largo de las quebradas (todas quebradas)? Se incluyen también la estructura verde en el medio, la conexión de los corredores de las corrientes?
The environmental corridors, shown in the master plans, do they include linear parks along streams (all streams?) but also the green structure in between, connecting the stream corridors?

Los paseos urbanos, qué inclyuen? Que ha influido el emplazamiento? Se conectan a tras estructuras verdes o parques de la ciudad?
The so called urban paths, what do they include? What have determined its location? Are they connecting to other green structures or parks in the city?

¿Qué factores determinan los sitios que necesitan restauración ecológica? ¿Cómo se relacionan los proyectos a los asentamientos en los alrededores? Hay inclusión de la participación local?
What factors determine the sites in need of Ecological Restoration? How should

these sites relate to the settlements in the nearby area? Any inclusion of local participation?

Porqué hay partes no defindos en los planes maestro?
Why are some parts not defined on the master plans?

Bienes y servicios, que significa?
What does “bienes” and “servicios” mean in this context?