INNER MONGOLIA KEYIHE IFM (CONVERSION OF LOGGED TO PROTECTED FOREST) PROJECT

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1. PROJECT DETAILS

1.1 Summary Description of the Project

The **Inner Mongolia Keyihe IFM (conversion of logged to protected forest) Project** (hereafter “the project activity”) is implemented in Oroqen Autonomous Banner, Hulun Buir City, Inner Mongollia Autonomous Region of China by Inner Mongolia Keyihe Forest Industry LLC., the geo-coordinate of the project proponent is 122°13′00″E~123°00′30″E and 50°09′00″N~50°46′52″N, the total area is 214,078 ha, which includes the Improved Forest Management (IFM) of the forests in the conversion of logged to protected forest.

The area of the project activity is 20,526 ha, including 1,969 subcompartments spreading over Kuya department, Molengge department, Suotuhan department, Tele department, Tuohe department of Inner Mongolia Keyihe Forest Industry LLC.. All these departments are state-owned forests and have the legal right to forest ownership. The species involved in the project are Birch(Betula platyphylla) and Larch(Larix gmelinii).

Before the implementation of the project activity, the trees are logged based on a valid and verifiable government-approved timber management plan for harvesting the project area. The implementation of the project activity converses the trees to protected forest to reduce the GHG emissions for about 3,856,915 tCO_2e in 30 years, the average annual emission reduction is 128,563 tCO2e and Verified Carbon Units with buffer deduction is about 3,008,381 tCO_2e in 30 years, the average annual VCUs with buffer deduction is 100,279 tCO_2e.

The project activity will contribute to the environment (biodiversity conservation and soil erosion control), thus contribute to sustainable development.

1.2 Sectoral Scope and Project Type

Sectoral scope 14 (AFOLU)

Improved Forest Management: Logged to Protected Forest (LtPF)

1.3 Project Proponent

Organization name	Inner Mongolia Keyihe Forest Industry LLC.
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1.4 Other Entities Involved in the Project

N/A

1.5 Project Start Date

The project start date is 01/01/2013, which is announced by the Keyihe Forestry Bureau. The document shows that commercial timber harvest was strictly forbidden since 01/01/2013 in Inner Mongolia Keyihe Forest Industry LLC.

1.6 Project Crediting Period

The project crediting period is from 01/01/2013 to 31/12/2042 with the total length of 30 years.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Years	Estimated GHG emission reductions or removals (tCO_2e)	Estimated GHG emission reductions or removals with buffer deduction (tCO_2e)
01/01/2013-31/12/2013	86,940	67,813
01/01/2014-31/12/2014	84,407	65,837
01/01/2015-31/12/2015	80,766	62,997
01/01/2016-31/12/2016	95,913	74,812
01/01/2017-31/12/2017	82,522	64,367
01/01/2018-31/12/2018	138,519	108,044
01/01/2019-31/12/2019	166,969	130,235
01/01/2020-31/12/2020	164,659	128,434
01/01/2021-31/12/2021	234,777	183,126
01/01/2022-31/12/2022	136,822	106,721

01/01/2023-31/12/2023	168,498	131,428
01/01/2024-31/12/2024	175,919	137,216
01/01/2025-31/12/2025	143,561	111,977
01/01/2026-31/12/2026	150,308	117,240
01/01/2027-31/12/2027	156,996	122,456
01/01/2028-31/12/2028	166,404	129,795
01/01/2029-31/12/2029	142,641	111,259
01/01/2030-31/12/2030	147,000	114,660
01/01/2031-31/12/2031	147,059	114,706
01/01/2032-31/12/2032	133,819	104,378
01/01/2033-31/12/2033	129,070	100,674
01/01/2034-31/12/2034	111,360	86,860
01/01/2035-31/12/2035	121,693	94,920
01/01/2036-31/12/2036	122,742	95,738
01/01/2037-31/12/2037	109,384	85,319
01/01/2038-31/12/2038	99,898	77,920
01/01/2039-31/12/2039	98,259	76,642
01/01/2040-31/12/2040	96,818	75,518
01/01/2041-31/12/2041	86,185	67,224
01/01/2042-31/12/2042	77,007	60,065
Total estimated ERs	3,856,915	3,008,381
Total number of crediting years	30	
Average annual ERs	128,563	100,279

1.8 Description of the Project Activity

The Improved Forest Management (IFM) project activity is located in Oroqen Autonomous Banner,Hulun Buir City, Inner Mongollia Autonomous Region of China. The annual average temperature is −4.7℃ and the annual average precipitation is 455.5 mm.

The project activity includes the Improved Forest Management (IFM) of the forests in 1,969 subcompartments spreading over Kuya department, Molengge department, Suotuhan department, Tele department, Tuohe department of Inner Mongolia Keyihe Forest Industry LLC. by the conversion of logged to protected forest. All the subcompartments had the legal right to harvest issued by local forest bureau before the implementation of the project activity. Before 2013, they were all forests which the trees could be logged and sold once reached the cutting rotation age based on a timber harvest plan. After 2013, they are all converted to protected forests.

Table 1: Land parcels of the project

Parcel number	Department	Serial number	Area（ha）
1	Kuya department	KY	1999

2	Molengge department	MLG	768
3	Suotuhan department	STH	6150
4	Tele department	TL	2506
5	Tuohe department	TH	9103
Total			**20526**

The Inner Mongolia Keyihe Forest Industry LLC. and Beijing Shengdahuitong Carbon Management Co., Ltd together have overall control responsibility for the project. The latter is also in charge of applying VCS project.

The purpose of strata is to improve accuracy and reduce the sampling cost. The strata is usually based on the tree species, age and canopy density, but it does not mean all these factors should be considered for all projects, more strata means more workload and cost. For this project, the factor of species for strata could reduce the variation within the same stratum and reach the accuracy level of 90% under certain degree of freedom. So the strata are reasonable and feasible. All the subcompartments are divided into 2 strata based on the tree species .

Serial number of strata	Area (ha)	Tree species	Source
1	10,454	Birch	Forest second class investigation issued by Inner Mongolia autonomous region forestry survey and design institute
2	10,072	Larch	
Total	**20,526**		

The implementation of the project activity includes the conversion from logged to protected forests in the parcels mentioned above. After the activity, trees could be avoided to be logged and then the carbon stocks could be increased. Therefore, net GHG emission reductions/removals resulting from the implementation of IFM projects aimed at the protection of forests that would be logged in the absence of carbon finance could be earned by the project activity.

1.9 Project Location

The project is located in Oroqen Autonomous Banner, Hulun Buir City, Inner Mongollia Autonomous Region of P.R.China. The geo-coordinate range of the project proponent is 122°13′00″E~123°00′30″E and 50°09′00″N~50°46′52″N. There are 1,969 subcompartments spreading over Kuya department, Molengge department, Suotuhan department, Tele department, Tuohe department of Inner Mongolia Keyihe Forest Industry LLC.

The schematic diagram of the location of the project is shown in figure 1 below:

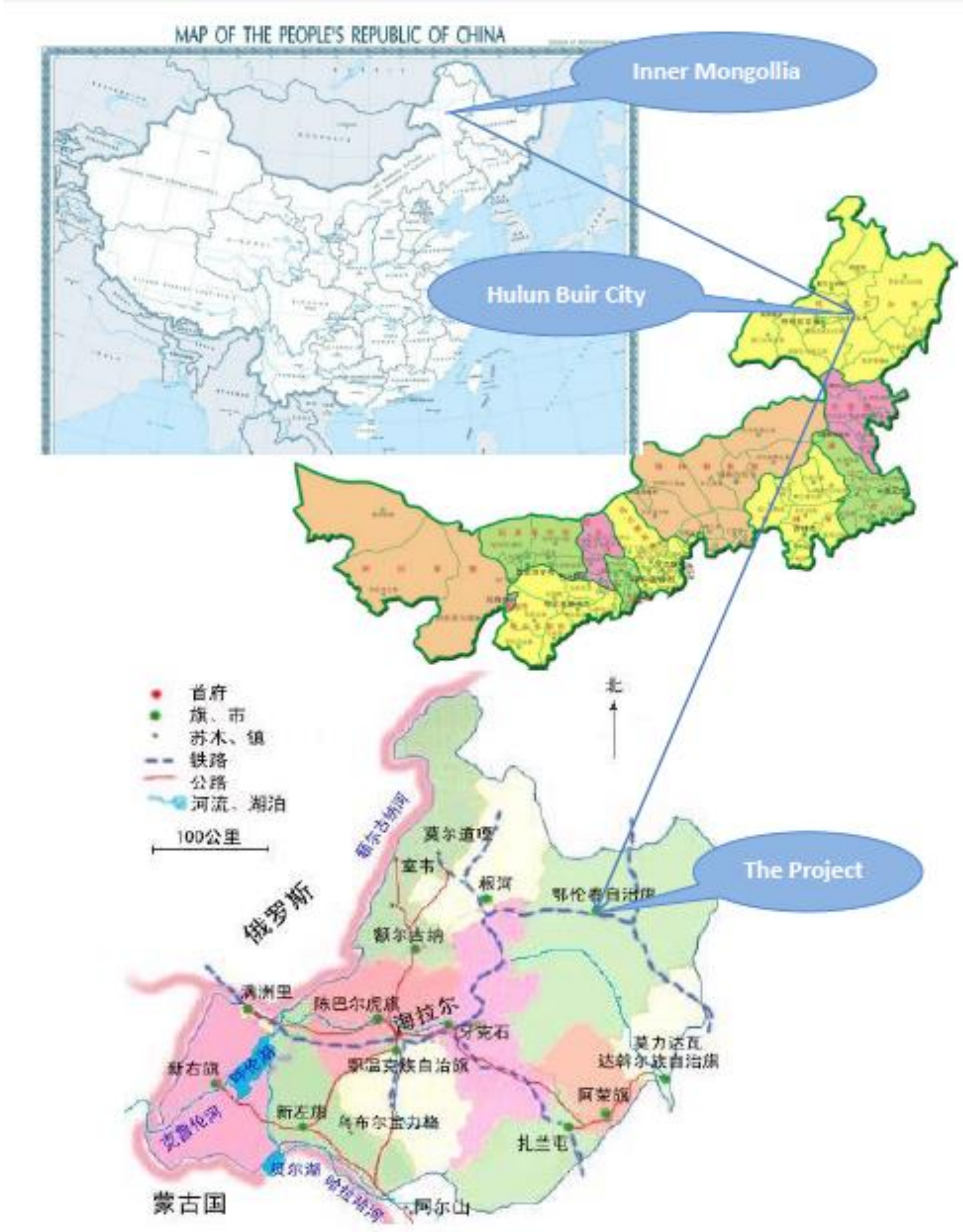


Figure 1: The project location

1.10 Conditions Prior to Project Initiation

Prior to the implementation of the project, the forest within the project area was logged annually according to the timber harvest plan.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project activity is in line with the Forest Law of People's Republic of China and Inner Mongolia Autonomous Region ecological public welfare forest management approach.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Inner Mongolia Keyihe Forest Industry LLC.(hereafter "the project proponent"), established in July 1998. The project proponent has the ownership and legal right of the forests and carbon sink credit of this project.

1.12.2 Emissions Trading Programs and Other Binding Limits

N/A

1.12.3 Other Forms of Environmental Credit

The project has neither intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program, nor any such credit has been or will be cancelled from the relevant program.

1.12.4 Participation under Other GHG Programs

The project has not been registered, or is seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

N/A

Leakage Management

N/A

Commercially Sensitive Information

There are no commercially sensitive information been excluded from the public version of the project description.

Sustainable Development

As one of the most precious ecological resources, forest is the *key to biodiversity and all life forms. The protection of local forest will enrich the biodiversity and provide more opportunity for adaptive response to natural challenges and economic development (e.g. climate change)*. The project activity will result in significant carbon sequestration and contribute to the environment (e.g. biodiversity conservation and soil erosion control), thus contribute to sustainable development.

Further Information

There is no additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2. APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

VM0010 version 1.3: Methodology for Improved Forest Management: Conversion of Logged to Protected Forest

This methodology uses the latest versions of the following methodologies, modules and tools:

- *CDM Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities*
- *CDM Tool for testing significance of GHG emissions in A/R CDM project activities*
- *VCS methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age*
- *VCS methodology VM0005 Methodology for Conversion of Low-Productive Forests to High-Productive Forests*
- *VCS methodology VM0007 REDD+ Methodology Framework (REDD-MF)*
- *VCS methodology VM0011 Methodology for Improved Forest Management: Calculating GHG Benefits from Logged to Protected Forest*
- *VCS tool VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities*

2.2 Applicability of Methodology

According to VM0010 version 1.3, Projects must fall within the AFOLU project category "IFM Logged to Protected Forest" as defined in the most recent version of the VCS AFOLU Guidance document. Therefore, specific conditions which can be applicable to the methodology are shown below:

- *Forest management in the baseline scenario must be planned timber harvest;*

  There is a planned timber harvest before the conversion of Logged to Protected Forest as the baseline scenario.

- *Under the project scenario, forest use is limited to activities that do not result in commercial timber harvest or forest degradation;*

  Under the project scenario, there is no forest use for commercial timber harvest or forest degradation.Only forest tending and managing are allowed in the timber harvest plan, which has been strictly carried out by the project proponent.

- *Planned timber harvest must be estimated using forest inventory methods that determine allowable offtake as volume of timber (m^3 ha^{-1});*

  There are regular forest inventory taken by Inner Mongolia autonomous region forestry survey and design institute who is qualified, experienced for the forestry investigation. Then local forestry bureau uses these data, based mainly on the stock volume to estimate the planned timber harvest and then to determine allowable offtake as volume of timber (m^3 ha^{-1}),

- *The boundaries of the forest land must be clearly defined and documented;*

  The boundaries of the forest land could be clearly defined and documented through the maps and the forest inventory data.The location of the forest is measured by GPS and draw map, then edit in GIS. Both the forest map and forest second class investigation will be monitored periodically by the government according to the local laws and regulations.

- *Baseline scenario cannot include conversion to managed plantations;*

  According to the previously issued timber harvest plan, the project baseline scenario is planned timber harvest *within the project area*, which doesn't include conversion to managed plantations.

- *Baseline scenario, project scenario and project case cannot include wetland or peatland*

  The project baseline scenario, project scenario and project case don't include wetland or peatland.

- *All applicability conditions of VCS and CDM tools used in conjunction with this methodology must be met.*

  The project meets all applicability conditions of VCS and CDM tools used in conjunction with this methodology.

  The applicability conditions of Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities are:

a) AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced;

Yes, all projects are in conformity with law.

b) The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.

Yes, the baseline methodology uses a stepwise approach justifying the determination of the most plausible baseline scenario. And project proponent proposing new baseline methodologies ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.

2.3 Project Boundary

According to VM0010 version 1.3, the spatial boundaries of the project activity so as to facilitate accurate measuring, monitoring, accounting, and verifying of the project's emissions reductions and removals is defined below:

2.3.1 Geographical Boundaries

When describing physical project boundaries, the information is shown in Figure 1 above. The details of the subcompartments (e.g. area, age, species, stock volume and location) are shown in forest second class investigation as appendix submitted to DOE.

The geographic boundaries of the project activity are fixed and thus do not change over the project lifetime.

Following the VCS definition of market leakage the geographic boundaries for leakage from market effects are those of the country in which the project area occurs.

2.3.2 Temporal Boundaries

The following temporal boundaries shall be defined:

The temporal boundaries are defined by the project start date and length of the project crediting period

According to VCS standard version 3.7, the start date of the project activity is 01/01/2013. The length of the project crediting period is 30 years.

The minimum duration of a monitoring period is one year and the maximum duration is 10 years.

The project proponent decides the periodicity of verifications every 5 years.

2.3.3 Carbon Pools

The carbon pools included or excluded from the project boundary are shown in the table below:

Carbon pools	Included/Optional/ Excluded	Justification / Explanation of choice
Aboveground trees	Included	The stock change in the aboveground tree biomass is estimated
Aboveground non-tree	Excluded	Exclusion is always conservative when forests remains as forest
Belowground	Excluded	Unlikely to change significantly in forests remaining as forests and is difficult to measure - omission is conservative
Dead wood (logging slash)	Included in the baseline	The dead wood (logging slash) carbon pool is expected to be larger in the baseline than in the project scenario, and therefore this pool must be included
Dead wood (naturally accumulated)	Excluded	Following IPCC guidelines, it is assumed that carbon stocks in the naturally occurring dead wood pool (both standing and lying) are equivalent in both the project and baseline scenario, and therefore this pool is conservatively excluded.
Harvested wood products	Included	Will be greater in baseline than project scenario and significant
Litter	Excluded	Insignificant and exclusion is conservative
Soil organic carbon	Excluded	Exclusion is always conservative when forests remains as forest

2.3.4 Greenhouse Gases

The emissions sources included in or excluded from the project boundary are shown in the table below.

The project proponent has chosen to exclude to account for GHG emissions related to the combustion of fossil fuels, which is conservative.

Gas	Source	Included?	Justification
CO_2	Combustion of fossil fuels (in vehicles, machinery and equipment)	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Removal of herbaceous vegetation	Excluded	Based on CDM EB decision reflected in paragraph11ofthe report of the23rdsessionoftheboard: cdm.unfccc.int/Panels/ar/023/ar_023_rep.pdf

CH_4	Combustion of fossil fuels (in vehicles, machinery and equipment)	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Burning of biomass	Included	Included as CO_2 equivalent emission
N_2O	Combustion of fossil fuels (in vehicles, machinery and equipment)	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Nitrogen based fertilizer	Excluded	Potential emissions are negligible. Following the VCS update to the Tool for AFOLU Methodological Issues and Guidance for AFOLU Projects, emissions through the use of fertilizer are considered insignificant and are not considered here.
	Burning of biomass	Excluded	Potential emissions are negligible

2.4 Baseline Scenario

2.4.1 Selection of baseline

According to VM0010, the “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” (version 3.0), the following steps are applied for the demonstration of the additionality for the project by project proponent:

a) STEP 1. Identification of alternative land use scenarios to the AFOLU project activity;

b) STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

c) STEP 3. Barriers analysis; and

d) STEP 4. Common practice analysis.

Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS. The scenarios should be feasible for the project area taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends. The identified land use scenarios at least include:

i) Continuation of the pre-project land use as the timber harvest plan;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project;

iii) If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from:

- Legal requirements; or
- Extrapolate similar activities in the geographical area under similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity which cover a period began a decade earlier than the project start date.

For (ii), the NPV under this scenario is obviously not financially attractive compared to the scenario of logging.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements and are existed as forests more than ten years prior to the project start date. So (iii) is not applicable.

Therefore, the baseline scenario is continuation of the pre-project land use as the timber harvest plan.

The baseline is further confirmed by the timber harvest plan issued by the forestry authority and is determined both in PD and MR.

2.4.2 Modelling the baseline scenario

According to VM0010 version 1.3, a historical baseline scenario is used for determining how to model the baseline management scenario as:

1. Historical records of forest management exist for 5 years preceding the project start date;

2. Historical records indicate that the management practices have surpassed the legal requirements provided by conforming to all local and regional forest legislation;

3. Historical records that indicate that the historical management surpasses financial barriers by providing above average financial returns.

Box 1. Timber Harvest Plan

The description of harvesting in the form of a timber harvest plan forms the basis of the baseline scenario for greenhouse gas accounting.

The timber harvest plan describes the harvest of timber products:

a) reference the forest volume inventory (see Section 8.1.1 – parameter $V_{j,i|BSL}$) to identify the relative number of trees per hectare potentially available for harvest by species in each stratum;

b) demarcate all non-harvest areas within the forest based on legally required exclusions for environmental features such as slope, swamp areas or conservation buffers;

c) divide the harvestable forest into annual operating areas (referred to throughout this methodology as land parcels) using common practice;

d) include a design and presentation of the forestry infrastructure to harvest, skid/haul, store and move harvested timber products from the land parcels to downstream processing or market entry points. Where the project proponent accounts for emissions from forestry infrastructure, the design and presentation must include all forest roads, skidtrails and log landings that would be established under the baseline scenario as a georeferenced layer (shapefile or equivalent), and must list necessary harvest and transport machinery.

e) the timber harvest plan must follow local best practice for timber harvest practices, including planning of roads, skidtrails and log landings-and the timber resource volume and extraction quotas defined in any legal requirements.

For the purpose of estimating the net annual changes in carbon stocks resulting from planned timber harvest in the baseline scenario a detailed planned timber harvesting schedule will be developed from the timber harvest plan, setting out details of harvest and forestry infrastructure establishment for each land parcel in the project area in terms of the following:

a) the species to be harvested;

b) the year (1,2,3...) in which timber harvest and/or forestry infrastructure establishment of each land parcel is scheduled to occur;

c) the number of years each land parcel is in a post-harvest and/or forestry infrastructure establishment state during the project crediting period;

d) the maximum and minimum diameters at breast height (DBH), at stump and at top for tree harvesting;

e) the planned harvesting regime (clearfelling, specie/stratum-selective logging, area-selective logging);

f) the fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products ($F_{V,INF,HWP}$). Based on this fraction, as well as forest inventory and forestry infrastructure data, $V_{EX,INF,j,i|BSL}$ and $V_{notEX,INF,j,i|BSL}$ (see points 2 and 3 below) will be calculated.

g) technical specifications for the categories of wood products to be harvested; and

h) the total volumes or fractions to be harvested, broken down by categories of wood products defined as sawnwood, wood-based panels, other industrial roundwood, paper and paper board, and other.

The planned timber harvest schedule is determined ex ante to reflect the timber harvesting plan as stipulated in the legal right to harvest. The planned timber harvesting schedule will be developed for the Project Area to include all land parcels within the

project boundary for the proposed IFM activity. **The output of the timber harvest plan and timber harvesting schedule must be:** 1) The mean extracted volume of extracted merchantable timber per unit area by species in each stratum in each year ($V_{EX,j,i\|BSL}$). 2) Where the project proponent accounts for forestry infrastructure, the mean volume of merchantable timber extracted for wood processing that is harvested during the process of forestry infrastructure establishment per unit area by species in each stratum in each year ($V_{EX,INF,j,i\|BSL}$). 3) Where the project proponent accounts for forestry infrastructure, the mean volume of merchantable timber that is cleared during the process of forestry infrastructure establishment and NOT extracted for wood processing per unit area by species in each stratum in each year ($V_{notEX,INF,j,i\|BSL}$). The planned timber harvesting schedule will be submitted by the project proponent as part of the project documents.

The timber harvest and management plan describes the harvest of timber products and includes:

<table>
<tr><th>Demands</th><th>The project activity</th></tr>
<tr><td>a) reference the forest volume inventory (see Section 8.1.1 – parameter $V_{j,i|BSL}$) to identify the relative number of trees per hectare potentially available for harvest by species in each stratum;</td><td>According to the forest volume inventroy, the $V_{j,i|BSL}$ is listed as follows:
<table>
<tr><td>Dominant Species</td><td>Area(ha)</td><td>Volume (m^3)</td><td>$V_{j,i|BSL}$ (m^3/ha)</td></tr>
<tr><td>Birch</td><td>10,454</td><td>1197352</td><td>114.54</td></tr>
<tr><td>Larch</td><td>10,072</td><td>1191142</td><td>118.26</td></tr>
</table></td></tr>
<tr><td>b) demarcate all non-harvest areas within the forest based on legally required exclusions for environmental features such as slope, swamp areas or conservation buffers;</td><td>The project area only includes commercial forests, the ecological forests are excluded from the project boundary. Therefore, the legally required exclusions for environmental features such as slope, swamp areas or conservation buffer are obviously non-harvest areas, which are also excluded from the project boundary.</td></tr>
<tr><td>c) divide the harvestable forest into annual operating areas (referred to throughout this methodology as land parcels) using common practice;</td><td>Yes, the harvestable forests are listed into annual operating areas using clear felling. The timber harvest plan is announced by Keyihe Forestry Bureau in 2012 is a long-term plan of 30 years.</td></tr>
<tr><td>d) include a design and presentation of the forestry infrastructure to harvest, skid/haul, store and move harvested timber products from the land parcels to downstream processing or market entry points. Where the project proponent accounts</td><td>Because the emission from forestry infrastructure is hard to calculate, and if it is accounted in the baseline scenario, the total emission reduction will be greater. Considering the cost effectiveness and conservative, the project proponent didn’t account for emission from from forestry infrastructure.</td></tr>
</table>

for emissions from forestry infrastructure, the design and presentation must include all forest roads, skidtrails and log landings that would be established under the baseline scenario as a georeferenced layer (shapefile or equivalent), and must list necessary harvest and transport machinery.	
e) the timber harvest plan must follow local best practice for timber harvest practices, including planning of roads, skidtrails and log landings-and the timber resource volume and extraction quotas defined in any legal requirements.	The timber harvest plan has followed local best practice for timber harvest practices. The planning of roads, skidtrails and log landings meet the related national regulations and standard. The timber resource volume and extraction quota is defined according to forest second investigation data, which comply with the legal requirements.

