Mon Jun 09, 2014 23:53 -0400
pDL950.gb
Text Map

```
                10        20        30        40        50        60        70        80        90       100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
      1 GAATTCtgcccttcttcagggcttaatttttaagagcgtcaccttcatggtggtcagtgcgtcctgctgatgtgctcagTATCACCGCCAGTGGTAttta 100
                                                                                          >>>>>>>>>>>>>>>>>
                                                                                          OL1

                110       120       130       140       150       160       170       180       190       200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    101 tgtCAACACCGCCAGAGATAattTATCACCGCAGATGGTTatctgtatgtttttatatgaatttatttttgcagggggcattgtttggtaggtgaga 200
           >>>>>>>>>>>>>>>>>>
           OL2
                                >>>>>>>>>>>>>>>>>>
                                OL3

                210       220       230       240       250       260       270       280       290       300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    201 gatctgaattgctatgtttagtgagttgtatctatttatttttcaataaatacaattggttatgtgttttgggggcgatcgtgaggcaaagaaaacccgg 300

                310       320       330       340       350       360       370       380       390       400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    301 cgctgaggccgggttattcttgttctctggtcaaattatatagttggaaaacaaggatgcatatatgaatgaacgatgcagaggcaatgccgatggcgat 400

                410       420       430       440       450       460       470       480       490       500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    401 agtgggtatcatgtagccgcttatgctggaaagaagcaataacccgcagaaaaacaaagctccaagctcaacaaaactaagggcatagacaataactacc 500

                510       520       530       540       550       560       570       580       590       600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    501 gatgtcatatacccatactctctaatcttggccagtcggcgcgttctgcttccgattagaaacgtcaaggcagcaatcaggattgcaatcatggttcctg 600

                610       620       630       640       650       660       670       680       690       700
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    601 catatgatgacaatgtcgccccaagaccatctctatgagctgaaaaagaaacaccaggaatgtagtggcggaaaaggagatagcaaatgcttacgataac 700

                710       720       730       740       750       760       770       780       790       800
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    701 gtaaggaattattactatgtaaacaccaggcatgattctgttccgcataattactcctgataattaatccttaactttgcccacctgccttttaaaacat 800

                810       820       830       840       850       860       870       880       890       900
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    801 tccagtatatcacttttcattcttgcgtagcaatatgccatctcttcagctatctcagcattggtgaccttgttcagaggcgctgagagatggccttttt 900

                910       920       930       940       950       960       970       980       990      1000
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    901 ctgatagataatgttctgttaaaatatctccggcctcatcttttgcccgcaggctaatgtctgaaaattgaggtgacgggttaaaaataatatccttggc 1000

               1010      1020      1030      1040      1050      1060      1070      1080      1090      1100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1001 aaccttttttatatccctttaaattttggcttaatgactatatccaatgagtcaaaaagctccccttcaatatctgttgcccctaagacctttaatata 1100

               1110      1120      1130      1140      1150      1160      1170      1180      1190      1200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1101 tcgccaaatacaggtagcttggcttctaccttcaccgttgttcggccgatgaaatgcatatgcataacatcgtctttggtggttcccctcatcagtggct 1200

               1210      1220      1230      1240      1250      1260      1270      1280      1290      1300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1201 ctatctgaacgcgctctccactgcttaatgacattcctttcccgattaaaaaatctgtcagatcggatgtggtcggcccgaaaacagttctggcaaaacc 1300

               1310      1320      1330      1340      1350      1360      1370      1380      1390      1400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1301 aatggtgtcgccttcaacaaacaaaaaagatgggaatcccaatgattcgtcatctgcgaggctgttcttaatatcttcaactgaagctttagagcgattt 1400

               1410      1420      1430      1440      1450      1460      1470      1480      1490      1500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1401 atcttctgaaccagactcttgtcatttgttttggtaaagagaaaagtttttccatcgattttatgaatatacaaataattggagccaacctgcaggtgat 1500

               1510      1520      1530      1540      1550      1560      1570      1580      1590      1600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1501 gattatcagccagcagagaattaaggaaaacagacaggtttattgagcgcttatctttccctttatttttgctgcggtaagtcgcataaaaaccattctt 1600
```

```
           1610      1620      1630      1640      1650      1660      1670      1680      1690      1700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1601 cataattcaatccatttactatgttatgttctgaggggagtgaaaattcccctaattcgatgaagattcttgctcaattgttatcagctatgcgccgacc 1700

           1710      1720      1730      1740      1750      1760      1770      1780      1790      1800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1701 agaacaccttgccgatcagccaaacgtctCCTAGGaaggcgacgtgcgtcctcaagctgctcttgtgttaatggtttctttttgtgctcatacgttaaa 1800

           1810      1820      1830      1840      1850      1860      1870      1880      1890      1900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1801 tcTATCACCGCAAGGGATAaatatcTAACACCGTGCGTGTTGactattttACCTCTGGCGGTGATAatggttgcatgtactaaggaggttgtatggaaca 1900
                                                      <<<<<<<<<<<<<<<<<
                                                      OR1
                                 <<<<<<<<<<<<<<<<<
                                 OR2