The timber harvest schedule：

Demands	The project activity
a) the species to be harvested;	The species within the project area are Birch and Larch.
b) the year (1,2,3...) in which timber harvest and/or forestry infrastructure establishment of each land parcel is scheduled to occur;	The harvest plan has demonstrated the year in which timber harvest is scheduled to occur. The forestry infrastructures of departments were established when the company was founded, so the timber harvest schedule doesn’t include this part.
c) the number of years each land parcel is in a post-harvest and/or forestry infrastructure establishment state during the project crediting period;	According to the timber harvest plan, the land parcel will be regenerated after timber harvest occurred, the post-harvest state during the project crediting period will be not more than a year.
d) the maximum and minimum diameters at breast height (DBH), at stump and at top for tree harvesting;	There is no specific requirement for the maximum and minimum diameters at breast height (DBH), at stump and at top for tree harvesting, which is not applicable in China.
e) the planned harvesting regime (clearfelling, specie/stratum-selective logging, area-selective logging);	The planned harvesting regime is clearfelling for the project.
f) the fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products ($F_{V,INF,HWP}$). Based on this fraction, as well as forest inventory and forestry	The fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products is very small and hard to calculate precisely, so we didn’t take the $V_{EX,INF,j,i\|BSL}$ and

infrastructure data, $V_{EX,INF,j,i\|BSL}$ and $V_{notEX,INF,j,i\|BSL}$ (see points 2 and 3 below) will be calculated.	$V_{notEX,INF,j,i\|BSL}$ into account for calculate the baseline scenario emission. As this is conservative for emission reduction of the project, so it is reasonable.
g) technical specifications for the categories of wood products to be harvested; and	There is no technical specifications for the categories of the wood products, they will be determined by the requirements of the customers
h) the total volumes or fractions to be harvested, broken down by categories of wood products defined as sawnwood, wood-based panels, other industrial roundwood, paper and paper board, and other.	The wood products of the project is only sawnwood, there is no others such as wood-based panels, other industrial roundwood, paper and paper board, etc.

2.4.3 Stratification

As the project activity area contains different forest types or forests with different carbon density, stratification is carried out in order to improve the accuracy and precision of carbon stock estimates. The details of the subcompartments (e.g. area, age, species, stock volume and location) are shown in forest second class investigation as appendix submitted to DOE.

Based on the availability of data regarding the nature and composition of forest stocks in the project area, stratification is developed on the basis of existing vegetation stratification, where these are documented in the legal right to harvest. The purpose of strata is to improve accuracy and reduce the sampling cost. The strata is usually based on the tree species, age and canopy density, but it does not mean all these factors should be considered for all projects, more strata means more workload and cost. For this project, the factor of species for strata could reduce the variation within the same stratum and reach the accuracy level of 90% under certain degree of freedom. So the strata are reasonable and feasible.

Table 2 shows the 2 strata specified based on the tree species.

Table 2: Tree strata

Serial number of strata	Area (ha)	Tree species	Source
1	10,454	Birch	Forest second class investigation issued by Inner Mongolia autonomous region forestry survey and design institute
2	10,072	Larch	
Total	**20,526**		

2.5 Additionality

According to VM0010 version 1.3, the additionality of the project is demonstrated using the VCS "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" version 3.0.

The following four steps are applied for the project:

2.5.1 Step 1: Identification of alternative land use scenarios to the AFOLU project activity;

Sub-step 1a: Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS. The scenarios should be feasible for the project area taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends.

The identified land use scenarios shall at least include:

i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 2.4;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

iii) If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from:

- Legal requirements; or
- Extrapolate similar activities in the geographical area under similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity which cover a period began a decade earlier than the project start date.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements and are existed as forests more than ten years prior to the project start date. So (iii) is not applicable.

Pre-project land use scenario is the timber forest which is the common practice in China, it is feasible for the project area taking into account Forest Law of People's Republic of China. And there is no land within the Project boundary performed being registered as the VCS AFOLU project.

b) All identified land use scenarios must be credible. All land-uses within the boundary of the proposed VCS AFOLU project that are currently existing or that existed at some time in the period beginning ten years prior to the project start date but no longer exist, may be deemed realistic and credible. For all other land use scenarios, credibility shall be justified. The justification shall include elements of spatial planning information (if applicable) or legal requirements and may include assessment of economic feasibility of the proposed land use scenario.

The (i) and (ii) identified land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS are realistic and credible, as all land-uses within the boundary of the project activity that existed in the period beginning ten years prior to the project start date but no longer exist. Therefore, it is deemed realistic and credible. Outcome of Section 2.5.1.1:

The identified land use scenarios include the two below:

i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 2.4;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

Sub-step 1b: Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

The scenarios are feasible for the project area taking into account Forest Law of People's Republic of China, *Inner Mongolia Autonomous Region* ecological public welfare forest management approach[1]. Therefore, the 2 identified realistic and credible alternative land used scenarios that could have occurred on the land within the project boundary of the VCS AFOLU project are listed below.The identified land use scenarios include the two below:

i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 2.4;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

2.5.2 Step 2: Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

This section will determine whether the proposed project activity, without the revenue from the sale of GHG credits is economically or financially less attractive than at least one of the other land use scenarios. To conduct the investment analysis, use the following sections.

Sub-step 2a: Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis. If the VCS AFOLU project generates no financial or economic benefits other than VCS related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Note, that Options I, II and III are mutually exclusive hence, only one of them can be applied.

[1] http://www.nmg.gov.cn/xxgkml/zzqzf/gkml/201509/t20150915_494403.html

According to the tool, Option I is not applicable for the proposed project since the project will generate other financial and economic benefits (e.g. income from tending and managing instead of commercial harvest) other than VCS related income.

The benchmark analysis is not applicable for the proposed project since there is neither practical nor public available standard benchmark for forest industry within the project area.

Therefore, the project will use the investment comparison analysis (Option II) since the 2 alternatives identified in step 1 both have cost and benefit separately.

Sub-step 2b: Option II. Apply investment comparison analysis

As the PP should compare to determine which one is more economic attractive in the 2 scenarios identified in step 1, NPV will be used as the financial indicator to calculate the discounting in 30 years for decision-making context.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to options II and III):

a) Calculate the suitable financial indicator for the proposed VCS AFOLU project without the financial benefits from the VCS for the 2 alternatives identified in step 1. Include all relevant costs and revenues, and, as appropriate, non-market cost and benefits in the case of public investors.

Series	Item	Unit	Baseline value	Project value	Data source
		Revenue			
1	Birch Price	RMB/m^3	900	0	Financial statement
2	Larch Price	RMB/m^3	750	0	
3	Other timber product from tending and managing instead of commercial harvest	RMB/m^3	313	313	
		Extracted Volume			
1	Birch	m^3	1197352	0	Timber Harvest Plan
2	Larch	m^3	1191142	0	
3	Other timber product from tending and managing instead of commercial harvest	m^3/year	8000	8000	
4	Total Area	Mu	307890	307890	

Cost					
1	A/R cost	RMB/Mu	300	0	Financial statement
2	Harvest cost	RMB/m^3	180	0	
3	Management Fee	RMB/Mu	120	120	
4	Additional maintenance cost for protected forest	RMB/Mu/working day	0	0.1	

b) Present the investment analysis in a transparent manner and provide all the relevant assumptions in the VCS AFOLU project description

The NPV before and after the conversion of logged to protected forest is shown in the table below. The NPV under the scenario of logging is ¥17,333*10^4 Yuan with the discount rate of 8%. However, the NPV under the scenario of protected forest is¥ -7,721*10^4 Yuan with the discount rate of 8%, which is lower than the scenario of logging. Therefore, the NPV under the scenario of protected forest is obviously not financially attractive compared to the scenario of logging. By taking into account the VCUs revenue, the NPV under the scenario of protected forest is increased to be ¥ -5,436*10^4 Yuan. With revenue from VCS at the assumed price level, the project would be more financially attractive. Table 3 shows the comparison of the NPV between project and baseline scenario.

Table 3: Comparison of NPV at different scenarios

	NPV (10^4 Yuan)
Scenario of Logging	¥17,333
Scenario of protected	¥-7,721

Sub-step 2d: Sensitivity analysis

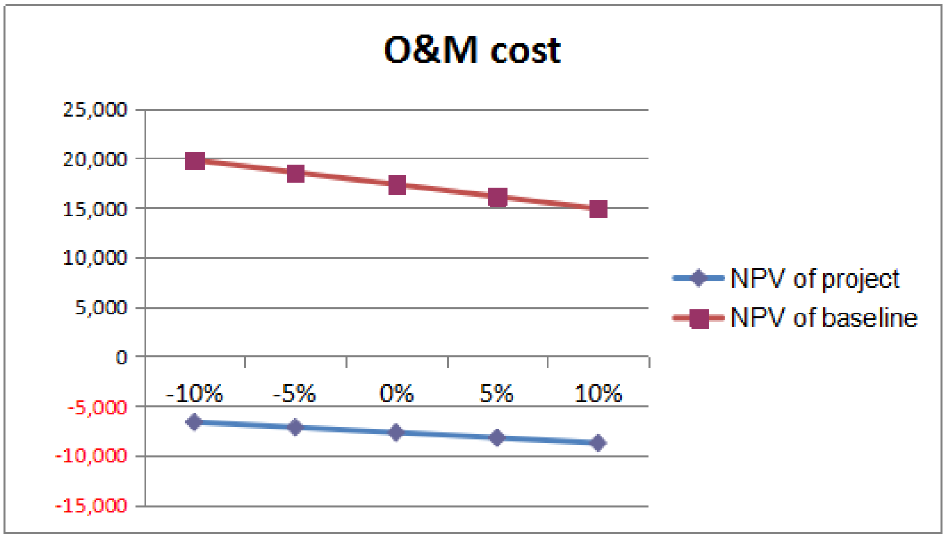
The objective of the sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the proposed VCS AFOLU project without the financial benefits from the VCS is unlikely to be financially attractive.

For the project, the key parameters of timber price, the O&M cost, and the extracted volume will be taken into account of the sensitivity analysis. Results of the 3 parameters are shown in the table 4 and figure 2 below:

Table 4: NPV comparison sensitivity analysis of the project

Key parameters	**NPV of baseline scenario (10^4 Yuan)**					**NPV of project scenario (10^4 Yuan)**				
	-10%	**-5%**	**0%**	**5%**	**10%**	**-10%**	**-5%**	**0%**	**5%**	**10%**
Timber price	13,150	15,241	17,333	19,425	21,517	-8,003	-7,862	-7,721	-7,581	-7,440

O&M cost	19,784	18,558	17,333	16,108	14,883	-6,667	-7,194	-7,721	-8,248	-8,775
Extracted volume	15,065	16,199	17,333	18,467	19,602	-8,003	-7,862	-7,721	-7,581	-7,440



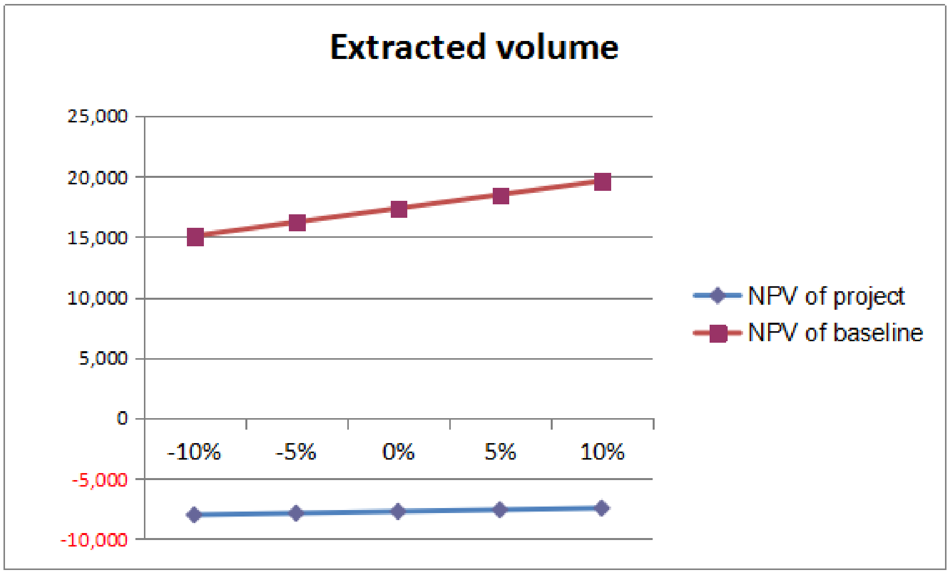


Figure 2: Sensitivity analysis of the project

By referring to the Figures above, the NPV under protected scenario will not exceed the baseline scenario if the price, the O&M cost and the extracted volume varies within ±10%.

In the baseline scenario, the project receives revenue from both the commercial harvest and timber products derived from tending and managing. The latter covers a very small fraction. Under the project scenario, all the commercial harvest has been cancelled and only tending and managing is allowed, the only revenue of the project scenario is the very little income from the selling of the timber products from tending and managing, which remains the same amounts as the baseline scenario. It is obvious that the revenue of the project is only a small part of the baseline scenario, which would not be influenced by the variation of the timber price and extracted volume. On the other hand, the cost in the project scenario will increase due to the more cost on tending and maintenance. Therefore, it is impossible for the NPV of the project scenario to reach to the baseline scenario no matter how the two parameters vary.

In order to show the opportunity of the NPV under protected scenario exceeding the baseline scenario is very little, the analysis of critical assumption is conducted as below. That is, for the three parameters, to what extent, the NPV of the project scenario can reach to that of the baseline scenario.

Parameters	Range Extent (When the NPV of the project scenario reached to the baseline scenario)
Timber price	888.80%
O&M cost	-237.70%
Extracted Volume	888.80%

1) Timber price

It is assumed that only when the timber product price for tending and managing increased 888.80%, the nominal NPV of the project scenario could reach to $17,333*10^4$Yuan. Since the timber price for the project scenario and the baseline scenario remains the same. Therefore, the project scenario will not become equal to the baseline scenario.

2) O&M cost

The NPV of the Project will reach to $17,333*10^4$ Yuan if the O&M cost reduced by 237.70%, and it is obvious that when the O&M cost reduced by 100%, it would become zero, that is impossible to occur for the normal project operating, not even to mention the decrease of 237.70%. In fact, the cost of labor index has increased recently according to the data of National Bureau of Statistics of China[2].

3) Extracted Volume

It is assumed that only when the extracted volume for tending and managing increased 888.80%, the nominal NPV of the project scenario could reach to $17,333*10^4$ Yuan. As the extracted volume of the project is determined in the timber production plan issued by the forestry authority based on the forest survey, it is also impossible to increase 888.80%. Therefore, it is impossible for the NPV of the project scenario to reach to the baseline scenario within the crediting period.

Therefore, the result of the sensitivity analysis confirms that the project is financially unattractive.

According to the tool, if after the sensitivity analysis it is concluded that the proposed VCS AFOLU project without the financial benefits from the VCS is unlikely to be financially most attractive (Option II and Option III), then proceed directly to Step 4 (Common practice analysis).

2.5.3 Step 3. Barrier analysis

Not applicable.

2.5.4 Step 4. Common practice analysis

According to the “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” (version 3.0). “Similar activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology”.China has a vast territory, the development policies and economic environment for projects in each province of China are not same. The investment climate varies considerably from province to province depending on the local conditions. The Project is located in Inner Mongolia Autonomous Region. However, the geographic and geomorphic conditions are totally different in the whole province. Therefore, only stated-owned activities in Inner Mongolia Autonomous Region are included in the analysis.

By searching the VCS, CDM websites and so on, we found that in Inner Mongolia Autonomous Region, the Inner Mongolia Chao’er Improved Forest Management Project has been registered

[2] http://data.stats.gov.cn/easyquery.htm?cn=B01&zb=A0602&sj=2017B

and the Inner Mongolia Wu'erqihan IFM (conversion of logged to protected forest)Project is under validation as VCS projects[3]. And there is no similar project without applying the VCS, CDM[4] or other voluntary emission reduction project[5].

Therefore, according to the analysis above, the similar activities which haven't applied for the VCS are not common practice in Keyihe county. So the proposed project has additionality.

2.6 Methodology Deviations

N/A

3. QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Calculation of baseline emissions for all land parcels under both the historical and common practice baseline scenarios requires the application of the equations presented in Sections 8.1.1 to Section 8.1.6 of the methodology.

Baseline projections are calculated ex-ante and are not adjusted through-out the project lifetime.

According to the methodology, Section 8.1.1 serves to calculate carbon stocks in commercial timber volumes. Next, baseline emissions are estimated based on the calculation of deadwood (logging slash) generated in the process of timber harvest and establishment of forestry infrastructure (Section 8.1.2), the emissions resulting from production and subsequent retirement of wood products derived from timber harvesting (including timber harvesting from the establishment of forestry infrastructure (Section 8.1.3)), the combustion of fossil fuels in forestry machinery including mechanized felling, skidding / forwarding /hauling, loading and transporting inside the project area, and processing (Section 8.1.5), minus the rates of forest regrowth post-timber harvest (Section 8.1.6).

The following table lists the baseline emissions modelled by the methodology:

Included in modelling
1. Emission from wood product conversion
2. Decomposition of deadwood from harvested trees
3. Emissions from wood product retirement
4. Stock change due to regrowth following timber harvest
5. Decomposition of trees incidentally killed during tree felling
Where project proponent accounts for forest infrastructure：
6. Decomposition of trees killed through skid trail creation
7. Decomposition of trees killed through road construction

[3] http://www.vcsprojectdatabase.org/#/project_details/1529
[4] http://cdm.unfccc.int/
[5] http://cdm.ccchina.gov.cn/ccer.aspx

Optional (as omission is conservative) 8. Emissions from fossil fuels burned in baseline harvesting practices
Conservatively excluded from modeling
9. Emissions through subsequent forest re-entry

The options of 5 to 9 are hard to calculate and tiny in baseline scenario, so we exclude those from baseline emissions modelling considered of cost. As emission is conservative so it is reasonable to exclude those from baseline emissions modelling. Baseline commercial timber volumes must be derived for development of the timber harvest plan and for ex-post accounting of emissions resulting from natural forest disturbance.

The equations below calculate the total emissions across the project crediting period for each emission source. Total emissions are averaged across the crediting period to give annual emissions and are multiplied by t*, time elapsed since the start of project activity. EX-post, t* is updated so baseline projections are available for each proposed future verification date.

Data for input into these carbon stock change calculations for the baseline scenario shall be established from the same data used to create the timber harvest plan.

According to VM0010 version 1.3, the baseline emissions are calculated in the sections below:

3.1.1 Calculation of carbon stocks in commercial timber volumes

This section calculates $C_{HB,j,i|BSL}$, the mean carbon stock in total harvested biomass in $tC{\cdot}ha^{-1}$ and $C_{EX,j,i|BSL}$, the mean carbon stock in extracted timber (merchantable timber that leaves the forest) in $tC{\cdot}ha^{-1}$.

The pre-existing forest inventory data are used for this purpose provided that the pre-existing data:

a) represents the project strata;

b) is not more than 10 years old.

These inventory data used the method of sample plot inventory. These data were carried out through field surveys which were finished at the end of 2012 by Inner Mongolia autonomous region forestry survey and design institute who is qualified, experienced for the forestry investigation.. The project involves 2 strata and 1,969 subcompartments. For each stratum, mean volume is estimated from sample plot size of 0.04 ha and at least 1 sample plot will be selected in 1 subcompartment within the project area using standard forest inventory assessment methods, which satisfies the number of sample plots required by the Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities (version 02.1.0) as stated in section 5.3.5.

The estimate of merchantable volume for each species j at the sample plot level will be calculated as:

$$V_{j,i,sp} = \sum_{l=1}^{L} V_{l,j,i,sp} \qquad (1)$$

Where:

错误!未找到引用源。	merchantable volume for species j in stratum i in sample plot sp, m^3;
$V_{l,j,i,sp}$	merchantable volume for tree l of species j in stratum i in sample plot sp, m^3;
l	1, 2, 3 …L sequence of individual trees in sample plot;
i	1, 2, 3 …M strata;
sp	1, 2, 3 …SP sample plots; and
j	1, 2, 3 …J tree species.

Therefore, the merchantable volume per unit area of species j in stratum i will be calculated as the mean merchantable volume in all sample plots in stratum i:

$$V_{j,i|BSL} = \frac{1}{SP} * \sum_{sp=1}^{SP} \frac{V_{j,i,sp}}{A_{sp}} \qquad (2)$$

Where:

$V_{j,i\|BSL}$	mean merchantable volume per unit area of species j in stratum i in the baseline scenario, $m^3 \cdot ha^{-1}$;
$V_{j,i,sp}$	merchantable volume for species j in stratum i in sample plot *sp*; m^3;
A_{sp}	area of sample plot *sp*, ha;
i	1, 2, 3 …M strata;
sp	1, 2, 3 …SP sample plots; and
j	1, 2, 3 …J tree species.

Therefore, the carbon stock of timber harvested per unit area for species j in stratum i will be calculated from this mean volume of extracted timber:

$$C_{HB,j,i|BSL} = V_{EX,j,i|BSL} * BCEF_R * C_j \qquad (3)$$

Where:

$C_{HB,j,i\|BSL}$	mean carbon stock of harvested biomass per unit area for species j in stratum i, $tC{\cdot}ha^{-1}$;
$V_{EX,j,i\|BSL}$	mean volume of extracted timber per unit area for species j in stratum i, $m^3{\cdot}ha^{-1}$;
$BCEF_R$	biomass conversion and expansion factor applicable to wood removals in the project area, t.d.m m^{-3};
CF_j	carbon fraction of biomass for species j, tC t $d.m^{-1}$;
i	1, 2, 3 …M strata; and
j	1, 2, 3 …J tree species.

Not all of the harvested biomass leaves the forest because the timber harvested has two components: 1) wood removed to market (extracted timber) and, 2) wood remaining in the forest as a result of harvest.

Therefore, the mean carbon stock of extracted timber per unit area for species j in stratum i will be calculated from the mean volume of extracted timber multiplied by density and carbon fractions:

$$C_{EX,j,i|BSL} = V_{EX,j,i|BSL} * D_j * CF_j \tag{4}$$

Where:

$C_{EX,j,i\|BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i; $tC{\cdot}ha^{-1}$;
$V_{EX,j,i\|BSL}$	mean volume of extracted timber per unit area for species j in stratum i, $m^3{\cdot}ha^{-1}$;
D_j	basic wood density of species j; t d.m. m^{-3};
CF_j	carbon fraction of biomass for species j, tC t $d.m^{-1}$;
i	1, 2, 3 …M strata; and
j	1, 2, 3 …J tree species.

3.1.2 Calculation of dead wood (logging slash) generated in the process of timber harvest

This section calculates $\Delta C_{DWSLASH,i,p|BSL}$, the change in carbon stock in dead wood resulting from timber harvest in stratum i in land parcel p, using $C_{EX,j,i|BSL}$ and $C_{HB,j,i|BSL}$ as calculated in section 3.1.1.

The simplifying assumption is made that dead wood created during timber harvest is emitted in the year of harvest.

Therefore, the change in carbon stock in the dead wood pool in stratum i in land parcel p will be calculated as the difference between the total carbon stock of the harvested biomass and the carbon stock of the extracted timber:

$$\Delta C_{DWSLASH,i,p|BSL} = \left[\sum_{j=1}^{J}\left(C_{HB,j,i|BSL} - C_{EX,j,i|BSL}\right)\right] \quad (5)$$

Where:

$\Delta C_{DWSLASH,i,p|BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in $tCha^{-1}$;
$C_{HB,j,i|BSL}$	mean carbon stock of harvested biomass per unit area for species j in stratum i, $tC \cdot ha^{-1}$;
$C_{EX,j,i|BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i, $tC \cdot ha^{-1}$;
i	1, 2, 3 …M strata; and
j	1, 2, 3 …J tree species.
p	1, 2, 3 ...P land parcels.

3.1.3 Calculation of baseline carbon sequestered in wood products

The carbon stock of extracted timber across species is calculated as:

$$C_{EX,i|BSL} = \sum_{j=1}^{J} C_{EX,j,i|BSL} \quad (6)$$

Where:

$C_{EX,i|BSL}$	change in carbon stock of extracted wood products resulting from timber harvest per unit area in stratum i in land parcel p, $tC \cdot ha^{-1}$;
$C_{EX,j,i|BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i, $tC \cdot ha^{-1}$;
i	1, 2, 3 …M strata; and
j	1, 2, 3 …J tree species.

In accordance with the VCS AFOLU Requirements, the amount of carbon stored in wood products that would decay within 3 years after harvest (ie, the Wood Waste (WW) and the Short Lived Fraction (SLF)), are assumed to be emitted at the time of harvest.

Wood products that are retired between 3 and 100 years after harvest (ie, the Additional Oxidised Fraction, OF), must be accounted according to a 20 year linear decay function. This decay function is applied when the net greenhouse gas emissions/removals are calculated on an annual basis in equations 11 and 12.

All other wood product pools are considered to permanently store carbon.

Therefore, the carbon stock of extracted timber that is immediately emitted to the atmosphere at the time of harvest is calculated as

$$C_{WP0,i|BSL} = \sum_{k} C_{EX,i,k|BSL} * (WW_k + SLF_k) \quad (7)$$

Where:

$C_{WP0,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to be emitted immediately at the time of harvest, in tC·ha^{-1};
$C_{EX,i\|BSL}$	mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, tC·ha^{-1};
WW_k	fraction of biomass carbon from wood waste that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product k, dimensionless;
SLF_k	fraction of biomass carbon from the short lived wood product pool that is assumed to that be emitted to the atmosphere immediately at the time of harvest for wood product k, dimensionless;
i	1, 2, 3 …M strata; and
k	Wood products (sawnwood, wood base products, etc).

The amount of extracted carbon stock that is assumed to enter the wood products pool that is not immediately emitted at harvest is calculated as per equation 8 below:

$$C_{WPi|BSL} = \sum_k C_{EX,i,k|BSL} - C_{WP0,i|BSL} \quad (8)$$

Where:

$C_{WP,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ,in tC·ha^{-1};
$C_{EX,i\|BSL}$	mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, tC·ha^{-1};
$C_{WP0,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to be emitted

immediately at the time of harvest, in tC·ha^{-1};

i 1, 2, 3 …M strata; and

k Wood products (sawnwood, wood base products, etc).

Therefore, the carbon stock of wood products assumed to be retired between 3-100 years following harvest is calculated as:

$$C_{WP100,i|BSL} = C_{WP,i|BSL} * OF_k \tag{9}$$

Where :

$C_{WP100,I,p\|BSL}$	Amount of carbon stored in wood products that are assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC·ha^{-1};
$C_{WP,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ,in tC·ha^{-1};
OFk	fraction of biomass carbon for wood product type k that is assumed to be emitted to the atmosphere between 3 and 100 years of timber harvest, dimensionless; and
i	1, 2, 3 …M strata

3.1.4 Change in carbon stocks due to forest regrowth after harvest

The carbon sequestration in the baseline resulting from forest regrowth after timber harvest up to year t is equal to the forest regrowth rate of each stratum.

Therefore, carbon sequestration resulting from forest regrowth after timber harvest is calculated as:

$$C_{RG,i,p|BSL} = \sum_i RGRi \tag{10}$$

Where:

$C_{RG,i,p\|BSL}$	carbon sequestration resulting from forest regrowth after timber harvest in stratum i in land parcel p, tC ha^{-1} yr^{-1};
RGR_i	regrowth rate of forest post timber harvest for stratum i, tCha^{-1} yr^{-1};
i	1, 2, 3 …M strata

3.1.5 Calculation of baseline scenario greenhouse gas emissions from change in carbon stocks

The net carbon stock change to be converted to emissions is equal to the carbon stock change as a result of timber harvest plus the carbon stock change resulting from conversion and retirement of wood products minus carbon sequestration from forest regrowth after harvest.

In order to generate the annual carbon stock change in the baseline scenario, the total net change in carbon stocks for parcels within is multiplied by the area of forest in the particular age class (ie, years since harvest in the baseline).

The annualized calculations vary between years 1, 2-10; 10-20; and all years since the start of the project activity, depending on which decay functions apply.

Therefore, the net change in carbon stock from wood products and logging slash across all parcels within the first year of harvest in the baseline is calculated as:

$$\Delta C_{NET|BSL(1)} = \sum_{i,p} A_{1,i,p} * \sum_{i=1}^{M} (C_{DWSLASH,i,p\backslash BSL}/10) + C_{WP0,i,p\backslash BSL} + (C_{WP100,i,p\backslash BSL}/20) \quad (11)$$

Where:

$\Delta C_{NET\|BSL(1)}$	net change in carbon stock across all parcels in the baseline scenario in the first year since harvest in the baseline scenario, in tC;
$\Delta C_{DWSLASH,i,p\backslash BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in tC ha^{-1};
$\Delta C_{WP0,i,p\backslash BSL}$	change in carbon stock resulting from wood product conversion and retirement from stratum i in land parcel p, that is assumed to be emitted in the first year of harvest in the baseline tC ha^{-1};
$\Delta C_{WP100,i,p\backslash BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha^{-1};
$A_{1,i,p}$	the area of stratum i in land parcel p that was harvested 1 year ago, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change in carbon stock from wood products and logging slash across all parcels the years 2-10 since harvest in the baseline are calculated as:

$$\Delta C_{NET|BSL(2-10)} = \sum_{i,p} A_{2-10,i,p} * \sum_{i=1}^{M} (C_{DWSLASH,i,p\backslash BSL}/10) + (C_{WP100,i,p\backslash BSL}/20) \quad (12)$$

Where:

$\Delta C_{NET\|BSL(2-10)}$	net change in carbon stock across all parcels in the baseline scenario in years 2-10 since harvest in the baseline scenario, in tC;
$\Delta C_{DWSLASH,i,p\backslash BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in tC ha^{-1};
$\Delta C_{WP100,i,p\backslash BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha^{-1};
$A_{2-10,i,p}$	the area of stratum i in land parcel p that was harvested 2 and 10 years ago, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change in carbon stock from wood products across all parcels the years 11-20 since harvest in the baseline are calculated as:

$$\Delta C_{NET|BSL(11-20)} = \sum_{i,p} A_{11-20,i,p} * \sum_{i=1}^{M} (C_{WP100,i,p\backslash BSL}/20)$$

(13)

Where:

$\Delta C_{NET\|BSL(11-20)}$	net change in carbon stock across all parcels in the baseline scenario in years 11-20 since the start of the project activity, in tC;
$\Delta C_{WP100,i,p\backslash BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha^{-1};
$A_{11-20,i,p}$	the area of stratum i in land parcel p that was harvested 11 and 20 years ago, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change (sequestration) in carbon stock due to forest regrowth across all parcels in all years since harvest in the baseline scenario is calculated according to equation 14 below. Note that there will be no more emissions quantified from decay of logging slash or wood products.

$$\Delta C_{NET|BSL(1+)} = \sum_i A_{t*} * \sum_{i=1}^{M} (-\Delta C_{RG,i,p\backslash BSL})$$

(14)

Where:

$\Delta C_{NET\|BSL(1+)}$	net change in carbon stock due to forest regrowth in all parcels that have been harvested in the baseline scenario, in tC;
$\Delta C_{RG,i,p\backslash BSL}$	carbon sequestration resulting from forest regrowth after timber harvest

	in stratum i in land parcel p, tC ha^{-1}
A_{t*}	Cumulative area harvested until time t*, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

Therefore, net change in carbon stock across all parcels harvested over each year of the project crediting period in the baseline scenario since the start of the project activity is calculated as:

$$\Delta C_{NET|BSL,t*} = \sum_{p=1}^{P} \Delta C_{NET|BSL(1)} + \Delta C_{NET|BSL(2-10)} + \Delta C_{NET|BSL(11-20)} + \Delta C_{NET|BSL(1+)} \quad (15)$$

Where:

$\Delta C_{NET\|BSL,t*}$	net change in carbon stock across all parcels in the baseline scenario in the year t* since the start of the project activity, in tC;
$\Delta C_{NET\|BSL(1)}$	net change in carbon stock in the baseline scenario for all parcels p that are within 1 year of harvest in the baseline scenario, in tC;
$\Delta C_{NET\|BSL(2-10)}$	net change in carbon stock in the baseline scenario for all parcels p, that were harvested between 2-10 years ago in the baseline scenario, in tC;
$\Delta C_{NET\|BSL(11-20)}$	net change in carbon stock in the baseline scenario in parcel p, that were harvested between 11-20 years ago in the baseline scenario, in tC;
$\Delta C_{NET\|BSL(1+)}$	net change in carbon stock due to forest regrowth in the baseline scenario for all parcels p that have been harvested in the baseline scenario, in tC;
t*	time elapsed since the start of the project, in years; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net carbon stock change in the baseline scenario must be converted to net greenhouse gas emissions and is calculated as:

$$GHG_{NET|BSL,t*} = \Delta C_{NET|BSL,t*} * \frac{44}{12} \quad (16)$$

Where:

$GHG_{NET\|BSL,t*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2e;
$\Delta C_{NET\|BSL}$	net change in carbon stock across all parcels in the baseline scenario in the year t* since the start of the project activity, tC; and
44/12	ratio of molecular weights of carbon dioxide and carbon, tCO_2-e tC^{-1}.

3.2 Project Emissions

3.2.1 Ongoing forest growth in the project scenario

This section calculates $\Delta C_{AB,t|PRJ}$ annual carbon stock change in aboveground biomass of trees in the project scenario, in tCO_2e.

3.2.1.1 Allometry

Select the appropriate allometric equation for forest type/group of species j (e.g. tropical humid forest or tropical dry forest) or for each species or family j (group of species) found in the inventory (hereafter referred to as species group) that converts tree dimensions from field timber inventories on sample plots to aboveground biomass of trees.

3.2.1.2 Measurements

Only the individual trees, species and strata which were to be harvested in the baseline scenario are to be measured. Any minimum values employed in inventories are held constant for the duration of the project.

3.2.1.3 Determining Sample Plot Carbon Stocks

The carbon stock in aboveground biomass for each individual tree of species group j in the sample plot located in stratum i will be estimated using the selected allometric equation applied to the tree dimensions resulting from section 3.2.1.2.

Therefore, the sum of the carbon stock in each sample plot will be calculated as:

$$C_{AB,j,i,t,sp|PRJ} = \sum_{l=1}^{L_{j,i,sp,t}} f_j(X, Y \ldots) * CF_j \qquad (17)$$

Where:

$C_{AB,j,i,t,sp|PRJ}$	carbon stock in aboveground biomass of trees of species j in plot sp in stratum i at time t in the project scenario, tC
CF_j	carbon fraction of biomass for tree group j, tC t d.m.$^{-1}$;
$f_j(X,Y...)$	aboveground biomass of trees based on allometric equation for species group j based on measured tree variable(s), t. d.m. tree-1;
i	1, 2, 3, …M strata;
j	1, 2, 3 … J tree species;
l	1, 2, 3, … $L_{j,i,t,sp}$ sequence number of individual trees of species group j in stratum i at time t in sample plot sp;
t	0, 1, 2, 3, …t* years elapsed since start of the project activity; and

sp	1, 2, 3 …SP sample plots.

3.2.1.4 Determining Stratum Carbon Stocks

The total carbon stock in the aboveground biomass of all trees present in sample plot sp in stratum i at time t, must be calculated as:

$$C_{AB,i,t,sp|PRJ} = \sum_{j=1}^{J} C_{AB,j,i,t,sp|PRJ}$$

(18)

Where:

$C_{AB,i,t,sp\|PRJ}$	aboveground biomass carbon stock of all trees of stratum i at time t in sample plot sp in the project scenario, tC;
$C_{AB,j,i,t,sp\|PRJ}$	carbon stock in aboveground biomass of trees of species j in stratum i at time t in plot sp in the project scenario, tC;
i	1, 2, 3, …M strata;
j	1, 2, 3 … J tree species; and
t	0, 1, 2, 3 …t* years elapsed since the start of the project activity.

3.2.1.5 Determining Mean Carbon Stocks

Therefore, the mean carbon stock in aboveground biomass for each stratum per unit area is calculated as:

$$C_{AB,i,t|PRJ} = \frac{1}{SP} * \sum_{SP=1}^{SP} \left(\frac{C_{AB,i,t,sp|PRJ}}{A_{sp}}\right)$$

(19)

Where:

$C_{AB,i,t\|PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, tC ha^{-1};
$C_{AB,i,t,sp\|PRJ}$	aboveground biomass carbon stock of trees in stratum i at time t in sample plot sp, tC;
$A_{,sp}$	area of sample plot sp, ha;
sp	1, 2, 3 … SP sample plots;
i	1, 2, 3 … M strata; and

t	0, 1, 2, 3 … t* years elapsed since the start of the project activity.

3.2.1.6 Determining Carbon Stock Changes

The annual carbon stock change in aboveground biomass of trees in year t is the difference in mean carbon stock in aboveground biomass between sampling events and, when expressed in tCO_2e, is calculated as:

$$\Delta C_{AB,t|PRJ} = (\sum_{i=1}^{M}(A_i * \frac{C_{AB,i,t2|PRJ} - C_{AB,i,t1|PRJ}}{T})) * \frac{44}{12}$$

(20)

Where:

$\Delta C_{AB,t\|PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, $tCO_2e\ yr^{-1}$;
$C_{AB,i,t\|PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, $tC\ ha^{-1}$;
$A_{,i}$	area covered by stratum i, ha;
sp	1, 2, 3 … SP sample plots;
T	number of years between monitoring time t1 and t2 ($T=t_2 - t_1$); years;
i	1, 2, 3 … M strata; and
t	0, 1, 2, 3 … t* years elapsed since the start of the project activity; and
44/12	ratio of molecular weights of carbon dioxide divided carbon, $tCO_2e\ tC^{-1}$.

The carbon stock change in aboveground biomass of trees ($\Delta C_{AB,t|PRJ}$) is the output of this section and is necessary to calculate net greenhouse gas emissions in the project scenario.

3.2.2 Forest disturbance in the project scenario

This section calculates $\Delta C_{DIST\_FR,t|PRJ}$, carbon stock change due to fire disturbance in the project scenario; tCO_2-e, $\Delta C_{DIST,t|PRJ}$, carbon stock change due to non-fire natural disturbance in the project scenario; tCO_2-e

3.2.2.1 Natural disturbance

3.2.2.1a Natural Disturbance - Fire

Where fires occur ex post in the project area, the area burned shall be delineated. Therefore, based on the IPCC 2006 Inventory Guidelines, estimation of greenhouse gas emissions from biomass burning shall be calculated as:

$$\Delta C_{DIST_{FR},t|PRJ} = \sum_{i=1}^{M} A_{burn,i,t} * B_{i,t|PRJ} * COMF_i * G_{g,i} * 10^{-3}.GWP_{CH4} \quad (21)$$

Where:

$\Delta C_{DIST\_FR,t\|PRJ}$	net greenhouse gas emissions resulting from fire disturbance in year *t*, tCO_2e ;
$A_{burn,i,t}$	area burnt for stratum *i* at time *t*, ha;
$B_{i,t\|PRJ}$	average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning stratum *i*, time *t*; t d. m. ha^{-1};
$COMF_i$	combustion factor for stratum *i*, dimensionless;
$G_{g,i}$	emission factor for stratum *i* for methane, g kg^{-1} dry matter burnt;
GWP_{CH4}	global warming potential for CH_4 (IPCC default: 21), tCO_2e tCH_4^{-1};
i	1, 2, 3 …*M* strata; and
t	1, 2, 3, … *t** years elapsed since the start of the IFM project activity.

The average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning for a particular stratum shall be calculated as:

$$B_{i,t|PRJ} = \sum_{j=1}^{J} \{V_{EX,i,j|BSL} * BCEF_R\} \quad (22)$$

Where:

$B_{i,t\|PRJ}$	average aboveground biomass stock present in the project scenario but absent in the baseline before burning for stratum *i*, time *t*, t d. m. ha^{-1};
$V_{EX,j,i\|BSL}$	mean volume of extracted timber per unit area for species *j* in stratum *i*, m3·ha^{-1};
$BCEF_R$	biomass conversion and expansion factor applicable to wood removals in the project area, t.d.m m^{-3};
i	1, 2, 3 …*M* strata;
j	1, 2, 3 …*J* tree species; and
t	1, 2, 3, … *t** years elapsed since the start of the IFM project activity.

3.2.2.1b Natural Disturbance – Non-Fire

There are no fire disturbance occurred in the project area, therefore, $\Delta C_{DIST\_FR,t|PRJ}=0$

Where non-fire natural disturbances occur ex post in the project area, the area disturbed must be delineated.

$$\Delta C_{DIST,t|PRJ} = \sum_{i=1}^{M} \left(A_{dist,i,t} * \sum_{j=1}^{J} \{ C_{AB,j,i|BSL} \} \right) * \frac{44}{12}$$

(23)

Where:

$\Delta C_{DIST,t\|PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year *t*, tCO_2e ;
$A_{dist,i,t}$	area disturbed for stratum *i* at time *t*, ha;
$C_{AB,i\|BSL}$	carbon stock in aboveground biomass per unit area in stratum *i*, $tC \cdot ha^{-1}$;
44/12	ratio of molecular weights of carbon dioxide and carbon, $tCO_2e\ tC^{-1}$;
i	1, 2, 3 …*M* strata;
j	1, 2, 3 …*J* tree species; and
t	1, 2, 3, … *t** years elapsed since the start of the IFM project activity.

There are non-fire natural disturbances occur ex post in the project area, therefore, $\Delta C_{DIST,t|PRJ}$=0

3.2.2.2 Illegal logging

Where the PRA and the limited sampling indicate degradation is occurring, net carbon stock changes as a result of illegal logging shall be calculated as:

$$\Delta C_{DIST-IL,t|PRJ} = \sum_{i=1}^{M} \left(A_{DIST-IL,j} * \frac{C_{DIST-IL,i,t|PRJ}}{AP_i} \right)$$

(24)

Where:

$\Delta C_{DIST\_IL,t\|PRJ}$	net carbon stock changes as a result of illegal logging at time *t*, tCO_2e;
$A_{DIST\_IL,}i$	area potentially impacted by illegal logging in stratum *I*, ha;
$C_{DIST\_IL,i,t\|PRJ}$	biomass carbon of trees cut and removed through illegal logging in stratum i at time t, tCO_2e;
APi	total area of illegal logging sample plots in stratum *i*, ha;
i	1, 2, 3 …*M* strata in the in the project case; and
t	1, 2, 3, … *t* years elapsed since the projected start of the project activity.

There are no degradation occurred indicated in PRA and limited sampling, therefore, $\Delta_{CDIST\_IL,t|PRJ}$ =0

3.2.3 Net greenhouse gas emissions in the project scenario

This section calculates $\Delta C_{NET,t|PRJ}$, the net greenhouse gas emissions in the project scenario in year t, in tCO_2e.

The net greenhouse gas emissions in the project scenario are the sum of net greenhouse gas emissions resulting from fire and non-fire forest disturbance, plus any carbon stock changes that occur as a result of illegal logging, minus the annual carbon stock change in the aboveground biomass of trees due to forest growth.

Therefore, net greenhouse gas emissions in the project scenario in year t, is calculated as:

$$\Delta C_{NET,t|PRJ} = \left(\Delta C_{DIST-FR\;\;,t|PRJ} + \Delta C_{DIST,t|PRJ} + \Delta C_{DIST-IL\;\;,t|PRJ}\right) - \Delta C_{AB,t|PRJ}$$

(25)

Where:

$\Delta C_{NET,t\|PRJ}$	net greenhouse gas emissions in the project scenario in year t, tCO_2-e
$\Delta C_{DIST\_FR,t\|PRJ}$	net greenhouse gas emissions resulting from fire disturbance in year t, tCO_2e
$\Delta C_{DIST,t\|PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year t, tCO_2e
$\Delta C_{DIST\_IL,t\|PRJ}$	Net carbon stock changes as a result of illegal logging at time t, tCO_2e
$\Delta C_{AB,t\|PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, tCO_2e yr^{-1}; and
t	1, 2, 3, t* years elapsed since start of the project activity.

The net greenhouse gas emissions across in the project scenario since the start of the project activity is calculated as:

$$GHG_{NET|PRJ} = \sum_{t=1}^{t^*} \Delta C_{NET,t|PRJ}$$

(26)

Where:

$GHG_{NET\|PRJ}$	net greenhouse gas emissions in the project scenario since the start of the project activity, tCO_2e
$\Delta C_{NET,t\|PRJ}$	net greenhouse gas emissions in the project scenario in year t, tCO_2e; and
t	1, 2, 3, t* years elapsed since start of the project activity.

3.3 Leakage

3.3.1 Activity shifting leakage

There may be no leakage due to activity shifting.

The project does not involve in the activity shifting leakage due to the following reasons:

In China, the forest timber harvest is strictly controlled by the authority. The stated council issued the annual timber harvest volume limit to each province every fives at the beginning of every national 5-year plan. And the provincial forestry authority issued the timber harvest approval and restrictions to its subordinate based on its limit. And its subordinate forestry authority did the same way for the timber harvest and transportation approval as its superior issued.

Also, the China Forest Law also clearly stipulates the punishment for the illegal logging, which not only requires 5-10 times compensation of replanting, but also 2-10 times economic penalty.

Definitely, in China, the timber harvest is tightly controlled by the forestry authority, the illegal logging is severely punished.

Therefore, for the project activity, even if the project proponent has more than one forest parcels, the timber harvest limit is planned in advance by the forestry authority; they have no right to harvest more in other parcels outside the project activity.

3.3.2 Market leakage

Leakage due to market effects is equal to the net emissions from planned timber harvest activities in the baseline scenario multiplied by an appropriate leakage factor:

$$GHG_{LK|LtPF} = LF_{me} * GHG_{NET|BSL,t*} \quad (27)$$

Where:

$GHG_{LK\|LtPF}$	is total market leakage as a result of IFM LtPF activities, tCO_2e;
TLF_{ME}	is the dimensionless leakage factor for market-effects calculations;
h$GHG_{NET\|BSL,t*}$ e	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2e.

lThe leakage factor is determined by considering where in the country logging will be increased as a result of the decreased timber supply caused by the project.

Leakage factor calculation

The leakage factor is determined by considering where in the country logging will be increased as a result of the decreased supply of the timber caused by the project. If the areas liable to be logged have a higher ratio of merchantable biomass to total biomass higher than the project area it is likely that the proportional leakage is higher and vice versa.

Therefore,

$LF_{ME} = 0$

If it can be demonstrated that no market-effects leakage will occur within national boundaries, that is if no new concessions are being assigned AND annual extracted volumes cannot be increased within existing national concessions AND illegal logging is absent (or de minimis) in the host country.

For the project,

- According to the 13th Five-year Forest Harvest Limit issued by State Council (Guohan [2016] No.32)[6], the total harvest volume limit from 2016 to 2020 is 25,403.6*10^4 m^3, and the planned harvest volume of the project is 59.9*10^4 m^3, accounting 0.24% of the national harvest volume, which will not result in the significant national concession and illegal logging;
- The annual extracted volume is unlikely increase within existing national concessions AND illegal logging is strictly forbidden and will be severely punished by the law.

In summary,

$LF_{ME} = 0$

The actual value will be monitored when verification.

3.4 Net GHG Emission Reductions and Removals

3.4.1 Net Project Greenhouse Gas Emission Reductions

According to VM0010 version 1.3, the Net Project Greenhouse Gas Emission Reductions are calculated as:

$$GHG_{CREDITS|LtPF,t*} = GHG_{NET|BSL,t*} - GHG_{NET|PRJ,t*} - GHG_{LK|LtPF,t*} \quad (28)$$

Where:

$GHG_{CREDITS\|LtPF,t*}$	project greenhouse gas credits associated with the implementation of improved forest management (IFM) activities in the year t* since the start of the project activity, in the project scenario, tCO_2e
$GHG_{NET\|BSL,t*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2e

[6] http://www.gov.cn/zhengce/content/2016-02/16/content_5041486.htm

$GHG_{NET|PRJ,t^*}$ net greenhouse gas emissions in the project scenario in the year t* since the start of the project activity, tCO_2e; and

$GHG_{LK|LtPF,t^*}$ total greenhouse gas emissions due to leakage arising outside the project boundary as a result of the implementation of improved forest management (IFM) activities in the year t* since the start of the project activity, in the project scenario, tCO_2e

3.4.2 Project Verified Carbon Units

The number of Verified Carbon Units (VCUs) for each year t in the project crediting period is the greenhouse gas emission reductions and removals adjusted for uncertainty and risk.

3.4.2.1 Adjustment for uncertainty

Estimated greenhouse gas emissions and emission reductions from IFM activities have uncertainties associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors. It is assumed that the uncertainties associated with input data are available, either as default uncertainty values given in most recent IPCC guidelines, or as statistical estimates based on sampling.

Uncertainty at all times is defined at the 95% confidence interval where the estimated variance exceeds +/- 15 percent from the mean. Procedures including stratification and the allocation of sufficient measurement plots will help ensure that low uncertainty results and ultimately full crediting can result.

Uncertainties arising from the measurement and monitoring of carbon pools and greenhouse gases shall always be quantified. Errors in each pool shall be weighted by the size of the pool so that projects may reasonably target a lower precision level in pools that only form a small proportion of the total stock.

For both the baseline and the with-project case the total uncertainty is equal to the square root of the sum of the squares of each component uncertainty and is calculated at the time of reporting through propagating the error in the baseline stocks and the error in the project stocks.

Therefore, total uncertainty for LtPF project is calculated as:

$$U_{TOTAL\,|LtPF} = \sqrt{U_{|PRJ}^2 + U_{|BSL}^2} \quad (29)$$

Where:

$U_{total|LtPF}$ total uncertainty for LtPF Project, dimensionless;

$U_{|PRJ}$ total uncertainty for the improved forest management activities in the project scenario, dimensionless; and

$U_{|BSL}$ total uncertainty for the baseline scenario, dimensionless.

Project proponents must justify the selection of uncertainty propagation in the VCS-PD.

If $U_{total|LtPF} \leq 0.15$ then no deduction will result for uncertainty.

If $U_{total|LtPF} > 0.15$ then the amount of greenhouse gas emission credits associated with IFM activities will be deducted as follows:

$$Credits_{total|LtPF} = GHG_{credits|LtPF} \cdot (1 - U_{total|LtPF}) \quad (30)$$

Where:

$Credits_{total|LtPF}$	total greenhouse gas credits adjusted for uncertainty for each year t in the project crediting period;
$GHG_{credits|LtPF}$	project greenhouse gas credits associated with the implementation of improved forest management (IFM) activities in the project scenario, $tCO_2e \cdot year^{-1}$; and
$U_{total|LtPF}$	total uncertainty for LtPF Project, dimensionless.

3.4.2.2 Calculation of verified carbon units

The amount of greenhouse gas credits estimated at section 3.4.2.1 above shall be adjusted to account for risk.

They shall be subject to deductions based on application of the most recent version of the VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination.

Therefore, the amount of VCU's that can be issued at time $t=t_2$ (the date of verification) for monitoring period $T=t_2-t_1$, is calculated as:

$$VCU_{net|LtPF} = \left(Credits_{total,t2|LtPF} - Credits_{total,t1|LtPF}\right) - Bu_{|IFM-VCS} \quad (31)$$

Where:

$VCU_{net|LtPF}$	number of verified carbon units; dimensionless;
$Credits_{total.t1|LtPF}$	net anthroprogenic greenhouse gas removals by sinks, as estimated for $t^*=t_1$ in tCO_2e;
$Credits_{total.t2|LtPF}$	net anthroprogenic greenhouse gas removals by sinks, as estimated for $t^*=t_2$ in tCO_2e; and
$Bu_{|IFM-VCS}$	total number of credits withheld in VCS buffer account

3.4.3 The calculation process

3.4.3.1 The calculation process of baseline emission

Therefore, for the calculation of $GHG_{NET|BSL}$, according to section 3.1, the process is shown below:

Table 5: Basic Parameter of Baseline Scenario

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	Birch	10454	ha	Timber harvest plan issued by Inner Mongolia Keyihe Forestry Bureau, and calculated from Forest second class investigation issued by Inner Mongolia autonomous region forestry survey and design institute
	Larch	10072	ha	
$V_{,j,I,BSL}$	Birch	114.54	m^3/ha	
	Larch	118.26	m^3/ha	
$V_{EX,j,i\|BSL,y}$	Refer to ER sheet		m^3/ha	
$A_{i,p,y}$	Refer to ER sheet		ha	
D_j	Birch	0.541	t d.m. m^{-3}	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Larch	0.490	t d.m. m^{-3}	
BEF	Birch	1.424	dimensionless	
	Larch	1.416	dimensionless	
$BCEF_R$	Birch	0.770	t d.m. m^{-3}	calculated by BEF and D
	Larch	0.694	t d.m. m^{-3}	
CF_j	Birch/Larch	0.5	tC t d.m.$^{-1}$	VM0010 version 1.3
WW	Birch/Larch	24%	kg kg^{-1}	
SLF	Birch/Larch	0.12	kg kg^{-1}	
OF	Birch/Larch	0.62	kg kg^{-1}	
Regrowth rate in baseline scenario	Birch	1.56	$m^3.ha^{-1}.yr^{-1}$	The statement on the growth volume in Keyihe issued by Keyihe forest bureau
	Larch	1.83	$m^3.ha^{-1}.yr^{-1}$	

Table 6: The baseline emission during the crediting period

Year	$\Delta C_{NET\|BSL}$	$GHG_{NET\|BSL}$
01/01/2013-31/12/2013	4,225	15,491
01/01/2014-31/12/2014	3,534	12,958
01/01/2015-31/12/2015	2,541	9,317
01/01/2016-31/12/2016	6,672	24,464
01/01/2017-31/12/2017	3,020	11,073
01/01/2018-31/12/2018	18,292	67,070
01/01/2019-31/12/2019	26,051	95,520

01/01/2020-31/12/2020	25,421	93,210
01/01/2021-31/12/2021	44,544	163,328
01/01/2022-31/12/2022	17,829	65,373
01/01/2023-31/12/2023	26,468	97,049
01/01/2024-31/12/2024	28,492	104,470
01/01/2025-31/12/2025	19,667	72,112
01/01/2026-31/12/2026	21,507	78,859
01/01/2027-31/12/2027	23,331	85,547
01/01/2028-31/12/2028	25,897	94,955
01/01/2029-31/12/2029	19,416	71,192
01/01/2030-31/12/2030	20,605	75,551
01/01/2031-31/12/2031	20,621	75,610
01/01/2032-31/12/2032	17,010	62,370
01/01/2033-31/12/2033	15,715	57,621
01/01/2034-31/12/2034	10,885	39,911
01/01/2035-31/12/2035	13,703	50,244
01/01/2036-31/12/2036	13,989	51,293
01/01/2037-31/12/2037	10,346	37,935
01/01/2038-31/12/2038	7,759	28,449
01/01/2039-31/12/2039	7,312	26,810
01/01/2040-31/12/2040	6,919	25,369
01/01/2041-31/12/2041	4,019	14,736
01/01/2042-31/12/2042	1,516	5,558
Total	467,306	1,713,445
Average	15,576	57,114

3.4.3.2 The calculation of project emission

The ex-ante estimation of project emission of the proposed project is as follows:

Table 7: Basic Parameter of Project Scenario

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	Birch	10454	ha	Timber harvest plan
	Larch	10072	ha	
D_j	Birch	0.541	t d.m. m^{-3}	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Larch	0.490	t d.m. m^{-3}	
BEF	Birch	1.424	dimensionless	
	Larch	1.416	dimensionless	

$BCEF_R$	Birch	0.770	t d.m. m^{-3}	calculated by BEF and D
	Larch	0.694	t d.m. m^{-3}	
CF_j	Birch/Larch	0.5	tC t d.m.$^{-1}$	VM0010 version 1.3
Ongoing growth rate in project scenario	Birch	2.80	$m^3.ha^{-1}.yr^{-1}$	The statement on the growth volume in Keyihe issued by Keyihe forest bureau
	Larch	2.35	$m^3.ha^{-1}.yr^{-1}$	

Because the forest inventory conducted by Inner Mongolia autonomous region forestry survey and design institute didn't include the detail of each tree in the subcompartment, so we didn't use allometric equation to estimate the project emission here. And according to the methodology, it is acceptable to use pre-existing forest inventory data for this purpose, so we use the ongoing growth rate to predict the project emission.

On-going growth rate is predicted by the project owner based on the historical data, so the emissions of each year during the whole crediting period are same. In the monitoring report, the actual stock volume will be measured, then re-calculate the emission within the crediting period.

Table 8: The project emission during the crediting period

Year	$\Delta C_{AB,t\|PRJ}$	$\Delta C_{DIST\_FR,t\|PRJ}$	$\Delta C_{DIST,t\|PRJ}$	$\Delta C_{DIST\_IL,t\|PRJ}$	$\Delta C_{NET,t\|PRJ}$
01/01/2013-31/12/2013	71,449	0	0	0	-71,449
01/01/2014-31/12/2014	71,449	0	0	0	-71,449
01/01/2015-31/12/2015	71,449	0	0	0	-71,449
01/01/2016-31/12/2016	71,449	0	0	0	-71,449
01/01/2017-31/12/2017	71,449	0	0	0	-71,449
01/01/2018-31/12/2018	71,449	0	0	0	-71,449
01/01/2019-31/12/2019	71,449	0	0	0	-71,449
01/01/2020-31/12/2020	71,449	0	0	0	-71,449
01/01/2021-31/12/2021	71,449	0	0	0	-71,449
01/01/2022-31/12/2022	71,449	0	0	0	-71,449
01/01/2023-31/12/2023	71,449	0	0	0	-71,449
01/01/2024-31/12/2024	71,449	0	0	0	-71,449
01/01/2025-31/12/2025	71,449	0	0	0	-71,449
01/01/2026-31/12/2026	71,449	0	0	0	-71,449
01/01/2027-31/12/2027	71,449	0	0	0	-71,449
01/01/2028-31/12/2028	71,449	0	0	0	-71,449
01/01/2029-31/12/2029	71,449	0	0	0	-71,449
01/01/2030-31/12/2030	71,449	0	0	0	-71,449
01/01/2031-31/12/2031	71,449	0	0	0	-71,449
01/01/2032-31/12/2032	71,449	0	0	0	-71,449
01/01/2033-31/12/2033	71,449	0	0	0	-71,449

01/01/2034-31/12/2034	71,449	0	0	0	-71,449
01/01/2035-31/12/2035	71,449	0	0	0	-71,449
01/01/2036-31/12/2036	71,449	0	0	0	-71,449
01/01/2037-31/12/2037	71,449	0	0	0	-71,449
01/01/2038-31/12/2038	71,449	0	0	0	-71,449
01/01/2039-31/12/2039	71,449	0	0	0	-71,449
01/01/2040-31/12/2040	71,449	0	0	0	-71,449
01/01/2041-31/12/2041	71,449	0	0	0	-71,449
01/01/2042-31/12/2042	71,449	0	0	0	-71,449
Total	2,143,470	0	0	0	-2,143,470
Average	71,449	0	0	0	-71,449

Forest disturbance in the project scenario:

According to the analysis in section 3.2, $\Delta C_{DIST\_FR,t|PRJ}$, $\Delta C_{DIST,t|PRJ}$ and $\Delta C_{DIST\_IL,i,t|PRJ}$ are all = 0.

Therefore,

$GHG_{LK|LtPF}$ =0

3.4.4 Uncertainty for the baseline scenario:

According to *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*[7], the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation process follows the two rules below:

Rule A: Where uncertainties are to be combined by addition, the standard deviation of the sum will be the square root of the sum of the squares of the standard deviations of the quantities that are added with the standard deviations all expressed in absolute terms (this rule is exact for uncorrelated variables).

Using this interpretation, a simple equation can be derived for the uncertainty of the sum, that when expressed in percentage terms becomes:

$$U_{total} = \frac{\sqrt{(U_1 \times E_1)^2 + (U_2 \times E_2)^2 + \cdots + (U_n \times E_n)^2}}{E_1 + E_2 + \cdots + E_n} \qquad (32)$$

Where:

[7] IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Chapter 6, Quantifying Uncertainties in Practice .

U_{total}	is the percentage uncertainty in the sum of the quantities (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage);
E_i and U_i	are the uncertain quantities and the percentage uncertainties associated with them, respectively
Rule B	Where uncertain quantities are to be combined by multiplication, the same rule applies except that the standard deviations must all be expressed as fractions of the appropriate mean values (this rule is approximate for all random variables).

A simple equation can also be derived for the uncertainty of the product, expressed in percentage terms:

$$U_{total} = \sqrt{U_1^2 + U_2^2 + \cdots + U_n^2} \quad (33)$$

Where:

U_{total}	is the percentage uncertainty in the product of the quantities (half the 95% confidence interval divided by the total and expressed as a percentage);
U_i	are the percentage uncertainties associated with each of the quantities.

The uncertainty is calculated per stratum by dividing the 95% confidence interval by the mean value of the uncertainty quantities. The corresponding standard deviation is calculated over the measured plot values of the uncertainty quantities. The 95% confidence interval is calculated based on the standard deviation and the t-value for n-1 degree of freedom of plots per stratum.

As the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation of the 4 parameters and coefficients are shown below:

1) Uncertainty of Area:

   In the baseline scenario, the area of every stratum are quoted from the field survey inventory data and legal right of harvest, so no data are from measurement and monitoring. Therefore, it is deemed as 0 in the period of validation. It will be monitored in the period of verification.

2) Uncertainty of expansion factors:

   The Sample size, Sample mean and Standard error of expansion factors are quoted from Forestry Part of China's greenhouse gas emissions list divided as tree species, and the uncertainty of expansion factors are calculated as below:

   For Birch:

Uncertainty of BCEF-Birch		5.95%	
Uncertainty of BEF-Birch	5.89%	Uncertainty of D-Birch	0.84%
BEF		D	
Sample size	55	Sample size	62
Sample mean (BEF)	1.180	Sample mean (D)	0.541
Standard deviation	0.257	Standard deviation	0.018
Average error	0.035	Average error	0.002
Confidence level	0.950	Confidence level	0.950
Degree of freedom	54	Degree of freedom	61
Two-sided Student's t-value	2.005	Two-sided Student's t-value	2.000
Allowable error	0.069	Allowable error	0.005
Lower confidence limit	1.111	Lower confidence limit	0.536
Upper confidence limit	1.249	Upper confidence limit	0.546
Confidence interval	0.069	Confidence interval	0.005

For Larch:

Uncertainty of BCEF-Larch		5.76%	
Uncertainty of BEF-Larch	3.16%	Uncertainty of D-Larch	4.81%
BEF		D	
Sample size	321	Sample size	13
Sample mean (BEF)	1.416	Sample mean (D)	0.490
Standard deviation	0.408	Standard deviation	0.039
Average error	0.023	Average error	0.011
Confidence level	0.950	Confidence level	0.950
Degree of freedom	320	Degree of freedom	12
Two-sided Student's t-value	1.967	Two-sided Student's t-value	2.179
Allowable error	0.045	Allowable error	0.024
Lower confidence limit	1.371	Lower confidence limit	0.466
Upper confidence limit	1.461	Upper confidence limit	0.514
Confidence interval	0.045	Confidence interval	0.024

3) Uncertainty of carbon stock:

The calculation of uncertainty of carbon stock is based on the uncertainty of volume in every stratum multiply by the uncertainty of expansion factors using formula (32):

Uncertainty of carbon stock-Birch	6.02%	Uncertainty of carbon stock-Larch	5.95%
Uncertainty of volume-Birch	0.90%	Uncertainty of volume-Larch	1.52%
carbon stock-Birch	677734.22	carbon stock-Larch	548648.87
Area(ha)	10454.00	Area(ha)	10072.00
Sample size	830	Sample size	1139
Sample mean (m^3/ha)	168.31	Sample mean (m^3/ha)	157.02
Standard deviation	22.23	Standard deviation	40.98
Average error	0.77	Average error	1.21
Confidence level	0.95	Confidence level	0.95
Degree of freedom	829	Degree of freedom	1138
Two-sided Student's t-value	1.96	Two-sided Student's t-value	1.96
Allowable error	1.51	Allowable error	2.38
Lower confidence limit	166.79	Lower confidence limit	154.64
Upper confidence limit	169.82	Upper confidence limit	159.40
Confidence interval	1.51	Confidence interval	2.38

4) Uncertainty of regrowth

The uncertainty of regrowth is only associated with the parameter RGR_i, as for the value quoted from the expertise of the local forest authority, the uncertainty of 10% is adopted from the National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry Bureau . And this uncertainty is adopted for the project for conservative.

Based on the calculation of the 4 parameters and coefficients above, the calculation of $U_{Birch|BSL}$ and $U_{Larch|BSL}$ are shown below:

Stratum	Parameter	A_{rea}(Ha)	$V_{EX,i,i\|BSL}$ (m3/ha)	BEF	D(tdm/m3)	$BCEF_R$ (tdm/m3)	CFj(tc/tdm)	$C_{HB,i,i\|BSL}$ (tC /ha)	$C_{EX,i,i\|BSL}$ (tC ha^{-1})	$\Delta C_{DW,i,p\|BSL}$
		a	b	c	d	e=c*d	f	g=b*e*f	h=b*d*f	i=g-h
								$U_g=\sqrt{U_b^2+U_e^2}$	$U_h=\sqrt{U_b^2+U_d^2}$	$U_i=\frac{\sqrt{(E_g*U_g)^2+(E_h*U_h)^2}}{(E_g+E_h)}$
Birch	E	10454.00	114.54	1.424	0.541	0.770	0.5	44.12	30.98	13.14
	U	0	0.90%	5.89%	0.84%	5.95%		6.02%	1.23%	3.57%
Larch	E	10072.00	118.26	1.416	0.490	0.694	0.5	41.03	28.97	12.05
	U	0	1.52%	3.16%	4.81%	5.76%		5.95%	5.04%	4.07%

Stratum	Parameter	WW_k	SLF_k	$C_{wp,0\|BSL}$ (tc/ha)	$C_{WP,i\|BSL}$(tc/ha)	OF_k	$\Delta C_{WP,100\|BSL}$ (tc/ha)	Ai,p(ha)	$\Delta C_{NET\|BSL(1)}$(tC)
		j	k	l=h*(j+k)	m=h-l	n	o=m*n	p	q=(i/10+l+o/20)*p
				$U_l=U_h$	$U_m=\frac{\sqrt{(E_h*U_h)^2+(E_l*U_l)^2}}{(E_h+E_l)}$		$U_o=U_m$	$U_p=0$	$U_m=\frac{\sqrt{(E_i*U_i)^2+(E_l*U_l)^2+(E_o*U_o)^2}}{(E_i+E_l+E_o)}$
Birch	E	24%	0.12	11.15	19.83	0.62	12.29	2116.60	27688.84
	U			1.23%	0.96%		0.96%		1.37%
Larch	E	24%	0.12	10.43	18.54	0.62	11.50	1562.42	19078.64
	U			5.04%	3.94%		3.94%		2.50%

Stratum	Parameter	$\Delta C_{NET\|BSL(2-10)}$(tC)	$\Delta C_{NET\|BSL(11-20)}$(tC)	regrowth rate (m3/ha/yr)	$\Delta C_{NET\|BSL,t^*}$(tC)	ΔCNET, i,P|BSL
		r=(i/10+o/20)*p	s=o/20*p	t	v=e*f*p*t	w=q+r+s-v
		$U_r = \frac{\sqrt{(E_i * U_i)^2 + (E_o * U_o)^2}}{(E_i + E_o)}$	$U_s = U_o$	$U_t = 10\%$	$U_v = \sqrt{U_e^2 + U_t^2}$	$U_m = \frac{\sqrt{(E_q * U_q)^2 + (E_r * U_r)^2 + (E_s * U_s)^2 + (E_v * U_v)^2}}{(E_q + E_r + E_s + E_v)}$
Birch	E	4081.45	1301.03	1.56	1271.86	31799.46
	U	1.90%	0.96%	10.00%	11.64%	1.21%
Larch	E	2781.40	898.16	1.83	991.92	21766.27
	U	2.83%	3.94%	10.00%	11.54%	2.10%
					U_{BSL}	1.12%

Therefore, as there are 2 strata in the project activity, the uncertainty across combined strata for is calculated with the revised equation below:

$$U_{|BSL} = \frac{\sqrt{(U_{Birch|BSL} \times E_{Birch|BSL})^2 + (U_{Larch|BSL} \times E_{Larch|BSL})^2}}{E_{Birch|BSL} + E_{Larch|BSL}} \quad (34)$$

Where:

$U_{\|BSL}$	Total uncertainty in baseline scenario; %
$U_{Birch\|BSL}$	Uncertainty in baseline scenario in stratum Birch; %;
$U_{Larch\|BSL}$	Uncertainty in baseline scenario in stratum Larch; %;
$E_{Birch\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum Birch in the baseline case; t CO_2e
$E_{Larch\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum Larch in the baseline case; t CO_2e

After calculation, U_{BSL} is 1.12% for the baseline scenario.

3.4.5 Uncertainty for the project scenario:

Stratum	Parameter	A_{rea}(Ha)	BEF	D(tdm/m3)	$BCEF_R$ (tdm/m3)	CFj (tc/tdm)	ongoing growth rate (m3/ha/yr)	$\Delta C_{AB,t\|PRJ}$(tCO2)
		a	b	c	d=b*c	e	f	g=f*a*d*e*44/12
							U_f=10%	$U_g=\sqrt{U_d^2+U_f^2}$
Birch	E	10454.00	1.424	0.541	0.770	0.5	2.80	41341.78
	U	0	5.89%	0.84%	5.95%		10.00%	11.64%
Larch	E	10072.00	1.416	0.490	0.694	0.5	2.35	30108.17
	U	0	3.16%	4.81%	5.76%		10.00%	11.54%
							U_{PRJ}	8.30%

Total uncertainty

Total uncertainty for LtPF project is calculated according to the follow equation:

$$U_{Total|LtPF} = \sqrt{U_{|PRJ}^2 + U_{|BSL}^2} = \sqrt{8.30^2 + 1.12\%^2} = 8.38\% = 0.0838$$

According to the methodology, if $U_{total,LtPF} \leq 0.15$ then no deduction will result for uncertainty, as U_{total}<0.15, then no deduction will result from uncertainty.

3.4.6 Calculation of verified carbon units

Based on the analysis in NON-PERMANENCE RISK REPORT, the overall risk rating is 22, then 22% of the total emission reductions should be deducted .

Therefore, the emission reduction detail is listed:

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)	Estimated net GHG emission reductions or removals with buffer deduction (tCO_2e)
01/01/2013-31/12/2013	15,491	-71,449	0	86,940	67,813
01/01/2014-31/12/2014	12,958	-71,449	0	84,407	65,837
01/01/2015-31/12/2015	9,317	-71,449	0	80,766	62,997
01/01/2016-31/12/2016	24,464	-71,449	0	95,913	74,812
01/01/2017-31/12/2017	11,073	-71,449	0	82,522	64,367
01/01/2018-31/12/2018	67,070	-71,449	0	138,519	108,044
01/01/2019-31/12/2019	95,520	-71,449	0	166,969	130,235
01/01/2020-31/12/2020	93,210	-71,449	0	164,659	128,434
01/01/2021-31/12/2021	163,328	-71,449	0	234,777	183,126
01/01/2022-31/12/2022	65,373	-71,449	0	136,822	106,721
01/01/2023-31/12/2023	97,049	-71,449	0	168,498	131,428
01/01/2024-31/12/2024	104,470	-71,449	0	175,919	137,216
01/01/2025-31/12/2025	72,112	-71,449	0	143,561	111,977
01/01/2026-31/12/2026	78,859	-71,449	0	150,308	117,240
01/01/2027-31/12/2027	85,547	-71,449	0	156,996	122,456
01/01/2028-31/12/2028	94,955	-71,449	0	166,404	129,795
01/01/2029-31/12/2029	71,192	-71,449	0	142,641	111,259
01/01/2030-31/12/2030	75,551	-71,449	0	147,000	114,660
01/01/2031-31/12/2031	75,610	-71,449	0	147,059	114,706
01/01/2032-31/12/2032	62,370	-71,449	0	133,819	104,378
01/01/2033-31/12/2033	57,621	-71,449	0	129,070	100,674
01/01/2034-31/12/2034	39,911	-71,449	0	111,360	86,860
01/01/2035-31/12/2035	50,244	-71,449	0	121,693	94,920
01/01/2036-31/12/2036	51,293	-71,449	0	122,742	95,738
01/01/2037-31/12/2037	37,935	-71,449	0	109,384	85,319
01/01/2038-31/12/2038	28,449	-71,449	0	99,898	77,920
01/01/2039-31/12/2039	26,810	-71,449	0	98,259	76,642

01/01/2040-31/12/2040	25,369	-71,449	0	96,818	75,518
01/01/2041-31/12/2041	14,736	-71,449	0	86,185	67,224
01/01/2042-31/12/2042	5,558	-71,449	0	77,007	60,065
Total	1,713,445	-2,143,470	0	3,856,915	3,008,381
Average	57,114	-71,449	0	128,563	100,279

4. MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter:	$V_{l,j,i,sp}$
Data unit:	m^3
Description:	Merchantable volume for tree l of species j in sample plot sp in stratum i
Source of data:	Calculated from volume tables or equations linking diameter at breast height (DBH, at typically 1.3 m aboveground level), and merchantable height (MH), to commercial (merchantable) volume of trees in the sample plots above the minimum DBH set in the timber harvest plan. If locally derived equations or yield tables are not available use relevant regional, national or default equations from IPCC literature, national inventory reports or published peer-reviewed studies– such as those provided in Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003).
Value applied:	See the detailed excel spreadsheet
Justification of choice of data or description of measurement methods and procedures applied:	It is necessary to verify the applicability of equations used. Allometric equations can be verified by both: 1. Verification of equation conditions Justification should be provided for the applicability of the equation to the project locations. Such justification should include identification of climatic, edaphic, geographical and taxonomic similarities between the project location and the location in which the equation was derived. Any equation used should have an r2 value of greater than 0.5 (50%) and a p value that is significant (<0.05 at the 95% confidence level). 2. Additional field verification The following limited measures method must be used for field verification: select at least 10 trees per species distributed across the age range (but excluding trees less than 15 years old for which there is rarely a great relative inaccuracy in equations) ;

	measure DBH, and height to a 10 cm diameter top or to the first branch; calculate stem volume from measurements; and plot the estimated volume of all the measured trees along with the curve of volume against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a volume consistently higher than predicted by the equation. The equation may not be used if >75% of the measured trees have a volume lower than the predicted curve. In this instance another equation must be selected.
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	CF_j
Data unit:	tC·td.m.$^{-1}$
Description:	Carbon fraction of dry matter for species j
Source of data:	According to VM0010 version 1.3, the default value 0.5 tC·t d.m.$^{-1}$ is used and the same value is used in all instances where this parameter is used.
Value applied:	0.5
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	D_j
Data unit:	t d.m. m^{-3}
Description:	Basic wood density of species j in t d.m. m^{-3}
Source of data:	According to VM0010 version 1.3, it must be chosen with priority from higher to lower preference as follows: National species-specific or group of species-specific values (eg, from National GHG inventory); Species-specific or group of species-specific values from neighboring countries with similar conditions. When species-specific data from neighboring countries is of higher quality, being more representative of the species in the project scenario, it may be

	preferable to use these values than lower quality national data; Global species-specific or group of species-specific (eg, IPCC 2006 AFOLU Chapter 4 Tables 4.13 and 4.14). Species-specific wood densities may not always be available, and may be difficult to apply with certainty in the typically species rich forests of the humid tropics, hence it is acceptable practice to use wood densities developed for forest types or plant families or species groups. "Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change" matches the first choice.
Value applied:	<table><tr><th>Tree species</th><th>D_j</th></tr><tr><td>Birch</td><td>0.541</td></tr><tr><td>Larch</td><td>0.490</td></tr></table>
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$f_j(X, Y…)$
Data unit:	t d.m. tree^{-1}
Description:	Allometric equation(s) for species j linking measured tree variable(s) to aboveground biomass of living trees
Source of data:	Equations must have been derived using a wide range of measured variables (eg, DBH, Height, etc.) based on datasets that comprise at least 30 trees. Equations must be based on statistically significant regressions and must have an r2 that is ≥ 0.8. The source of equation(s) must be chosen with priority from higher to lower preference, as available, as follows: a) National species-, genus-, family-specific; b) Species-, genus-, family-specific from neighbouring countries with similar conditions (ie, broad continental regions); c) National forest-type specific; d) Forest-type specific from neighbouring countries with similar conditions (ie, broad continental regions); e) Forest type-specific such as those provided Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003); or in Pearson, T., Walker, S. and Brown, S. 2005. Sourcebook for Land Use, Land-Use Change and

	Forestry Projects. Winrock International and the World Bank Biocarbon Fund. 57pp.; or in Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145: 87-99. Species-, genus- and family-specific allometric equations may not always be available, and may be difficult to apply with certainty in the typically species rich forests of the humid tropics. Hence it is acceptable practice to use equations developed for regional forest types, provided that their accuracy has been validated with direct site-specific data following guidance given below. If a forest-type specific equation is used, it should not be used in combination with species-specific equation(s) (ie, it must be used for all tree species).
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	It is necessary to validate the applicability of equations used. Source data from which equation(s) was derived should be reviewed and confirmed to be representative of the forest type/species and conditions in the project and covering the range of potential independent variable values. Allometric equations can be validated either by: 1. Limited Measurements select at least 30 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, ie, species representation in roughly in proportion to relative basal area). Minimum diameter of measured trees must be 20cm and maximum diameter must reflect the largest trees present or potentially present in the future in the project area (and/or leakage belt); measure DBH, and height to a 10 cm diameter top or to the first branch; calculate stem volume from measurements and multiplying by species-specific density to gain biomass of bole; apply a biomass expansion factor to estimate total aboveground biomass from stem biomass37; and plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both

	above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve, destructive sampling must be undertaken or another equation must be selected. 2. Destructive Sampling select at least 5 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, ie, species representation in roughly in proportion to relative basal area) at the upper end of the range of independent variable values existing in the project area; measure DBH and commercial height and calculate volume using the same procedures/equations used to generate commercial volumes to which BCEFs will be applied; fell and weigh the aboveground biomass to determine the total (wet) mass of the stem, branch, twig, leaves, etc. Extract and immediately weigh subsamples from each of the wet stem and branch components, followed by oven drying at 70 degrees C to determine dry biomass; determine the total dry weight of each tree from the wet weights and the averaged ratios of wet and dry weights of the stem and branch components; and plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve another equation must be selected. Details of destructive sampling measurements are given in: Brown, S. 1997. Estimating biomass and biomass change of tropical forests: a primer. FAO Forestry Paper 134, Rome, Italy. Available at http://www.fao.org/docrep/W4095E/W4095E00.htm If using species-specific equations, and new species are encountered in the course of monitoring, new allometric equations must be sourced from the literature and validated, if necessary, as per requirements and procedures above. Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	$BCEF_R$
Data unit:	t d.m. m^{-3}
Description:	Biomass conversion and expansion factor applicable to wood removals in the project area
Source of data:	The source of data must be chosen with priority from higher to lower preference as follows: Existing local forest type-specific; National forest type-specific or eco-region-specific (eg, from national GHG inventory); Forest type-specific or eco-region-specific from neighboring countries with similar conditions. Sometimes (c) might be preferable to (b); Global forest type or eco-region-specific (eg, IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.5). Alternatively: BCEFR = BEFR * D Where BCEF values are not directly available, they can be calculated as Biomass Expansion Factor (BEF)* basic wood density (D). Application of this equation requires caution because basic wood density and biomass expansion factors tend to be correlated. If the same sample of trees was used to determine D, BEF or BCEF, conversion will not introduce error, therefore, it is acceptable to use this equation. If, however, basic wood density is not known with certainty, transforming one into the other might introduce error, as BCEF implies a specific but unknown basic wood density, therefore, all conversion and expansion factors must be derived or their applicability checked locally. "Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change" matches the second choice.
Value applied:	Tree species: Birch — $BCEF_R$ 0.770; Larch — $BCEF_R$ 0.694
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	The combustion factor is a measure of the proportion of the fuel that is actually combusted, which varies as a function of the size and

Value applied:

Tree species	$BCEF_R$
Birch	0.770
Larch	0.694

	architecture of the fuel lcad (ie, a smaller proportion of large, coarse fuel such as tree stems will be burnt compared to fine fuels, such as grass leaves), the moisture content of the fuel and the type of fire (ie, intensity and rate of spread). Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	G_{gi}
Data unit:	g kg^{-1} dry matter burnt
Description:	Emission factor for stratum i for gas g
Source of data:	Defaults can be found in Volume 4, Chapter 2, of the IPCC 2006 Inventory Guidelines in table 2.5
Value applied:	Please refer to the spreadsheet
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	Default values shall be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	OF, SLF,WW
Data unit:	Kg kg^{-1}
Description:	OF = Fraction of wood products that will be emitted to the atmosphere between 3 and 100 years after production; SLF = Fraction of wood products that will be emitted to the atmosphere within 3 years of production; and WW = Fraction of extracted biomass effectively emitted to the atmosphere during production Wood waste fraction(WW): Winjum et al. 1998indicatethattheproportionofextracted biomass that is oxidized (burning or decaying) from the production of commodities to be equal to19%fordevelopedcountries, 24% for developing countries. Short-lived fraction (SLF) Winjumetal1998 give decay rates for proportions of wood products, which were converted to with short-term (<3yr) uses (applicable internationally) as below: Sawnwood 0.12 Woodbase panels 0.06 Other industrial roundwood 0.18

<table>
<tr><td></td><td>Paper and Paperboard 0.24
Additional oxidized fraction (OF)
Winjum et al 1998 gives annual oxidation fractions for each class of wood products split by forest region (boreal, temperate and tropical).
This methodology projects these fractions over 95 years to give the additional proportion that is oxidized between the 3rd and the 100th year after initial harvest:
<table>
<tr><th rowspan="2">Wood Product Class</th><th colspan="3">OF</th></tr>
<tr><th>Boreal</th><th>Temperate</th><th>Tropical</th></tr>
<tr><td>Sawnwood</td><td>0.39</td><td>0.62</td><td>0.86</td></tr>
<tr><td>Woodbase panels</td><td>0.62</td><td>0.86</td><td>0.98</td></tr>
<tr><td>Other industrial roundwood</td><td>0.86</td><td>0.98</td><td>0.99</td></tr>
<tr><td>Paper and paperboard</td><td>0.39</td><td>0.62</td><td>0.99</td></tr>
</table></td></tr>
<tr><td>Source of data:</td><td>According to VM0010 version 1.3, the default values are chosen.</td></tr>
<tr><td>Value applied:</td><td>
<table>
<tr><th>Parameters</th><th>Species</th><th>Value</th></tr>
<tr><td>OF</td><td>Birch/Larch</td><td>0.62</td></tr>
<tr><td>SLF</td><td>Birch/Larch</td><td>0.12</td></tr>
<tr><td>WW</td><td>Birch/Larch</td><td>24%</td></tr>
</table></td></tr>
<tr><td>Justification of choice of data or description of measurement methods and procedures applied:</td><td>N/A</td></tr>
<tr><td>Purpose of Data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Comments:</td><td>N/A</td></tr>
</table>

Data / Parameter:	RGR_i
Data unit:	$tC.ha^{-1}.yr^{-1}$
Description:	Forest regrowth rate post timber harvest for stratum i
Source of data:	Regrowth rate must be calculated from either a) data generated in a reference area using measurements of timber volume in a chronosequence of replicated sample plots; or b) published data on forest growth after timber harvest of the same forest type within the same region as the project; or c) the IPCC default values for aboveground net biomass growth in natural forests.
Value applied:	

	<table><tr><th>Species</th><th>Value</th><th>Uint</th></tr><tr><td>Birch</td><td>1.56</td><td>$m^3.ha^{-1}.yr^{-1}$</td></tr><tr><td>Larch</td><td>1.83</td><td>$m^3.ha^{-1}.yr^{-1}$</td></tr></table>
Justification of choice of data or description of measurement methods and procedures applied:	Method b is applied. The average annual regrowth is confirmed by Inner Mongolia autonomous region forestry survey and design institute based on their expertise. And the RGRi can therefore be calculated by the biomass expansion factor, density and carbon fraction of the separate species.
Purpose of Data	Calculation of baseline emissions
Comments:	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	$V_{EX,j,i\|BSL}$
Data unit:	$m^3.ha^{-1}$
Description:	Mean volume of extracted timber per unit area for species j in stratum i
Source of data:	The timber harvest plan sets the allowable mean extracted volume is equal to the merchantable volume of timber in the forest inventory ($V_{j,i\|BSL}$), based on legal limits.
Value applied:	please refer to ER sheet
Justification of choice of data or description of measurement methods and procedures applied:	The measurement method is from academic paper and equations developed for regional forest types. Please refer to ER sheet
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{i,p}$
Data unit:	Ha
Description:	Area covered by stratum i over land parcel p
Source of data:	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions-
Comments:	It must be assumed ex-ante that land parcel boundaries and strata

	areas must not change through time

Data / Parameter:	$A_{1,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested 1 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{2\text{-}10,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested between 2 and 10 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{11\text{-}20,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested between 11 and 20 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	A_{t*}
Data unit:	Ha
Description:	Cumulative area harvested until time t*
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{s,p}$
Data unit:	Ha
Description:	Area of sample plot sp
Source of data:	Recording and archiving of size of sample plots
Justification of choice of data or description of measurement methods and procedures applied:	Standard procedures for plot delineation in forest timber inventory surveys shall be used
Purpose of Data	Calculation of baseline emissions
Comments:	Ex-ante the size of the plots shall be defined and recorded in the monitoring plan.

4.2 Data and Parameters Monitored

Data / Parameter:	Illegal Logging PRA Results
Data unit:	Dimensionless
Description:	N/A
Source of data:	PRA
Description of measurement methods and procedures to be applied:	The PRA must evaluate whether timber harvest may be occurring in the project area and shall consist of semi-structured interviews / questionnaires. If ≥ 10% of those interviewed/surveyed believe that illegal logging may be occurring within the project boundary then the limited on-the-ground illegal logging survey shall be triggered. An additional output of the PRA shall be a depth of penetration of illegal logging pressure. A maximum distance shall be recorded for

	penetration into the forest from access points (such as roads, rivers, already cleared areas) for the purpose of harvesting timber.
Frequency of monitoring/recording:	Every two years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimation shall be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	Result of Limited Illegal Logging Survey
Data unit:	Dimensionless
Description:	N/A
Source of data:	Limited on-the-ground illegal logging survey
Description of measurement methods and procedures to be applied:	Sampled by surveying multiple transects of known length and width across the access-buffer area to check whether new tree stumps are evident or not. The access-buffer area shall be equal in area to at least 1% of $A_{DIST\_IL,i}$
Frequency of monitoring/recording:	Must to be repeated each time the PRA indicates a potential for illegal logging.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante an estimation shall be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	$A_{burn,i,t}$
Data unit:	Ha

Description:	Area burnt in stratum i at time t
Source of data:	Geodetic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Areas burnt must be monitored at least every five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimations of areas burned shall be based on historic incidence of fire in the Project region

Data / Parameter:	$A_{dist,i,t}$
Data unit:	Ha
Description:	Area disturbed in stratum i at time t
Source of data:	Geodetic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Areas disturbed shall be monitored at least every five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A

Comments:	Ex ante estimations of areas burned must be based on historic incidence of fire in the Project region

Data / Parameter:	$A_{DIST\_IL,i}$
Data unit:	Ha
Description:	Area potentially impacted by illegal logging in stratum i
Source of data:	GIS delineation and ground truthing
Description of measurement methods and procedures to be applied:	Must be composed of a buffer from all access points (access buffer), such as roads and rivers or previously cleared areas. The width of the buffer shall be determined by the depth of degradation penetration as defined as a PRA output
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante a limited survey can be used to determine a likely depth of degradation penetration

Data / Parameter:	$C_{DIST\_IL,i,t\|PRJ}$
Data unit:	tCO_2e
Description:	biomass carbon of trees cut and removed through illegal logging in stratum i at time t
Source of data:	Field measurements in sample plots
Description of measurement methods and procedures to be applied:	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone ($A_{DIST\_IL,i}$). The diameter of all tree stumps will be measured and conservatively assumed to be the same as the DBH. Where the stump is a large buttress, several individuals of the same species nearby shall be located and a ratio of the diameter at DBH to the diameter of buttress at the same height above ground as the measured stumps shall be determined. This ratio will be applied to the measured stumps to estimate the likely DBH of the cut tree.The aboveground carbon stock of each harvested tree will be estimated using the allometric regression equations chosen for forest growth in the project scenario. The mean aboveground carbon stock of the harvested trees is conservatively estimated to be the total emissions and to all enter

	the atmosphere
Frequency of monitoring/recording:	Repeated each time limited sampling of A_{DIST_IL}, indicates illegal logging
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	If species-specific equations are used and species cannot be identified from stumps then it shall be assumed that the harvested species is the species most commonly harvested. A PRA shall be used to determine the most commonly harvested species.

Data / Parameter:	AP_i
Data unit:	Ha
Description:	Total area of illegal logging sample plots in stratum i
Source of data:	Ground measurement
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimation should be made of area of plots. This should be set to exactly 3% of the buffer zone $A_{DIST\_IL,i}$

Data / Parameter:	PMP_i
Data unit:	%
Description:	Merchantable biomass as a proportion of total aboveground tree biomass for stratum i within the project boundaries
Source of data:	Within each stratum divide the summed merchantable biomass (defined as total gross biomass of a tree 15cm DBH or larger) by the summed total of aboveground tree biomass.
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex-ante a time zero measurement shall be made of this factor. The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory ($V_{j,i\|BSL}$), based on legal limits.

Data / Parameter:	Ai
Data unit:	Ha
Description	Area covered by stratum i
Source of data	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Description of measurement methods and procedures to be applied	The stratum is from the second class forestry inventory
Frequency of monitoring/recording:	Every ten years.

<table>
<tr><td>Value applied:</td><td>
<table>
<tr><th>Serial number of strata</th><th>Area (ha)</th><th>Tree species</th></tr>
<tr><td>1</td><td>10,454</td><td>Birch</td></tr>
<tr><td>2</td><td>10,072</td><td>Larch</td></tr>
<tr><td>Total</td><td>20,526</td><td></td></tr>
</table>
</td></tr>
<tr><td>Monitoring Equipment:</td><td>Tape Measure</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.</td></tr>
<tr><td>Purpose of Data</td><td>For the calculation of the baseline and project emissions.</td></tr>
<tr><td>Calculation method:</td><td>N/A</td></tr>
<tr><td>Comments</td><td>In the baseline scenario strata areas must not change through time. In the project scenario it must be assumed ex-ante that stand boundaries and strata areas must not change through time. Ex post adjustments of the project scenario strata may be needed if unexpected disturbances occur during the project crediting period, severely affecting different parts of an originally homogenous stratum. This disturbance will be delineate as a separate stratum for the purpose of monitoring the carbon stock changes.</td></tr>
</table>

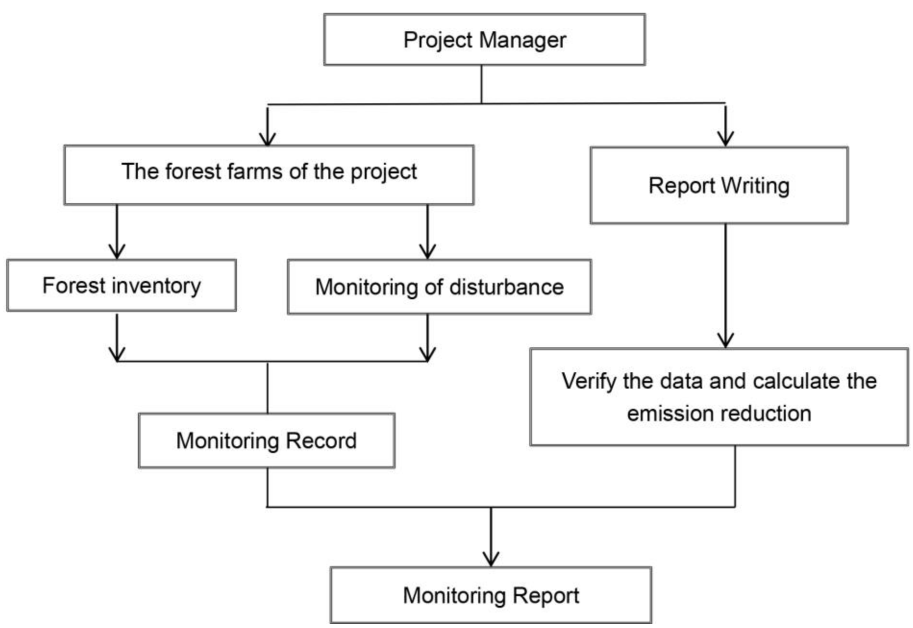
Data / Parameter:	DBH
Data unit:	cm
Description	Diameter at breast height of tree
Source of data	On site measuring on the sample spot.
Description of measurement methods and procedures to be applied	The National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry Bureau has detailed requirement of the measurement method.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring Equipment:	Tape Measure
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of tree volume, then to carbon stock change further to the project emissions.

Calculation method:	N/A
Comments	As for the project tree species, there are no allometric equation applied in the project area, the average annual growth and biomass expansion method is adopted for the estimated calculation of carbon stock change. Based on the DBH.and local volume table, the volume can be calculated, combined by the BCEF and CF, the carbon stock can be obtained.

4.3 Monitoring Plan

4.3.1 Scope of monitoring and the monitoring plan

The project proponent and consultant will set up a team together to conduct the monitoring. The team is in charge of collecting, monitoring and verifying the data, while the project manager will be assisted by the consultant company. The findings should be reported to the project manager and work out a solution. The operational and management structure is as follows:



Monitoring is required to

a) determine changes in forest carbon stocks and greenhouse gas emissions from project activity;

b) confirm project activity; and

c) determine changes in forest carbon stocks and greenhouse gas emissions from disturbance and illegal logging.

In some cases monitoring may also be implemented to update stratification.

The monitoring plan addresses the monitoring of project implementation, the monitoring of actual carbon stock changes from project activity, and estimation of ex-post net carbon stock changes from the conversion of logged to protected forest.

4.3.2 General requirements for monitoring

All data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the project crediting period. All measurements will be conducted according to relevant standards.

Data archiving shall take both electronic and paper forms, and copies of all data shall be provided to each project participant.

All electronic data and reports shall also be copied on durable media such as CDs and copies of the CDs are to be stored in multiple locations.

The archives shall include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheets;
- Estimates of the carbon stock changes in all pools and non-CO_2 GHG and corresponding calculation spreadsheets;
- GIS products; and
- Copies of the measuring and monitoring reports.

4.3.3 Monitoring of project implementation

Information must be provided, and recorded in the VCS-PD, to establish that:

- The geographic position of the project boundary is recorded for all areas of land;
- The geographic coordinates of the project boundary (and any stratification inside the boundary) are established, recorded and archived. This will be achieved by field survey (e.g. using GPS) or by using geo-referenced spatial data (e.g. maps, GIS datasets, aerial photography, or geo-referenced remote sensing images);
- Commonly accepted principles of forest inventory and management are implemented;
- Standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management will be applied. SOPs already applied in national forest monitoring or available from published handbooks or from the IPCC GPG LULUCF 2003 will be used.
- The project plan, together with a record of the plan as actually implemented during the project, shall be available for validation or verification as appropriate.

4.3.4 Stratification

An ex ante stratification of the project area in the project scenario is developed by project proponents through sampling in the project area according to the species.

Sampling to adjust the number and boundaries of the strata defined ex ante where an update is required because of

a) unexpected disturbances occurring during the project crediting period affecting differently various parts of an originally homogeneous stratum and/or

b) forest management activities that are implemented in a way that affects the existing stratification in the project scenario.

Established strata may also be merged if the reasons for their establishment have disappeared.

4.3.5 Monitoring of actual carbon stock changes

Carbon stocks will be measured according to the stock assessment equations with field sampling based on forest inventory methods. Various sources exist to assist with the design of a verifiable forest field inventory based on best practice for sampling, data management and analysis (Box 3).

In the project area the inventory plan is specified as below:

a) adequate forest stratification, sample size estimation methods and consider uncertainty:

The forest stratification is based on the species, which is adequate according to the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is according to the "Calculation of the number of sample plots for measurements within A/R CDM project activities" (version 02.1.0) approved by the CDM Executive Board.

b) a sampling framework including sample size, plot size, plot shape and information to determine plot location:

The design of a verifiable forest field inventory based on best practice for sampling, data management and analysis are selected from the Box 3 of the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is according to the most recent version of the tool for the "Calculation of the number of sample plots for measurements within A/R CDM project activities" (version 02.1.0) approved by the CDM Executive Board.

For the baseline scenario, the calculation process is shown below:

Parameter	Unit	Description
n	dimensionless	Number of sample plots required for estimation of biomass stocks within the project boundary
n_i	dimensionless	Number of sample plots allocated to stratum i for

		estimation of biomass stocks within the project boundary

In the baseline scenario:

n_{BSL} for n and $n_{BSL,i}$ for n_i.

In the project scenario:

N_{PROJ} for n and $n_{PROJ,i}$ for n_i

The sample plot will be 0.04 ha and at least 3 sample plots will be selected in 1 As the sample size should be less than 100, then the total sample plot area should be less than 4 ha, which is small than 5% of the total project are(20526*5%=1026.3 ha). So we can conclude that the area sampled will be less than 5% of the project area, which means a small sampling fraction.

Therefore, the following simplified equation can be used for estimating the number of sample plots according to the CDM tool:

$$n = (\frac{t_{VAL}}{E})^2 * (\sum_i \omega_i * S_i)^2 \qquad (36)$$

where:

n	Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless
t_{VAL}	Two-sided Student's *t*-value at infinite degrees of freedom for the required confidence level; dimensionless
E	Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha^{-1}), i.e. in the units used for S_i
w_i	Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless
S_i	Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})
i	1, 2, 3, … biomass stock estimation strata within the project boundary

After the estimation of total number of sample plots (n), allocation of number of sample plots among strata is calculated as:

$$n_i = n * \frac{\omega_i * S_i}{\sum_i \omega_i * S_i} \qquad (37)$$

where:

n_i	Number of sample plots allocated to stratum i; dimensionless

n Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

w_i Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless

S_i Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})

i 1, 2, 3, … biomass stock estimation strata within the project boundary

Based on the data of biomass stocks in a carbon pool in the baseline scenario, the estimation of number of sample plots required in shown in table 9 below:

Table 9: The estimation of number of sample plots required

Strata No	Stratum Name	Area (ha)	Mean tonnes C/ha	Standard Deviation (t C/ha)	Plot size (ha)	Wi	W_i * Si
Strata 1	Birch	10454.00	64.83	22.23	0.04	0.51	11.32
Strata 2	Larch	10072.00	54.47	40.98	0.04	0.49	20.11

		Number of Plots	
STRATA NO	Stratum Name	Plot Quantity	Rounded Plot Quantity
Total Sample Size		106.31	
Strata 1	Birch	38.29	39
Strata 2	Larch	68.01	69
TOTAL NUMBER OF PLOTS			**108**

* Where the confidence level is 95% as required in the methodology VM0010 version 1.3 and D_f is ∞. Therefore, t_{VAL} is 1.96.

Carbon stock changes over time shall be estimated by taking measurements in plots at each monitoring event. Monitoring events shall take place at intervals of 5, or preferably 3 years. Including monitoring all the parameters needed. Monitoring reports can use such extrapolated parameter values for the determination of net emissions by sources and removals resulting from the project.

The design of the sampling regime will be determined by the number of strata and timber harvest the baseline case.

4.3.6 Conservative approach and uncertainty

Project proponent will also apply all relevant equations for the ex-ante calculation of net anthropogenic GHG removals by sinks with care and provide transparent estimations for the parameters that are monitored during the project crediting period. These estimates shall be based on measured or existing published data where possible and project proponents should retain a conservative approach; that is, if different values for a parameter are equally plausible, a value that does not lead to over-estimation of net anthropogenic GHG removals by sinks must be selected

An uncertainty analysis is required for all estimates from monitoring related to change in area, change in carbon stocks and emissions for both the baseline and project case.

5. SAFEGUARDS

5.1 No Net Harm

There is no potential negative environmental or socio-economic impact due to the project.

5.2 Environmental Impact

An Environmental Impact Assessment (EIA) is not required for logged to protected forest projects according to Construction project classification management of environmental impact assessment list[8]. The key mitigation action of the project activity is avoiding the illegal harvest of the forest, which can protect and improve the surviving environment, keep the ecological balance, save the species resources and enhance homeland security.

5.3 Local Stakeholder Consultation

Questionnaires were distributed by the project proponent to the residents who lives in the community and closely related to the project. The questions aimed to find out their concerns and opinions about the project. The questionnaires covered areas of economic, social benefit and environmental effect etc. The content of the questionnaire includes the following information：

1. The purpose of the questionnaire
2. Basic information of the participants
3. Questions

1) Do you know the proposed project?

2) What do you think the proposed project will bring to you?

3) Do you support the implementation of the proposed project?

4) What is your concern about the proposed project?

[8] http://www.gov.cn/gongbao/content/2009/content_1265996.htm

5) What is your opinion and suggestion regarding the proposed project?

The Survey was conducted through distributing and collecting responses to a questionnaire in Dec 2012. Totally 40 questionnaires returned out of 40 with 100% response. The following is a summary of the key findings based on returned questionnaires.

1. The education background of the participants

The targets of this investigation are the people who will be affected by the project. A part of them finished the middle high school education, the rest of them graduated from college.

2. Attitude towards the proposed project

All of them support the implementation of the project, they think the protection of forest instead of cutting is good the environment, and will benefit the sustainable development.

3. The concern about the proposed project

The participants particularly hoping that the proposed project can improve local environmental situation and increase employment opportunities at the same time.

4. Conclusion

The survey shows that the proposed project is 100% supported by local people. It is because they believe the implementation of the project will bring multiple benefits.

5.4 Public Comments

This project was open for public comment from 26 September - 25 October 2017. No comments were received.

APPENDIX 1: < GEOGRAPHICAL COORDINATES OF PROJECT >

GEOGRAPHICAL COORDINATES OF PROJECT

serial No.	Department	compartment	sub compartment	coordinate X	coordinate Y
1	Kuya	6	1	455704	5603901
2	Kuya	6	3	455228	5603538
3	Kuya	6	5	455485	5603107
4	Kuya	6	8	455223	5602455
5	Kuya	6	9	455190	5602655
6	Kuya	6	10	455881	5602370
7	Kuya	6	11	455306	5602047
8	Kuya	6	12	455026	5601778
9	Kuya	6	13	455690	5601821
10	Kuya	6	15	455261	5601365
11	Kuya	6	16	455190	5601267
12	Kuya	6	17	455264	5601168
13	Kuya	6	19	455275	5601577
14	Kuya	6	20	455032	5601060
15	Kuya	6	22	454603	5601778
16	Kuya	10	2	459268	5604254
17	Kuya	10	3	459992	5604377
18	Kuya	10	4	460330	5604047
19	Kuya	10	5	459626	5603717
20	Kuya	10	8	460452	5603665
21	Kuya	10	14	460234	5603314
22	Kuya	10	17	459023	5602561
23	Kuya	10	18	459531	5602412
24	Kuya	10	25	458863	5602698
25	Kuya	10	26	459437	5604191
26	Kuya	10	27	459303	5603125
27	Kuya	10	32	459566	5602134
28	Kuya	11	10	448582	5602639
29	Kuya	11	25	448553	5601081
30	Kuya	12	1	449429	5602844

serial No.	Department	compartment	sub compartment	coordinate X	coordinate Y
986	Tele	19	12	459721	5589995
987	Tele	19	13	460470	5589149
988	Tele	19	15	461130	5590959
989	Tele	19	21	461262	5590980
990	Tele	19	32	461272	5590495
991	Tele	19	33	461467	5590179
992	Tele	19	34	461076	5589494
993	Tele	21	7	461258	5589837
994	Tele	21	9	461428	5590382
995	Tele	21	10	460654	5590602
996	Tele	21	11	461490	5589926
997	Tele	21	12	461467	5589777
998	Tele	21	13	461052	5590620
999	Tele	21	14	452673	5589098
1000	Tele	21	20	453068	5588969
1001	Tele	21	34	453667	5587954
1002	Tele	21	37	453655	5588108
1003	Tele	32	7	453783	5588472
1004	Tele	32	8	454353	5588365
1005	Tele	32	10	453847	5588120
1006	Tele	32	12	454225	5588020
1007	Tele	32	20	454046	5588361
1008	Tele	32	21	452527	5588186
1009	Tele	32	26	454296	5588588
1010	Tele	32	27	453048	5588711
1011	Tele	32	28	453481	5588377
1012	Tele	33	2	454607	5588130
1013	Tele	33	6	453018	5588011
1014	Tele	33	13	453387	5588015
1015	Tele	33	18	454208	5587325

31	Kuya	12	2	449571	5602662
32	Kuya	12	6	449346	5601722
33	Kuya	12	7	449814	5601435
34	Kuya	12	8	449629	5600716
35	Kuya	12	13	450232	5600489
36	Kuya	12	14	450083	5600110
37	Kuya	12	24	450253	5599544
38	Kuya	12	26	450181	5599057
39	Kuya	14	3	461355	5603168
40	Kuya	14	8	461016	5603367
41	Kuya	14	9	460980	5603184
42	Kuya	14	12	461136	5602670
43	Kuya	15	2	462046	5602620
44	Kuya	15	3	461913	5602153
45	Kuya	15	10	461725	5601537
46	Kuya	15	14	461590	5601279
47	Kuya	15	36	459891	5600782
48	Kuya	15	37	459556	5600680
49	Kuya	15	38	460245	5600939
50	Kuya	18	2	446869	5601624
51	Kuya	18	4	447817	5601442
52	Kuya	18	7	446447	5601160
53	Kuya	18	8	446664	5601342
54	Kuya	18	9	446718	5601222
55	Kuya	18	10	447310	5601150
56	Kuya	18	11	446747	5600926
57	Kuya	25	1	456209	5601426
58	Kuya	25	2	456590	5601348
59	Kuya	25	3	456540	5600973
60	Kuya	25	9	457477	5600151
61	Kuya	25	12	456009	5600739
62	Kuya	25	20	456149	5600238
63	Kuya	25	21	456559	5599755
64	Kuya	25	22	456595	5599955
65	Kuya	25	24	456748	5599779
66	Kuya	25	29	457852	5599033
67	Kuya	25	33	457669	5599189
68	Kuya	25	36	457086	5600410
69	Kuya	25	40	458170	5599416

1016	Tele	33	20	454438	5587566
1017	Tele	33	26	454027	5587895
1018	Tele	33	28	453070	5588283
1019	Tele	36	14	453881	5588720
1020	Tele	53	1	454449	5587876
1021	Tele	53	2	453618	5587717
1022	Tele	53	10	454777	5587637
1023	Tele	53	13	455291	5588252
1024	Tele	53	16	454870	5588274
1025	Tele	53	21	455124	5588164
1026	Tele	2	15	454822	5588165
1027	Tele	2	17	457054	5587436
1028	Tele	2	18	456141	5587911
1029	Tele	2	19	455553	5587814
1030	Tele	2	20	454953	5587973
1031	Tele	2	21	456132	5587613
1032	Tele	2	22	455180	5587636
1033	Tele	2	23	461737	5587424
1034	Tele	2	24	461919	5587710
1035	Tele	2	25	461737	5587424
1036	Tele	2	27	462096	5587529
1037	Tele	3	2	462259	5587330
1038	Tele	3	15	461463	5587905
1039	Tele	3	16	461382	5587757
1040	Tele	3	17	461453	5586955
1041	Tele	3	18	461125	5587271
1042	Tele	3	23	461287	5587445
1043	Tele	4	14	462561	5587223
1044	Tele	4	28	461972	5586966
1045	Tele	4	29	462013	5587215
1046	Tele	4	30	461928	5588100
1047	Tele	4	32	461659	5586856
1048	Tele	4	33	462247	5586817
1049	Tele	4	34	461697	5587876
1050	Tele	4	35	462258	5587675
1051	Tele	4	36	467192	5588037
1052	Tele	4	41	468991	5589102
1053	Tele	4	43	467753	5588212
1054	Tele	5	4	467983	5588117

70	Kuya	25	43	457333	5599440
71	Kuya	25	44	457384	5599902
72	Kuya	26	2	460695	5600434
73	Kuya	26	12	459073	5598823
74	Kuya	26	19	459174	5598196
75	Kuya	26	30	459434	5599119
76	Kuya	26	32	459595	5598559
77	Kuya	26	33	459047	5599126
78	Kuya	26	34	459008	5598587
79	Kuya	26	35	459115	5598382
80	Kuya	26	37	458805	5598646
81	Kuya	26	38	458738	5598229
82	Kuya	26	39	458959	5598271
83	Kuya	27	1	461310	5600569
84	Kuya	27	4	460702	5600249
85	Kuya	27	6	460962	5599987
86	Kuya	27	15	460478	5597915
87	Kuya	27	17	460684	5597887
88	Kuya	27	19	459478	5597545
89	Kuya	27	21	460732	5597735
90	Kuya	27	22	460786	5597457
91	Kuya	27	24	460042	5597470
92	Kuya	27	25	460353	5597330
93	Kuya	27	26	460738	5596969
94	Kuya	27	28	459325	5596827
95	Kuya	27	30	460297	5596973
96	Kuya	27	31	459881	5596735
97	Kuya	27	37	460087	5596411
98	Kuya	27	38	459821	5596204
99	Kuya	27	40	459542	5595894
100	Kuya	27	48	459562	5596209
101	Kuya	27	50	459572	5596825
102	Kuya	28	1	462161	5600819
103	Kuya	28	2	461820	5600598
104	Kuya	28	6	462043	5600173
105	Kuya	28	11	462236	5599524
106	Kuya	28	13	462032	5599125
107	Kuya	28	15	461544	5598627
108	Kuya	28	16	461806	5598813

1055	Tele	5	25	469125	5589542
1056	Tele	5	26	467629	5588415
1057	Tele	5	27	468649	5588662
1058	Tele	5	28	469203	5589986
1059	Tele	5	29	468117	5588844
1060	Tele	5	30	469387	5588794
1061	Tele	5	31	470169	5589658
1062	Tele	6	18	468890	5588246
1063	Tele	6	20	468688	5588194
1064	Tele	6	23	470297	5588317
1065	Tele	6	24	469860	5589598
1066	Tele	6	25	470321	5589144
1067	Tele	6	26	469668	5589076
1068	Tele	6	27	469862	5588678
1069	Tele	6	29	469343	5588365
1070	Tele	7	4	469990	5588439
1071	Tele	7	5	453009	5587078
1072	Tele	7	12	452256	5587244
1073	Tele	7	15	453752	5586717
1074	Tele	7	18	453078	5587604
1075	Tele	7	39	453538	5586586
1076	Tele	9	1	453153	5586403
1077	Tele	9	6	452755	5587058
1078	Tele	9	10	452878	5587233
1079	Tele	9	12	453762	5587243
1080	Tele	9	13	452926	5586824
1081	Tele	9	17	451868	5587859
1082	Tele	9	19	453392	5587269
1083	Tele	9	20	452693	5586384
1084	Tele	9	21	457785	5586402
1085	Tele	9	24	457358	5586750
1086	Tele	9	28	458708	5586590
1087	Tele	9	29	456764	5586243
1088	Tele	10	9	458222	5586394
1089	Tele	10	10	457382	5586617
1090	Tele	10	11	455730	5586874
1091	Tele	10	13	457477	5586013
1092	Tele	11	4	458868	5586241
1093	Tele	11	5	457567	5587004

109	Kuya	28	17	461316	5598475
110	Kuya	28	27	461620	5597331
111	Kuya	28	33	462125	5597251
112	Kuya	29	4	462608	5599869
113	Kuya	29	6	462505	5599454
114	Kuya	29	9	462754	5599113
115	Kuya	29	14	462503	5598168
116	Kuya	29	16	463206	5597923
117	Kuya	29	22	463002	5598156
118	Kuya	29	23	462722	5597648
119	Kuya	42	9	460140	5595533
120	Kuya	42	10	459706	5595516
121	Kuya	42	12	460002	5594985
122	Kuya	42	15	461074	5595111
123	Kuya	42	21	461305	5593556
124	Kuya	42	27	459740	5594905
125	Kuya	42	28	460837	5594711
126	Kuya	42	29	459734	5594616
127	Kuya	42	30	460619	5594274
128	Kuya	42	31	460701	5594050
129	Kuya	42	32	459236	5594873
130	Kuya	42	34	460343	5594217
131	Kuya	42	35	461035	5593887
132	Kuya	43	3	461686	5596578
133	Kuya	43	4	461969	5596553
134	Kuya	43	5	462174	5596562
135	Kuya	43	7	461947	5595516
136	Kuya	43	12	461415	5595084
137	Kuya	43	16	462062	5595379
138	Kuya	43	33	461799	5593495
139	Kuya	44	8	462394	5596213
140	Kuya	44	12	462530	5595986
141	Kuya	44	13	462902	5596277
142	Kuya	44	17	463851	5595831
143	Kuya	44	19	462478	5595228
144	Kuya	44	26	463598	5594771
145	Kuya	44	28	463858	5594606
146	Kuya	44	47	462909	5595918
147	Kuya	44	48	462423	5596499

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1095	Tele	11	20	455923	5586624
1096	Tele	11	21	457549	5586471
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1098	Tele	11	23	455494	5586623
1099	Tele	11	24	457050	5585977
1100	Tele	11	25	458019	5586204
1101	Tele	11	26	457568	5585690
1102	Tele	11	27	456239	5586840
1103	Tele	11	28	456730	5586428
1104	Tele	11	29	467146	5586751
1105	Tele	11	30	469899	5587522
1106	Tele	11	31	466050	5585804
1107	Tele	11	32	466757	5586570
1108	Tele	11	33	466954	5586390
1109	Tele	14	2	468105	5587194
1110	Tele	14	5	467163	5586328
1111	Tele	14	10	466023	5586181
1112	Tele	14	12	466695	5586216
1113	Tele	15	2	466953	5586570
1114	Tele	18	11	469192	5587278
1115	Tele	18	17	469385	5587507
1116	Tele	18	22	468994	5587216
1117	Tele	18	33	468433	5587767
1118	Tele	18	34	467360	5586599
1119	Tele	18	35	466882	5586010
1120	Tele	18	36	469458	5587331
1121	Tele	18	37	466386	5586433
1122	Tele	18	38	468506	5587425
1123	Tele	18	39	467800	5587312
1124	Tele	18	41	462341	5585222
1125	Tele	19	5	461472	5584069
1126	Tele	19	9	462985	5584635
1127	Tele	19	10	461731	5582563
1128	Tele	19	14	463497	5585810
1129	Tele	19	23	462126	5583638
1130	Tele	19	24	462407	5584741
1131	Tele	19	26	461772	5582921
1132	Tele	19	29	463162	5585732

148	Kuya	44	62	462387	5595539
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150	Molengge	20	3	482859	5621609
151	Molengge	20	6	482779	5621269
152	Molengge	20	7	483009	5621356
153	Molengge	20	12	483618	5621116
154	Molengge	20	13	483962	5621093
155	Molengge	20	14	483401	5620654
156	Molengge	20	16	483534	5620517
157	Molengge	20	17	483789	5620590
158	Molengge	20	18	484136	5620680
159	Molengge	20	20	484051	5620450
160	Molengge	20	26	484168	5619746
161	Molengge	20	29	485263	5620112
162	Molengge	20	34	485101	5619518
163	Molengge	20	35	485622	5619484
164	Molengge	20	36	485760	5619067
165	Molengge	20	38	485374	5619681
166	Molengge	20	39	485462	5619850
167	Molengge	20	40	485645	5619710
168	Molengge	20	41	485735	5619327
169	Molengge	29	16	478629	5617615
170	Molengge	30	41	480840	5615911
171	Molengge	30	42	480774	5615539
172	Molengge	30	44	479928	5616291
173	Molengge	30	48	479535	5615400
174	Molengge	30	49	479528	5615785
175	Molengge	30	50	479612	5615781
176	Molengge	30	51	479894	5615768
177	Molengge	30	52	479982	5615762
178	Molengge	30	53	480233	5615506
179	Molengge	30	54	480335	5615611
180	Molengge	30	55	479398	5615579
181	Molengge	30	56	479920	5615295
182	Molengge	30	63	479270	5615261
183	Molengge	30	64	479865	5615596
184	Molengge	34	1	487266	5619554
185	Molengge	34	2	487754	5619479
186	Molengge	34	6	487268	5619100

1133	Tele	19	30	461746	5582548
1134	Tele	19	31	461476	5583765
1135	Tele	19	35	462259	5584761
1136	Tele	19	36	462190	5585007
1137	Tele	21	24	462760	5585090
1138	Tele	21	29	462875	5585546
1139	Tele	21	32	461625	5584063
1140	Tele	21	36	462536	5585358
1141	Tele	21	38	461926	5583159
1142	Tele	21	39	462234	5583961
1143	Tele	21	40	461712	5583812
1144	Tele	21	41	463098	5585448
1145	Tele	21	42	461788	5584473
1146	Tele	21	43	461579	5583679
1147	Tele	32	4	463903	5584599
1148	Tele	32	6	463813	5585971
1149	Tele	32	13	463790	5585324
1150	Tele	32	22	464243	5585132
1151	Tele	32	25	465020	5584360
1152	Tele	32	32	463913	5585861
1153	Tele	32	33	464320	5585095
1154	Tele	32	34	464676	5584571
1155	Tele	32	35	464934	5584307
1156	Tele	32	36	463830	5585729
1157	Tele	32	40	464247	5584356
1158	Tele	32	41	464925	5583988
1159	Tele	32	42	463334	5585181
1160	Tele	32	43	464239	5583719
1161	Tele	33	4	463691	5585122
1162	Tele	33	10	464221	5584465
1163	Tele	33	12	464107	5585443
1164	Tele	33	19	463317	5584524
1165	Tele	33	27	464277	5584055
1166	Tele	33	30	469415	5585325
1167	Tele	33	31	469093	5586674
1168	Tele	33	34	469192	5586186
1169	Tele	33	38	468826	5585697
1170	Tele	33	43	467997	5582628
1171	Tele	33	45	469604	5584371

187	Molengge	34	7	486741	5619063
188	Molengge	34	8	487048	5618907
189	Molengge	34	14	486943	5618666
190	Molengge	34	15	487289	5618569
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386	Suotuhan	49	8	492891	5610431
387	Suotuhan	49	15	492738	5610069
388	Suotuhan	49	16	492852	5610241
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410	Suotuhan	50	35	494617	5608963
411	Suotuhan	50	37	494418	5608550
412	Suotuhan	50	38	494653	5608499
413	Suotuhan	50	39	494798	5608611
414	Suotuhan	50	40	494401	5608436
415	Suotuhan	50	41	494780	5608356
416	Suotuhan	50	44	493821	5610035
417	Suotuhan	50	46	493204	5610225
418	Suotuhan	50	47	493873	5610273
419	Suotuhan	50	48	493946	5609861
420	Suotuhan	53	10	474130	5609577

1367	Tuohe	33	16	472284	5586894
1368	Tuohe	33	21	472101	5586522
1369	Tuohe	33	24	472602	5586531
1370	Tuohe	33	29	471633	5586058
1371	Tuohe	33	39	472142	5585851
1372	Tuohe	34	5	472990	5586248
1373	Tuohe	34	6	472739	5585346
1374	Tuohe	34	7	473127	5585684
1375	Tuohe	34	12	473485	5585643
1376	Tuohe	34	17	473049	5584975
1377	Tuohe	34	20	473195	5584532
1378	Tuohe	34	23	473582	5584356
1379	Tuohe	34	25	472112	5586121
1380	Tuohe	34	26	471625	5586560
1381	Tuohe	34	28	472368	5586617
1382	Tuohe	34	29	472788	5585706
1383	Tuohe	34	30	475420	5585739
1384	Tuohe	34	31	476451	5585261
1385	Tuohe	34	32	476333	5585428
1386	Tuohe	34	33	479520	5588227
1387	Tuohe	34	34	479582	5588017
1388	Tuohe	34	35	478292	5586529
1389	Tuohe	34	36	478973	5586566
1390	Tuohe	38	1	478916	5586209
1391	Tuohe	38	8	478919	5585414
1392	Tuohe	38	11	478722	5584858
1393	Tuohe	38	13	478218	5584615
1394	Tuohe	38	26	478215	5584204
1395	Tuohe	39	24	478091	5586760
1396	Tuohe	40	5	481208	5587650
1397	Tuohe	40	6	481163	5587219
1398	Tuohe	40	9	481264	5586388
1399	Tuohe	40	10	481466	5586371
1400	Tuohe	40	11	480931	5585849
1401	Tuohe	40	13	481096	5585533
1402	Tuohe	40	18	481520	5585486
1403	Tuohe	40	20	480672	5585076
1404	Tuohe	40	26	481044	5585388
1405	Tuohe	40	27	481319	5585143

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422	Suotuhan	53	17	475486	5609117
423	Suotuhan	53	20	474609	5608990
424	Suotuhan	53	22	475222	5608939
425	Suotuhan	53	23	474357	5608847
426	Suotuhan	53	25	473779	5608312
427	Suotuhan	53	28	473518	5608281
428	Suotuhan	53	35	475174	5609775
429	Suotuhan	53	37	474672	5609880
430	Suotuhan	53	38	475011	5609592
431	Suotuhan	53	39	475918	5607920
432	Suotuhan	54	2	476139	5608850
433	Suotuhan	54	6	476478	5608601
434	Suotuhan	54	12	475299	5607902
435	Suotuhan	54	13	473910	5608090
436	Suotuhan	54	14	473863	5607693
437	Suotuhan	54	16	474396	5607781
438	Suotuhan	54	18	474608	5607636
439	Suotuhan	54	22	473753	5607623
440	Suotuhan	54	23	475408	5607577
441	Suotuhan	54	29	475417	5608630
442	Suotuhan	54	30	474450	5608181
443	Suotuhan	54	31	476284	5608168
444	Suotuhan	54	32	476653	5608768
445	Suotuhan	54	34	476281	5608992
446	Suotuhan	54	35	476551	5608900
447	Suotuhan	54	38	475149	5608673
448	Suotuhan	54	39	474068	5608064
449	Suotuhan	55	1	477136	5608347
450	Suotuhan	55	14	477856	5607575
451	Suotuhan	55	15	477117	5608532
452	Suotuhan	55	16	477397	5607968
453	Suotuhan	57	19	480632	5607365
454	Suotuhan	58	4	478204	5609251
455	Suotuhan	58	6	479114	5609291
456	Suotuhan	58	8	479813	5609069
457	Suotuhan	59	13	482251	5608062
458	Suotuhan	59	17	484257	5606258
459	Suotuhan	60	5	484145	5608360

1406	Tuohe	41	8	481276	5584418
1407	Tuohe	41	12	481590	5584534
1408	Tuohe	41	14	481609	5584955
1409	Tuohe	41	15	480620	5584230
1410	Tuohe	42	4	482565	5586027
1411	Tuohe	42	5	482171	5585405
1412	Tuohe	42	8	481866	5584338
1413	Tuohe	42	9	483927	5586686
1414	Tuohe	42	15	483888	5586191
1415	Tuohe	42	19	482871	5586575
1416	Tuohe	42	20	482775	5585080
1417	Tuohe	42	22	482879	5585024
1418	Tuohe	42	27	483286	5585259
1419	Tuohe	42	28	483295	5585075
1420	Tuohe	42	32	470575	5584765
1421	Tuohe	49	13	470551	5584203
1422	Tuohe	49	26	470916	5584400
1423	Tuohe	50	4	471158	5584792
1424	Tuohe	50	7	471397	5583911
1425	Tuohe	50	9	470799	5583346
1426	Tuohe	51	4	471666	5583259
1427	Tuohe	51	43	471004	5582766
1428	Tuohe	51	46	471337	5582445
1429	Tuohe	53	12	471413	5582611
1430	Tuohe	55	31	471304	5581926
1431	Tuohe	56	5	471904	5582216
1432	Tuohe	56	9	472045	5582025
1433	Tuohe	56	10	472443	5582111
1434	Tuohe	56	12	471697	5581095
1435	Tuohe	56	18	471912	5580796
1436	Tuohe	58	7	470273	5584529
1437	Tuohe	63	19	471533	5583765
1438	Tuohe	63	29	471236	5582253
1439	Tuohe	64	20	472022	5582398
1440	Tuohe	66	8	472084	5582525
1441	Tuohe	66	18	471603	5581563
1442	Tuohe	66	21	471698	5582355
1443	Tuohe	66	22	471608	5580902
1444	Tuohe	66	32	471414	5583139

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461	Suotuhan	60	13	484483	5607132
462	Suotuhan	60	33	484192	5606960
463	Suotuhan	60	34	484372	5606945
464	Suotuhan	60	35	486405	5606448
465	Suotuhan	63	2	488265	5607737
466	Suotuhan	63	7	488193	5606773
467	Suotuhan	63	9	487708	5606410
468	Suotuhan	63	10	487395	5606507
469	Suotuhan	63	20	488007	5606567
470	Suotuhan	63	21	486774	5606458
471	Suotuhan	63	22	487593	5606903
472	Suotuhan	63	23	487707	5606662
473	Suotuhan	63	24	487065	5606033
474	Suotuhan	64	5	489261	5607557
475	Suotuhan	64	7	489515	5607026
476	Suotuhan	64	8	489831	5607270
477	Suotuhan	64	9	488858	5607462
478	Suotuhan	64	10	490045	5607250
479	Suotuhan	64	18	489500	5607344
480	Suotuhan	64	19	490055	5607459
481	Suotuhan	64	20	489991	5607682
482	Suotuhan	64	21	489673	5607013
483	Suotuhan	64	22	488809	5607727
484	Suotuhan	64	23	488814	5607070
485	Suotuhan	64	24	489005	5607278
486	Suotuhan	64	25	488620	5607105
487	Suotuhan	68	9	472503	5606171
488	Suotuhan	68	13	472422	5605915
489	Suotuhan	68	14	472468	5605528
490	Suotuhan	68	17	473612	5605560
491	Suotuhan	68	19	474038	5605629
492	Suotuhan	68	20	472923	5605128
493	Suotuhan	68	22	473609	5605183
494	Suotuhan	69	4	474058	5607079
495	Suotuhan	69	6	474529	5607086
496	Suotuhan	69	8	473159	5606797
497	Suotuhan	69	10	473441	5606505
498	Suotuhan	69	14	475353	5606898

1445	Tuohe	66	33	471656	5583548
1446	Tuohe	66	35	471218	5582766
1447	Tuohe	68	16	471662	5582573
1448	Tuohe	69	18	471042	5582431
1449	Tuohe	70	14	471519	5584320
1450	Tuohe	74	24	471651	5585031
1451	Tuohe	75	1	471950	5584977
1452	Tuohe	75	14	472249	5584901
1453	Tuohe	75	15	471862	5583861
1454	Tuohe	75	21	473079	5584247
1455	Tuohe	75	31	473251	5583997
1456	Tuohe	76	6	473271	5584115
1457	Tuohe	76	14	473474	5584036
1458	Tuohe	76	15	472964	5583356
1459	Tuohe	76	19	472458	5583035
1460	Tuohe	80	10	472847	5582865
1461	Tuohe	80	17	472715	5582290
1462	Tuohe	80	32	472840	5582557
1463	Tuohe	83	15	472420	5583969
1464	Tuohe	87	18	472177	5584165
1465	Tuohe	88	9	472598	5584124
1466	Tuohe	88	17	472845	5583775
1467	Tuohe	89	2	472513	5583743
1468	Tuohe	89	12	477100	5586236
1469	Tuohe	89	15	477792	5584398
1470	Tuohe	89	21	477655	5584464
1471	Tuohe	89	22	477604	5583975
1472	Tuohe	89	28	477572	5583522
1473	Tuohe	89	29	477236	5583134
1474	Tuohe	89	31	477496	5582881
1475	Tuohe	89	40	477251	5582434
1476	Tuohe	89	43	477611	5584218
1477	Tuohe	89	44	479781	5584219
1478	Tuohe	89	45	478879	5584590
1479	Tuohe	92	3	479602	5583384
1480	Tuohe	93	8	478582	5583199
1481	Tuohe	93	9	478570	5582988
1482	Tuohe	93	11	479741	5585405
1483	Tuohe	93	12	479620	5585044

499	Suotuhan	69	19	474922	5606203
500	Suotuhan	70	1	476659	5607141
501	Suotuhan	70	5	478112	5607204
502	Suotuhan	70	6	476775	5606711
503	Suotuhan	70	9	478477	5606776
504	Suotuhan	70	12	478154	5606479
505	Suotuhan	70	13	478496	5606547
506	Suotuhan	70	15	478801	5606454
507	Suotuhan	70	16	478701	5606169
508	Suotuhan	70	20	478816	5605968
509	Suotuhan	70	24	477373	5607210
510	Suotuhan	70	25	477944	5607193
511	Suotuhan	70	26	478304	5606809
512	Suotuhan	70	29	478707	5606788
513	Suotuhan	71	13	479129	5607537
514	Suotuhan	71	14	479192	5607826
515	Suotuhan	71	15	479364	5606863
516	Suotuhan	72	9	481792	5607194
517	Suotuhan	72	14	482767	5607057
518	Suotuhan	73	1	480917	5607337
519	Suotuhan	73	6	481929	5606559
520	Suotuhan	73	7	482776	5606531
521	Suotuhan	73	17	483755	5606360
522	Suotuhan	73	20	483160	5606161
523	Suotuhan	73	22	483342	5606617
524	Suotuhan	73	23	482896	5606410
525	Suotuhan	73	24	482873	5605987
526	Suotuhan	73	25	483414	5606482
527	Suotuhan	73	26	484031	5606371
528	Suotuhan	74	6	471588	5604887
529	Suotuhan	74	15	471172	5604521
530	Suotuhan	74	24	471650	5604529
531	Suotuhan	74	25	472603	5603967
532	Suotuhan	74	26	473744	5603600
533	Suotuhan	75	5	474859	5605461
534	Suotuhan	75	6	474214	5604776
535	Suotuhan	75	19	475406	5604009
536	Suotuhan	75	21	475523	5603638
537	Suotuhan	75	24	475454	5603473

1484	Tuohe	93	13	481518	5583812
1485	Tuohe	93	16	484774	5586194
1486	Tuohe	94	9	484964	5585525
1487	Tuohe	94	10	482767	5582890
1488	Tuohe	94	12	482586	5582631
1489	Tuohe	94	14	482258	5583052
1490	Tuohe	94	15	483228	5584618
1491	Tuohe	94	16	483035	5583285
1492	Tuohe	94	21	482706	5583425
1493	Tuohe	94	24	484702	5585470
1494	Tuohe	94	33	485980	5585357
1495	Tuohe	96	31	485682	5584181
1496	Tuohe	96	32	484706	5583561
1497	Tuohe	99	14	484865	5583907
1498	Tuohe	99	16	485209	5583594
1499	Tuohe	99	20	485312	5583614
1500	Tuohe	99	33	484240	5583372
1501	Tuohe	100	8	483850	5583059
1502	Tuohe	100	12	483037	5582782
1503	Tuohe	100	24	485027	5583681
1504	Tuohe	1	25	485837	5584820
1505	Tuohe	3	22	485029	5583427
1506	Tuohe	4	16	483907	5583384
1507	Tuohe	4	21	486454	5584833
1508	Tuohe	4	22	486884	5585078
1509	Tuohe	4	23	487105	5584621
1510	Tuohe	4	24	486040	5584522
1511	Tuohe	4	25	485939	5584193
1512	Tuohe	4	26	485963	5583807
1513	Tuohe	4	27	486791	5583646
1514	Tuohe	5	5	486940	5583355
1515	Tuohe	5	6	487076	5583104
1516	Tuohe	5	7	487038	5582853
1517	Tuohe	5	12	485566	5583325
1518	Tuohe	5	23	485737	5583174
1519	Tuohe	5	25	486264	5583117
1520	Tuohe	5	26	486526	5582594
1521	Tuohe	5	27	485969	5582765
1522	Tuohe	6	19	487049	5582454

538	Suotuhan	76	1	475729	5606642
539	Suotuhan	76	30	477007	5602812
540	Suotuhan	76	33	476060	5604229
541	Suotuhan	76	35	476443	5603460
542	Suotuhan	77	5	476519	5605763
543	Suotuhan	77	19	476911	5604533
544	Suotuhan	77	25	477022	5603836
545	Suotuhan	77	29	478109	5603994
546	Suotuhan	77	37	477604	5603760
547	Suotuhan	77	38	477483	5603979
548	Suotuhan	77	39	477809	5603478
549	Suotuhan	77	40	477247	5603497
550	Suotuhan	78	1	479284	5605946
551	Suotuhan	78	4	478919	5605797
552	Suotuhan	78	7	479532	5605832
553	Suotuhan	78	8	479942	5605370
554	Suotuhan	78	14	479413	5605427
555	Suotuhan	78	29	478438	5603600
556	Suotuhan	78	31	479739	5604480
557	Suotuhan	78	35	479237	5604350
558	Suotuhan	78	41	479360	5605734
559	Suotuhan	78	42	479294	5606079
560	Suotuhan	78	43	479726	5605734
561	Suotuhan	78	44	479160	5604276
562	Suotuhan	78	47	478513	5604518
563	Suotuhan	78	48	479013	5604488
564	Suotuhan	78	49	478311	5603845
565	Suotuhan	78	51	479252	5604185
566	Suotuhan	79	7	481090	5605268
567	Suotuhan	79	9	484245	5606002
568	Suotuhan	79	12	481559	5605543
569	Suotuhan	79	14	483678	5605797
570	Suotuhan	79	15	483487	5605571
571	Suotuhan	80	1	484650	5605967
572	Suotuhan	80	6	485736	5606049
573	Suotuhan	80	7	485943	5605962
574	Suotuhan	80	15	485710	5605179
575	Suotuhan	80	16	484951	5604975
576	Suotuhan	80	23	485088	5604117

1523	Tuohe	6	20	486676	5582157
1524	Tuohe	8	3	486561	5582057
1525	Tuohe	8	8	485588	5583620
1526	Tuohe	9	1	486058	5583617
1527	Tuohe	9	2	487124	5583651
1528	Tuohe	9	7	479430	5582857
1529	Tuohe	9	11	478673	5582529
1530	Tuohe	9	22	479125	5582321
1531	Tuohe	9	23	477891	5581643
1532	Tuohe	9	24	478801	5581563
1533	Tuohe	9	25	479127	5581668
1534	Tuohe	9	27	477286	5581327
1535	Tuohe	9	29	477513	5580577
1536	Tuohe	10	7	476788	5580250
1537	Tuohe	10	24	480145	5581762
1538	Tuohe	10	30	481429	5581748
1539	Tuohe	10	31	481187	5581337
1540	Tuohe	11	13	480436	5580536
1541	Tuohe	11	17	481227	5580694
1542	Tuohe	11	26	483166	5582731
1543	Tuohe	11	28	483417	5582766
1544	Tuohe	13	5	484069	5582828
1545	Tuohe	13	6	484183	5582463
1546	Tuohe	13	14	483066	5582377
1547	Tuohe	13	18	483475	5582286
1548	Tuohe	13	22	483784	5582024
1549	Tuohe	13	25	484078	5582029
1550	Tuohe	13	39	482410	5582228
1551	Tuohe	13	43	482822	5581877
1552	Tuohe	13	48	484274	5581862
1553	Tuohe	14	5	483901	5582379
1554	Tuohe	15	17	484317	5581980
1555	Tuohe	15	37	484573	5583224
1556	Tuohe	16	21	484365	5583046
1557	Tuohe	16	22	484584	5582890
1558	Tuohe	16	26	485093	5583130
1559	Tuohe	16	27	485749	5582310
1560	Tuohe	17	22	484853	5582780
1561	Tuohe	18	1	485043	5582305

577	Suotuhan	80	26	485090	5605150
578	Suotuhan	80	27	485609	5605568
579	Suotuhan	80	30	485136	5605591
580	Suotuhan	80	31	485402	5605458
581	Suotuhan	80	32	484997	5604791
582	Suotuhan	80	33	485633	5605362
583	Suotuhan	80	34	486072	5605642
584	Suotuhan	80	35	484681	5604594
585	Suotuhan	92	3	474257	5604438
586	Suotuhan	92	6	474303	5604081
587	Suotuhan	92	9	474292	5603520
588	Suotuhan	92	11	474399	5603237
589	Suotuhan	92	12	474762	5603281
590	Suotuhan	92	13	475256	5603044
591	Suotuhan	92	15	475343	5602836
592	Suotuhan	93	5	471950	5603655
593	Suotuhan	93	8	472932	5603187
594	Suotuhan	93	9	473256	5603275
595	Suotuhan	93	13	474608	5602511
596	Suotuhan	93	14	475009	5602497
597	Suotuhan	93	19	472984	5602804
598	Suotuhan	93	21	473557	5602592
599	Suotuhan	93	25	473036	5602646
600	Suotuhan	93	27	473289	5602534
601	Suotuhan	93	32	474901	5602604
602	Suotuhan	93	33	472193	5603199
603	Suotuhan	93	37	473206	5603364
604	Suotuhan	94	3	479679	5603958
605	Suotuhan	94	5	480078	5603732
606	Suotuhan	94	7	479051	5603531
607	Suotuhan	94	13	479687	5602708
608	Suotuhan	94	14	479657	5602499
609	Suotuhan	94	16	478099	5602936
610	Suotuhan	94	17	478184	5602871
611	Suotuhan	94	18	479121	5602515
612	Suotuhan	94	19	479381	5602252
613	Suotuhan	94	20	479735	5602197
614	Suotuhan	94	22	479613	5602018
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1562	Tuohe	18	13	485695	5581770
1563	Tuohe	18	20	485822	5582507
1564	Tuohe	18	31	481782	5581874
1565	Tuohe	18	32	482186	5581941
1566	Tuohe	19	4	482689	5581650
1567	Tuohe	19	7	482851	5581742
1568	Tuohe	19	12	483929	5581252
1569	Tuohe	19	13	484096	5580974
1570	Tuohe	19	15	484190	5580898
1571	Tuohe	19	18	483654	5580778
1572	Tuohe	19	34	481627	5581424
1573	Tuohe	19	42	481869	5581455
1574	Tuohe	19	44	482568	5581192
1575	Tuohe	19	51	482920	5580672
1576	Tuohe	21	1	481634	5581660
1577	Tuohe	21	10	463329	5579099
1578	Tuohe	21	12	464967	5578132
1579	Tuohe	21	13	476295	5580065
1580	Tuohe	21	15	476035	5579997
1581	Tuohe	22	7	475771	5579510
1582	Tuohe	22	13	475796	5578958
1583	Tuohe	22	14	475302	5578873
1584	Tuohe	22	17	476412	5578936
1585	Tuohe	22	18	474388	5578218
1586	Tuohe	22	20	475532	5579871
1587	Tuohe	22	21	474632	5578411
1588	Tuohe	23	12	474562	5577692
1589	Tuohe	23	16	475975	5579140
1590	Tuohe	23	22	476373	5579292
1591	Tuohe	26	2	475250	5579024
1592	Tuohe	26	10	476238	5579001
1593	Tuohe	26	14	476398	5579686
1594	Tuohe	26	16	475544	5578455
1595	Tuohe	26	18	475118	5578866
1596	Tuohe	26	22	477172	5579008
1597	Tuohe	26	28	477876	5579130
1598	Tuohe	26	35	478261	5579120
1599	Tuohe	26	36	478226	5578325
1600	Tuohe	26	54	477756	5577711

616	Suotuhan	95	6	480512	5604204
617	Suotuhan	95	7	480821	5604002
618	Suotuhan	95	8	481074	5604009
619	Suotuhan	95	10	480314	5603596
620	Suotuhan	95	11	480033	5603044
621	Suotuhan	95	12	480518	5603502
622	Suotuhan	95	13	480878	5603209
623	Suotuhan	95	14	480489	5603051
624	Suotuhan	95	15	480311	5602989
625	Suotuhan	95	17	480860	5602619
626	Suotuhan	95	18	480264	5602421
627	Suotuhan	95	21	481030	5604614
628	Suotuhan	95	22	480584	5604508
629	Suotuhan	95	24	480850	5604346
630	Suotuhan	95	25	480521	5603796
631	Suotuhan	95	26	480831	5603732
632	Suotuhan	95	28	480974	5604749
633	Suotuhan	96	1	481662	5605278
634	Suotuhan	96	2	482064	5605320
635	Suotuhan	96	3	482316	5605265
636	Suotuhan	96	8	481516	5604237
637	Suotuhan	96	12	482197	5604427
638	Suotuhan	96	13	482475	5604610
639	Suotuhan	96	19	482092	5603904
640	Suotuhan	96	20	482387	5603961
641	Suotuhan	96	31	482699	5602909
642	Suotuhan	96	32	482575	5602981
643	Suotuhan	96	34	482311	5603079
644	Suotuhan	96	35	482388	5603014
645	Suotuhan	96	36	482245	5602898
646	Suotuhan	96	49	481512	5605034
647	Suotuhan	96	50	482135	5604730
648	Suotuhan	96	51	481347	5604470
649	Suotuhan	97	1	483109	5605277
650	Suotuhan	97	3	483193	5605280
651	Suotuhan	97	4	484044	5605666
652	Suotuhan	97	13	484219	5605304
653	Suotuhan	97	19	483467	5604094
654	Suotuhan	97	20	483225	5603743

1601	Tuohe	26	56	477457	5577418
1602	Tuohe	26	57	478246	5577249
1603	Tuohe	26	59	476710	5578342
1604	Tuohe	27	3	477452	5578943
1605	Tuohe	27	14	477400	5579066
1606	Tuohe	27	15	478279	5577711
1607	Tuohe	27	16	478076	5579825
1608	Tuohe	27	27	478431	5578770
1609	Tuohe	27	32	477422	5578586
1610	Tuohe	27	43	477376	5578672
1611	Tuohe	27	44	478806	5578689
1612	Tuohe	27	45	479161	5578201
1613	Tuohe	27	47	478980	5578138
1614	Tuohe	27	50	479363	5578319
1615	Tuohe	29	6	480085	5579921
1616	Tuohe	29	17	479762	5579468
1617	Tuohe	29	22	479803	5580131
1618	Tuohe	29	23	479726	5579644
1619	Tuohe	29	25	481485	5580333
1620	Tuohe	29	26	481372	5579529
1621	Tuohe	30	5	482001	5579496
1622	Tuohe	30	20	480853	5579327
1623	Tuohe	30	24	481297	5580046
1624	Tuohe	30	25	481831	5580243
1625	Tuohe	31	3	481744	5580757
1626	Tuohe	32	27	480753	5578458
1627	Tuohe	32	29	481395	5578207
1628	Tuohe	32	31	481015	5578727
1629	Tuohe	32	33	485324	5580446
1630	Tuohe	32	34	484981	5579709
1631	Tuohe	32	35	485700	5579948
1632	Tuohe	33	20	483302	5578264
1633	Tuohe	33	25	485081	5578465
1634	Tuohe	33	33	466567	5576176
1635	Tuohe	33	34	464978	5577094
1636	Tuohe	33	36	466561	5575786
1637	Tuohe	33	40	467390	5574544
1638	Tuohe	33	42	467377	5574186
1639	Tuohe	34	38	465515	5577874

655	Suotuhan	97	21	483146	5604089
656	Suotuhan	97	22	483761	5603445
657	Suotuhan	97	27	483363	5603136
658	Suotuhan	97	28	484100	5603225
659	Suotuhan	97	29	483082	5603160
660	Suotuhan	97	30	483112	5602997
661	Suotuhan	97	33	484180	5604495
662	Suotuhan	97	38	483180	5604929
663	Suotuhan	97	42	483928	5605200
664	Suotuhan	97	43	484374	5605048
665	Suotuhan	97	45	483911	5603844
666	Suotuhan	97	47	484257	5604665
667	Suotuhan	98	1	475450	5602416
668	Suotuhan	98	2	475197	5601867
669	Suotuhan	98	7	475040	5601492
670	Suotuhan	98	10	473937	5602030
671	Suotuhan	98	12	473777	5601922
672	Suotuhan	98	14	473661	5601734
673	Suotuhan	98	21	473346	5601790
674	Suotuhan	98	23	473056	5601722
675	Suotuhan	98	46	475650	5602578
676	Suotuhan	98	48	474802	5602016
677	Suotuhan	99	4	475738	5602207
678	Suotuhan	99	5	476003	5601788
679	Suotuhan	99	6	475603	5601682
680	Suotuhan	99	7	476385	5601644
681	Suotuhan	99	9	475294	5601265
682	Suotuhan	99	10	475432	5601058
683	Suotuhan	99	12	475571	5600926
684	Suotuhan	99	13	475866	5600840
685	Suotuhan	99	14	474464	5600577
686	Suotuhan	99	15	474820	5600205
687	Suotuhan	99	18	475653	5600101
688	Suotuhan	99	22	474941	5599618
689	Suotuhan	99	23	473945	5599896
690	Suotuhan	99	26	476154	5602101
691	Suotuhan	99	27	476131	5602489
692	Suotuhan	99	28	475876	5602461
693	Suotuhan	100	2	476561	5602391

1640	Tuohe	34	39	465228	5577870
1641	Tuohe	34	40	465694	5577515
1642	Tuohe	38	2	465835	5577352
1643	Tuohe	38	3	466036	5577167
1644	Tuohe	38	10	466298	5577313
1645	Tuohe	38	29	467218	5576436
1646	Tuohe	39	5	466800	5576313
1647	Tuohe	39	21	467600	5575546
1648	Tuohe	39	22	467415	5575970
1649	Tuohe	39	32	467529	5574666
1650	Tuohe	40	1	465316	5578070
1651	Tuohe	40	3	465843	5577598
1652	Tuohe	40	15	466627	5577158
1653	Tuohe	41	3	466825	5577099
1654	Tuohe	41	6	466762	5576771
1655	Tuohe	41	10	467618	5576179
1656	Tuohe	41	20	466438	5577004
1657	Tuohe	41	33	472742	5577018
1658	Tuohe	42	25	473751	5576319
1659	Tuohe	42	26	473049	5576414
1660	Tuohe	50	2	474816	5576286
1661	Tuohe	50	10	474230	5575794
1662	Tuohe	50	12	475104	5576270
1663	Tuohe	50	18	473987	5575283
1664	Tuohe	50	24	474393	5575493
1665	Tuohe	50	27	474703	5575680
1666	Tuohe	50	29	475041	5575855
1667	Tuohe	50	31	474891	5577473
1668	Tuohe	50	32	474914	5576156
1669	Tuohe	50	33	476272	5576282
1670	Tuohe	50	34	477760	5576396
1671	Tuohe	50	35	478797	5577067
1672	Tuohe	50	37	478646	5577320
1673	Tuohe	50	38	478915	5577365
1674	Tuohe	51	7	480072	5576720
1675	Tuohe	51	10	479559	5576678
1676	Tuohe	51	20	480134	5576371
1677	Tuohe	51	26	479840	5576507
1678	Tuohe	51	34	479265	5576749

694	Suotuhan	100	12	476984	5600984
695	Suotuhan	100	22	476901	5602108
696	Suotuhan	100	23	476795	5602415
697	Suotuhan	100	24	476531	5602509
698	Suotuhan	100	26	476911	5601154
699	Suotuhan	101	2	477549	5602345
700	Suotuhan	101	4	477896	5602204
701	Suotuhan	101	7	477898	5602019
702	Suotuhan	101	13	477669	5601013
703	Suotuhan	101	16	478804	5601469
704	Suotuhan	101	20	479271	5601828
705	Suotuhan	101	21	479708	5601892
706	Suotuhan	101	23	478565	5601411
707	Suotuhan	101	25	479020	5601190
708	Suotuhan	101	29	477870	5602601
709	Suotuhan	101	30	477530	5602639
710	Suotuhan	101	31	477900	5602752
711	Suotuhan	101	32	477682	5602370
712	Suotuhan	108	3	475613	5599347
713	Suotuhan	108	5	476759	5599660
714	Suotuhan	108	7	477980	5599796
715	Suotuhan	108	8	475111	5599033
716	Suotuhan	108	10	476720	5599308
717	Suotuhan	108	12	477866	5599400
718	Suotuhan	108	13	478442	5599389
719	Suotuhan	108	14	478769	5599377
720	Suotuhan	108	18	477332	5599430
721	Suotuhan	108	20	477707	5600072
722	Suotuhan	113	1	485481	5602302
723	Suotuhan	113	5	485671	5602079
724	Suotuhan	113	17	485369	5600990
725	Suotuhan	113	18	485241	5601015
726	Suotuhan	113	25	485387	5600485
727	Suotuhan	113	29	485564	5601775
728	Suotuhan	113	30	485568	5601469
729	Suotuhan	113	32	485380	5601881
730	Suotuhan	113	33	485205	5601625
731	Suotuhan	113	34	484934	5601562
732	Suotuhan	113	35	485544	5600550

1679	Tuohe	51	36	479450	5576854
1680	Tuohe	51	39	480008	5576474
1681	Tuohe	51	42	479497	5576519
1682	Tuohe	51	45	480939	5576358
1683	Tuohe	51	48	479454	5577933
1684	Tuohe	51	51	483097	5577765
1685	Tuohe	51	52	483469	5577301
1686	Tuohe	52	20	483878	5577224
1687	Tuohe	52	22	479574	5577705
1688	Tuohe	52	24	480188	5578031
1689	Tuohe	52	25	480709	5577888
1690	Tuohe	53	11	482891	5577566
1691	Tuohe	53	22	483119	5577207
1692	Tuohe	53	23	481247	5576987
1693	Tuohe	54	22	481204	5577198
1694	Tuohe	54	24	482217	5577109
1695	Tuohe	54	26	481611	5577246
1696	Tuohe	54	27	483203	5576780
1697	Tuohe	54	30	481661	5577307
1698	Tuohe	54	31	483280	5577636
1699	Tuohe	54	32	480490	5578088
1700	Tuohe	55	23	479310	5577563
1701	Tuohe	55	24	483672	5577466
1702	Tuohe	58	3	481970	5577766
1703	Tuohe	58	16	480528	5577659
1704	Tuohe	58	20	479949	5578184
1705	Tuohe	58	22	481061	5577951
1706	Tuohe	59	6	464347	5575827
1707	Tuohe	59	7	464893	5574972
1708	Tuohe	59	9	465735	5575442
1709	Tuohe	59	10	465550	5574416
1710	Tuohe	59	11	466722	5574635
1711	Tuohe	59	12	466775	5574778
1712	Tuohe	59	19	466429	5574203
1713	Tuohe	59	20	467132	5574087
1714	Tuohe	59	21	467135	5573908
1715	Tuohe	59	22	465314	5574935
1716	Tuohe	59	25	466027	5574665
1717	Tuohe	59	30	468051	5576266

733	Suotuhan	113	37	486083	5601441
734	Suotuhan	113	38	485817	5601335
735	Suotuhan	113	39	485100	5600869
736	Suotuhan	114	2	485944	5599957
737	Suotuhan	114	6	487218	5601086
738	Suotuhan	114	7	486094	5600263
739	Suotuhan	114	9	486802	5600644
740	Suotuhan	114	18	487563	5600565
741	Suotuhan	114	24	487838	5600294
742	Suotuhan	114	34	485480	5600339
743	Suotuhan	114	35	486187	5600528
744	Suotuhan	114	36	485826	5600211
745	Suotuhan	114	37	486480	5599302
746	Suotuhan	117	1	474954	5598879
747	Suotuhan	117	11	476051	5598062
748	Suotuhan	118	6	476416	5597984
749	Suotuhan	118	10	476085	5597457
750	Suotuhan	118	12	476609	5597753
751	Suotuhan	119	3	478724	5599062
752	Suotuhan	119	4	478388	5598971
753	Suotuhan	119	7	478283	5598492
754	Suotuhan	119	13	477388	5597971
755	Suotuhan	119	14	477288	5597698
756	Suotuhan	119	20	476821	5596947
757	Suotuhan	119	21	476908	5596811
758	Suotuhan	119	30	476070	5596410
759	Suotuhan	119	31	476075	5596181
760	Suotuhan	119	34	476397	5595917
761	Suotuhan	119	35	476447	5595787
762	Suotuhan	119	37	477540	5597784
763	Suotuhan	119	38	477482	5597301
764	Suotuhan	119	39	476472	5596522
765	Suotuhan	119	40	476885	5596391
766	Suotuhan	119	41	475790	5596455
767	Suotuhan	119	42	475798	5596129
768	Suotuhan	119	43	475571	5596434
769	Suotuhan	120	1	478800	5598841
770	Suotuhan	120	2	479183	5598929
771	Suotuhan	120	4	478646	5598443

1718	Tuohe	59	31	468072	5575810
1719	Tuohe	59	32	468570	5576147
1720	Tuohe	59	33	467866	5575712
1721	Tuohe	59	34	467991	5575503
1722	Tuohe	59	35	468510	5575933
1723	Tuohe	59	36	469501	5576008
1724	Tuohe	62	10	468525	5575745
1725	Tuohe	62	15	468151	5575324
1726	Tuohe	62	29	468485	5575339
1727	Tuohe	63	16	467833	5574847
1728	Tuohe	63	17	468026	5574382
1729	Tuohe	63	22	467767	5574106
1730	Tuohe	63	23	467862	5573987
1731	Tuohe	63	24	468408	5575606
1732	Tuohe	63	25	468965	5575315
1733	Tuohe	63	28	468511	5574908
1734	Tuohe	64	17	468260	5574655
1735	Tuohe	65	1	468808	5574515
1736	Tuohe	65	2	467996	5573846
1737	Tuohe	65	3	468756	5573876
1738	Tuohe	65	16	469310	5573635
1739	Tuohe	65	24	470048	5574156
1740	Tuohe	65	25	469274	5573282
1741	Tuohe	65	27	470321	5574454
1742	Tuohe	65	28	469825	5573489
1743	Tuohe	65	29	469444	5574046
1744	Tuohe	65	30	468960	5573527
1745	Tuohe	65	31	470493	5573736
1746	Tuohe	65	33	469021	5574670
1747	Tuohe	66	19	469770	5574298
1748	Tuohe	66	23	478308	5575996
1749	Tuohe	66	25	478149	5575988
1750	Tuohe	66	28	479345	5576320
1751	Tuohe	66	29	479009	5576091
1752	Tuohe	66	34	478641	5575791
1753	Tuohe	66	38	479765	5575389
1754	Tuohe	66	50	479855	5576032
1755	Tuohe	66	52	480320	5575974
1756	Tuohe	66	53	480741	5575795

772	Suotuhan	120	5	478893	5598671
773	Suotuhan	120	7	478955	5598250
774	Suotuhan	120	9	479474	5598013
775	Suotuhan	120	11	478337	5597993
776	Suotuhan	120	14	479036	5597820
777	Suotuhan	120	23	477792	5597013
778	Suotuhan	120	27	477705	5596751
779	Suotuhan	120	34	477721	5596110
780	Suotuhan	120	44	479125	5599156
781	Suotuhan	120	45	478883	5597720
782	Suotuhan	120	46	477900	5597809
783	Suotuhan	120	47	477865	5597336
784	Suotuhan	120	48	478397	5597493
785	Suotuhan	120	49	477424	5596996
786	Suotuhan	120	50	478553	5598020
787	Suotuhan	122	2	481557	5599336
788	Suotuhan	122	3	481440	5599132
789	Suotuhan	122	16	480941	5598433
790	Suotuhan	123	3	482125	5599042
791	Suotuhan	123	9	482396	5598502
792	Suotuhan	123	13	482473	5598311
793	Suotuhan	123	18	483098	5597922
794	Suotuhan	123	20	481951	5598958
795	Suotuhan	123	24	482643	5598598
796	Suotuhan	123	25	482227	5598776
797	Suotuhan	123	26	481966	5599144
798	Suotuhan	126	3	486264	5598925
799	Suotuhan	126	4	486192	5598643
800	Suotuhan	126	20	487673	5596358
801	Suotuhan	126	23	487993	5596702
802	Suotuhan	126	24	487071	5597784
803	Suotuhan	126	25	487328	5597818
804	Suotuhan	126	26	487107	5598199
805	Suotuhan	126	27	487403	5597476
806	Suotuhan	127	1	487924	5599534
807	Suotuhan	127	7	487516	5599030
808	Suotuhan	127	9	488298	5598825
809	Suotuhan	127	12	488743	5598681
810	Suotuhan	127	22	487916	5598614

1757	Tuohe	66	58	480990	5576064
1758	Tuohe	66	61	480704	5574955
1759	Tuohe	66	63	478024	5576307
1760	Tuohe	66	64	478137	5576179
1761	Tuohe	66	67	478129	5575821
1762	Tuohe	66	68	478698	5576456
1763	Tuohe	68	4	478507	5576645
1764	Tuohe	68	9	479172	5576481
1765	Tuohe	68	22	478878	5576108
1766	Tuohe	68	24	479191	5575891
1767	Tuohe	68	25	479658	5576326
1768	Tuohe	68	27	480079	5575675
1769	Tuohe	68	29	478601	5575926
1770	Tuohe	68	30	479472	5576177
1771	Tuohe	68	33	480017	5576110
1772	Tuohe	68	34	480576	5576126
1773	Tuohe	69	10	479527	5575615
1774	Tuohe	69	11	480885	5575540
1775	Tuohe	69	12	480836	5576191
1776	Tuohe	69	14	480939	5575559
1777	Tuohe	69	15	480648	5575546
1778	Tuohe	69	16	477708	5575859
1779	Tuohe	69	23	478743	5575466
1780	Tuohe	69	25	477639	5575390
1781	Tuohe	69	26	478039	5575325
1782	Tuohe	69	33	479808	5574349
1783	Tuohe	69	35	478158	5574973
1784	Tuohe	69	36	479428	5574233
1785	Tuohe	69	37	480013	5573702
1786	Tuohe	69	38	479944	5573278
1787	Tuohe	69	39	480118	5573825
1788	Tuohe	69	41	478851	5575726
1789	Tuohe	69	42	482791	5575738
1790	Tuohe	70	4	481857	5575896
1791	Tuohe	70	12	481576	5575763
1792	Tuohe	70	16	482877	5574863
1793	Tuohe	70	18	481416	5574855
1794	Tuohe	70	21	482365	5574955
1795	Tuohe	70	26	482480	5573890

811	Suotuhan	128	1	488261	5598181
812	Suotuhan	128	6	488951	5597802
813	Suotuhan	128	7	488070	5597592
814	Suotuhan	128	10	489205	5597565
815	Suotuhan	128	12	488100	5597207
816	Suotuhan	128	15	489113	5597120
817	Suotuhan	128	16	488026	5596965
818	Suotuhan	130	4	478552	5596704
819	Suotuhan	130	8	479945	5596836
820	Suotuhan	130	9	480567	5596776
821	Suotuhan	130	11	478853	5596233
822	Suotuhan	130	19	479098	5595975
823	Suotuhan	130	28	479144	5596550
824	Suotuhan	130	30	479767	5596582
825	Suotuhan	130	31	480667	5596558
826	Suotuhan	130	32	480969	5596675
827	Suotuhan	130	33	480114	5596142
828	Suotuhan	131	1	481733	5598355
829	Suotuhan	131	2	481985	5598230
830	Suotuhan	131	3	482126	5598275
831	Suotuhan	131	4	481498	5597677
832	Suotuhan	131	7	481700	5597474
833	Suotuhan	131	12	482601	5597472
834	Suotuhan	131	14	482651	5597548
835	Suotuhan	131	15	481277	5596986
836	Suotuhan	131	16	481487	5597344
837	Suotuhan	131	17	481511	5597112
838	Suotuhan	131	23	481425	5596801
839	Suotuhan	131	26	482506	5596661
840	Suotuhan	131	28	482700	5596570
841	Suotuhan	131	29	481480	5596633
842	Suotuhan	131	31	482035	5596323
843	Suotuhan	131	34	481534	5596366
844	Suotuhan	131	37	481950	5596165
845	Suotuhan	131	40	481982	5598498
846	Suotuhan	131	41	482200	5597882
847	Suotuhan	131	42	481717	5597729
848	Suotuhan	131	43	481384	5597156
849	Suotuhan	131	46	481802	5598687

1796	Tuohe	70	27	481346	5575950
1797	Tuohe	70	29	481643	5575416
1798	Tuohe	70	30	481500	5575568
1799	Tuohe	70	31	481743	5575080
1800	Tuohe	70	33	481395	5575328
1801	Tuohe	70	36	482279	5575109
1802	Tuohe	74	3	467259	5573425
1803	Tuohe	74	4	467394	5573516
1804	Tuohe	74	6	467710	5573131
1805	Tuohe	74	8	468057	5572743
1806	Tuohe	74	9	468533	5572543
1807	Tuohe	74	14	468331	5572705
1808	Tuohe	74	15	470011	5573214
1809	Tuohe	74	17	470348	5572963
1810	Tuohe	74	18	470053	5571991
1811	Tuohe	74	19	469967	5572411
1812	Tuohe	74	22	471149	5571258
1813	Tuohe	74	25	471532	5571404
1814	Tuohe	74	26	471520	5570797
1815	Tuohe	74	27	472056	5570602
1816	Tuohe	74	28	472469	5570181
1817	Tuohe	74	29	470337	5573224
1818	Tuohe	74	30	469897	5572876
1819	Tuohe	74	31	470814	5571956
1820	Tuohe	74	33	470379	5572200
1821	Tuohe	74	34	471165	5572163
1822	Tuohe	74	36	471277	5571438
1823	Tuohe	74	37	476059	5572964
1824	Tuohe	74	39	476188	5573046
1825	Tuohe	74	40	474026	5572629
1826	Tuohe	74	42	474328	5572966
1827	Tuohe	74	43	474800	5572600
1828	Tuohe	74	44	474163	5572491
1829	Tuohe	74	45	465403	5571905
1830	Tuohe	74	46	466872	5571890
1831	Tuohe	75	4	468260	5571863
1832	Tuohe	75	23	468898	5571979
1833	Tuohe	75	25	469222	5572337
1834	Tuohe	75	29	468072	5571532

850	Suotuhan	131	47	481305	5597377
851	Suotuhan	132	2	484239	5598269
852	Suotuhan	132	15	483129	5597195
853	Suotuhan	132	20	484321	5597228
854	Suotuhan	132	32	484693	5598221
855	Suotuhan	132	33	485360	5598027
856	Suotuhan	132	34	485366	5597782
857	Suotuhan	132	35	485575	5597919
858	Suotuhan	133	8	485071	5596888
859	Suotuhan	133	9	485516	5597149
860	Suotuhan	133	12	484299	5596535
861	Suotuhan	133	13	484634	5596487
862	Suotuhan	133	19	484353	5596247
863	Suotuhan	134	2	480894	5596191
864	Suotuhan	134	3	480707	5596025
865	Suotuhan	134	4	480473	5595936
866	Suotuhan	134	7	480862	5595667
867	Suotuhan	134	9	480103	5595440
868	Suotuhan	134	12	480790	5594784
869	Suotuhan	134	13	481033	5594811
870	Suotuhan	134	14	480312	5594865
871	Suotuhan	134	15	479776	5594956
872	Suotuhan	134	20	480678	5594662
873	Suotuhan	134	22	480725	5594402
874	Suotuhan	134	28	480439	5593811
875	Suotuhan	134	29	480703	5593917
876	Suotuhan	134	37	480470	5595705
877	Suotuhan	134	38	480972	5596306
878	Suotuhan	134	39	480699	5595152
879	Suotuhan	134	40	480563	5595337
880	Suotuhan	134	41	481171	5595202
881	Suotuhan	134	43	480825	5595036
882	Suotuhan	134	44	480146	5594515
883	Suotuhan	134	45	480463	5594083
884	Suotuhan	135	2	481230	5596062
885	Suotuhan	135	5	481728	5595460
886	Suotuhan	135	9	481701	5595049
887	Suotuhan	135	14	482523	5594908
888	Suotuhan	135	19	482119	5594515

1835	Tuohe	75	33	469097	5571415
1836	Tuohe	75	38	468227	5570909
1837	Tuohe	76	8	469229	5571032
1838	Tuohe	76	9	468923	5572195
1839	Tuohe	76	24	467365	5571419
1840	Tuohe	76	37	469164	5571930
1841	Tuohe	76	39	468951	5571680
1842	Tuohe	76	40	468924	5571310
1843	Tuohe	76	41	469318	5571290
1844	Tuohe	76	42	469602	5571883
1845	Tuohe	76	45	469491	5571107
1846	Tuohe	80	3	469733	5571156
1847	Tuohe	80	5	469367	5570865
1848	Tuohe	80	43	469832	5570820
1849	Tuohe	81	3	470621	5570597
1850	Tuohe	81	7	470535	5570162
1851	Tuohe	81	12	470804	5569652
1852	Tuohe	81	13	471290	5570130
1853	Tuohe	81	22	471661	5570261
1854	Tuohe	81	25	471735	5570048
1855	Tuohe	81	32	471910	5570115
1856	Tuohe	81	34	471177	5569640
1857	Tuohe	81	36	471067	5570146
1858	Tuohe	81	43	472170	5569953
1859	Tuohe	81	44	470038	5571111
1860	Tuohe	81	45	470662	5570737
1861	Tuohe	81	46	469456	5571450
1862	Tuohe	81	47	469620	5571289
1863	Tuohe	81	50	470731	5569783
1864	Tuohe	83	14	470847	5570571
1865	Tuohe	83	22	469428	5571805
1866	Tuohe	83	23	470348	5570723
1867	Tuohe	83	25	470216	5570400
1868	Tuohe	83	28	476171	5572749
1869	Tuohe	87	2	477003	5572532
1870	Tuohe	87	4	476250	5571941
1871	Tuohe	87	6	474749	5572290
1872	Tuohe	87	8	474288	5572086
1873	Tuohe	87	10	474776	5571543

889	Suotuhan	135	24	482964	5594503
890	Suotuhan	135	31	482304	5594197
891	Suotuhan	135	40	482297	5593865
892	Suotuhan	135	48	481186	5593387
893	Suotuhan	135	50	480881	5593100
894	Suotuhan	135	54	482237	5594861
895	Suotuhan	136	1	483665	5595736
896	Suotuhan	136	5	484785	5595818
897	Suotuhan	136	7	485122	5595932
898	Suotuhan	136	8	485337	5595798
899	Suotuhan	136	10	485443	5595502
900	Suotuhan	136	11	484215	5595681
901	Suotuhan	136	12	484262	5595391
902	Suotuhan	136	14	484856	5594923
903	Suotuhan	136	15	485315	5595186
904	Suotuhan	136	17	483239	5595373
905	Suotuhan	136	18	484001	5595187
906	Suotuhan	136	19	483339	5595170
907	Suotuhan	136	21	483692	5595014
908	Suotuhan	136	25	483377	5594900
909	Suotuhan	136	27	484024	5594507
910	Suotuhan	136	29	484334	5594224
911	Suotuhan	136	32	483521	5594469
912	Suotuhan	136	33	483367	5594640
913	Suotuhan	136	38	484209	5595498
914	Suotuhan	136	41	484548	5595802
915	Suotuhan	136	43	484685	5595112
916	Suotuhan	136	44	483940	5595768
917	Suotuhan	136	45	485036	5595629
918	Suotuhan	137	1	485691	5595725
919	Suotuhan	137	15	486266	5594247
920	Suotuhan	137	17	487211	5594178
921	Suotuhan	137	20	485956	5593847
922	Suotuhan	137	23	485792	5593910
923	Suotuhan	137	26	485852	5594267
924	Suotuhan	137	27	486600	5594420
925	Suotuhan	138	7	485675	5596256
926	Suotuhan	138	9	486067	5595922
927	Suotuhan	138	17	486312	5595655

1874	Tuohe	87	13	475053	5571569
1875	Tuohe	87	17	476621	5571519
1876	Tuohe	87	19	476655	5571400
1877	Tuohe	87	26	475991	5571300
1878	Tuohe	87	27	476212	5572662
1879	Tuohe	87	28	474938	5572095
1880	Tuohe	87	29	476645	5572812
1881	Tuohe	87	30	477649	5572410
1882	Tuohe	87	31	477088	5572791
1883	Tuohe	88	2	476951	5571959
1884	Tuohe	88	5	476860	5571242
1885	Tuohe	88	7	476658	5572414
1886	Tuohe	88	10	476650	5571771
1887	Tuohe	88	23	477106	5571491
1888	Tuohe	88	24	477382	5572056
1889	Tuohe	88	25	475920	5571811
1890	Tuohe	88	29	477037	5570948
1891	Tuohe	88	30	478267	5569397
1892	Tuohe	88	31	478772	5569630
1893	Tuohe	88	33	478622	5570745
1894	Tuohe	88	39	477494	5570546
1895	Tuohe	88	40	478219	5570231
1896	Tuohe	88	42	478192	5570930
1897	Tuohe	88	43	477898	5572010
1898	Tuohe	88	44	477596	5571545
1899	Tuohe	88	45	478036	5571603
1900	Tuohe	88	46	477391	5571276
1901	Tuohe	88	47	477019	5571077
1902	Tuohe	88	48	477215	5570691
1903	Tuohe	88	49	468341	5570187
1904	Tuohe	88	50	468474	5569819
1905	Tuohe	89	1	469396	5569883
1906	Tuohe	89	14	468913	5569597
1907	Tuohe	89	42	469296	5569582
1908	Tuohe	89	46	469768	5569353
1909	Tuohe	89	48	470076	5569571
1910	Tuohe	89	51	470424	5569127
1911	Tuohe	89	52	470263	5568588
1912	Tuohe	89	53	469909	5568586

928	Suotuhan	138	18	486346	5595435
929	Suotuhan	138	26	485705	5596701
930	Suotuhan	138	27	486080	5596593
931	Suotuhan	138	28	485719	5595976
932	Suotuhan	138	29	486015	5597102
933	Suotuhan	138	30	486495	5596206
934	Suotuhan	138	31	486177	5596279
935	Suotuhan	138	32	485815	5595834
936	Tele	2	2	453037	5590164
937	Tele	2	7	454563	5589924
938	Tele	4	18	453876	5590095
939	Tele	6	1	454306	5589766
940	Tele	6	2	454352	5590038
941	Tele	6	6	454700	5590118
942	Tele	6	12	455053	5589316
943	Tele	6	28	454082	5589397
944	Tele	7	2	453999	5589001
945	Tele	7	10	452888	5589291
946	Tele	7	11	452755	5590035
947	Tele	7	17	453422	5589424
948	Tele	7	20	453600	5589905
949	Tele	9	2	456127	5588145
950	Tele	9	8	455960	5588525
951	Tele	9	9	456738	5588135
952	Tele	9	11	455207	5588504
953	Tele	9	15	455875	5589561
954	Tele	9	16	456336	5588072
955	Tele	9	18	456989	5588220
956	Tele	9	26	457329	5589331
957	Tele	9	30	457383	5588152
958	Tele	9	31	457258	5588281
959	Tele	9	33	457105	5588825
960	Tele	10	2	458288	5588576
961	Tele	10	4	457357	5587493
962	Tele	10	5	457078	5587953
963	Tele	10	6	457793	5588205
964	Tele	10	7	458059	5588432
965	Tele	10	8	457474	5587872
966	Tele	10	12	457835	5589310

1913	Tuohe	89	54	470524	5568701
1914	Tuohe	89	55	470695	5568558
1915	Tuohe	90	10	470633	5568406
1916	Tuohe	90	21	471078	5568253
1917	Tuohe	90	22	471494	5568226
1918	Tuohe	90	26	471960	5567670
1919	Tuohe	90	27	470188	5569036
1920	Tuohe	90	28	471095	5569092
1921	Tuohe	90	29	471242	5568717
1922	Tuohe	90	30	474468	5570454
1923	Tuohe	90	31	474778	5570393
1924	Tuohe	90	32	475364	5570111
1925	Tuohe	90	33	475626	5569622
1926	Tuohe	90	34	475056	5569890
1927	Tuohe	90	35	474679	5569707
1928	Tuohe	92	5	475713	5570322
1929	Tuohe	92	6	475997	5570754
1930	Tuohe	92	9	476427	5570532
1931	Tuohe	92	10	476669	5570601
1932	Tuohe	92	12	476963	5570529
1933	Tuohe	92	13	476871	5569904
1934	Tuohe	92	15	477259	5569938
1935	Tuohe	92	19	478100	5569205
1936	Tuohe	92	20	476236	5569664
1937	Tuohe	92	21	476625	5570364
1938	Tuohe	92	24	477401	5569208
1939	Tuohe	92	26	477273	5569609
1940	Tuohe	92	28	477648	5568904
1941	Tuohe	92	29	472265	5569576
1942	Tuohe	92	34	472223	5569703
1943	Tuohe	92	41	472804	5569654
1944	Tuohe	92	42	471790	5569323
1945	Tuohe	92	43	472936	5569177
1946	Tuohe	94	30	470976	5569346
1947	Tuohe	94	35	471324	5569419
1948	Tuohe	94	36	472190	5568881
1949	Tuohe	94	37	472430	5568383
1950	Tuohe	96	2	471816	5568376
1951	Tuohe	96	5	472048	5568449

967	Tele	11	3	459528	5588742
968	Tele	14	7	459542	5587921
969	Tele	14	8	458566	5589472
970	Tele	14	11	459862	5587659
971	Tele	14	13	459364	5588218
972	Tele	14	24	459465	5586890
973	Tele	15	7	459385	5587479
974	Tele	15	12	458660	5589088
975	Tele	15	14	461968	5588327
976	Tele	15	17	459782	5588942
977	Tele	15	19	460634	5587456
978	Tele	15	20	459881	5588273
979	Tele	15	21	460589	5588705
980	Tele	15	22	461315	5588253
981	Tele	15	23	459968	5588702
982	Tele	15	24	460341	5589886
983	Tele	18	3	461082	5588362
984	Tele	18	21	460374	5587976
985	Tele	19	11	460074	5589614

1952	Tuohe	96	9	472139	5568241
1953	Tuohe	96	11	471930	5568671
1954	Tuohe	96	16	471427	5569542
1955	Tuohe	96	18	471827	5569070
1956	Tuohe	96	19	472014	5568253
1957	Tuohe	96	22	472114	5569023
1958	Tuohe	96	27	473891	5569054
1959	Tuohe	96	30	474390	5568677
1960	Tuohe	96	42	473683	5568430
1961	Tuohe	96	43	474460	5568206
1962	Tuohe	96	44	474711	5568252
1963	Tuohe	96	45	474139	5567943
1964	Tuohe	96	46	475587	5567341
1965	Tuohe	99	3	474861	5567658
1966	Tuohe	99	8	474819	5567910
1967	Tuohe	99	9	475627	5569151
1968	Tuohe	99	15	476241	5568644
1969	Tuohe	99	37	475932	5567563