      <<<<<<<<<<<<<<<<<
      OR3

           1910      1920      1930      1940      1950      1960      1970      1980      1990      2000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1901 acgcataACCGGTGGTAGCGGTTACATTGGAAGTCATACCTGTGTGCAATTACTGCAGCAAATAACGTAAAAACCCGCTTCGGCGGGTTTTTTTATGGGG 2000

           2010      2020      2030      2040      2050      2060      2070      2080      2090      2100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2001 GGAGTTTAGGGATCCGCCTACCTTTCACGAGTTGCGCAGTTTGTCTGCAAGACTCTATGAGAAGCAGATAAGCGATAAGTTTGCTCAACATCTTCTCGGG 2100

           2110      2120      2130      2140      2150      2160      2170      2180      2190      2200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2101 CATAAGTCGGACACCATGGCATCACAGTATCGTGATGACAGAGGCAGGGAGTGGGACAAAATTGAAATCAAATAATGATTTTATTTTGACTGATAGTGAC 2200

           2210      2220      2230      2240      2250      2260      2270      2280      2290      2300
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2201 CTGTTCGTTGCAACAAATTGATAAGCAATGCTTTTTTATAATGCCAACTTAGTATAAAAAAGCTGAACGAGAAACGTAAAATGATATAAATATCAATATA 2300

           2310      2320      2330      2340      2350      2360      2370      2380      2390      2400
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2301 TTAAATTAGATTTTGCATAAAAAACAGACTACATAATACTGTAAAACACAACATATGCAGTCACTATGAATCAACTACTTAGATGGTATTAGTGACCTGT 2400

           2410      2420      2430      2440      2450      2460      2470      2480      2490      2500
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2401 AACAGAGCATTAGCGCAAAGCTTGGCACTGGCCGTCGTTTTACAACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATC 2500

           2510      2520      2530      2540      2550      2560      2570      2580      2590      2600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2501 CCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGGACGCGCCCTGTAGCGG 2600
                 W  R  N  S  E  E  A  R  T  D  R  P  S  Q  Q  L  R  S  L  N  G  E  W
                 1
                 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                 LacZ alpha

           2610      2620      2630      2640      2650      2660      2670      2680      2690      2700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2601 CGCATTAAGCGCGGCGGGTGTGGTGGTTACGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTTTCTC 2700

           2710      2720      2730      2740      2750      2760      2770      2780      2790      2800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2701 GCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATT 2800

           2810      2820      2830      2840      2850      2860      2870      2880      2890      2900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2801 AGGGTGATGGTTCACGTAGTGGGCCATCGCCCCGATAGACGGTTTTTCGCCCTTTGACGCTGGAGTTCACGTTCCTCAATAGTGGACTCTTGTTCCAAAC 2900

           2910      2920      2930      2940      2950      2960      2970      2980      2990      3000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2901 TGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTATAAGGGATTTTTCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAA 3000

           3010      3020      3030      3040      3050      3060      3070      3080      3090      3100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3001 TTTAACGCGAATTTTAACAAAATATTAACGTTTATAATTTCAGGTGGCATCTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATAC 3100

           3110      3120      3130      3140      3150      3160      3170      3180      3190      3200
```

```
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3101 ATTCAAATATGTATCCGCTCATGAGACAATAACCCTGATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCT 3200

            3210      3220      3230      3240      3250      3260      3270      3280      3290      3300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3201 TATTCCCTTTTTTGCGGCATTTTGCCTTCCTGTTTTTGCTCACCCAGAAACGCTGGTGAAAGTAAAAGATGCTGAAGATCAGTTGGGTGCACGAGTGGGT 3300

            3310      3320      3330      3340      3350      3360      3370      3380      3390      3400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3301 TACATCGAACTGGATCTCAATAGTGGTAAGATCCTTGAGAGTTTTCGCCCCGAAGAACGTTTTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCG 3400
                                                                                >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                                                                Amp R (pDL plasmids)

            3410      3420      3430      3440      3450      3460      3470      3480      3490      3500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3401 CGGTATTATCCCGTATTGACGCCGGGCAAGAGCAACTCGGTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGCA 3500
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            3510      3520      3530      3540      3550      3560      3570      3580      3590      3600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3501 TCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCATGAGTGATAACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCG 3600
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            3610      3620      3630      3640      3650      3660      3670      3680      3690      3700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3601 AAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATGTAACTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTG 3700
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            3710      3720      3730      3740      3750      3760      3770      3780      3790      3800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3701 ACACCACGATGCCTGTAGTAATGGTAACAACGTTGCGCAAACTATTAACTGGCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGGA 3800
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            3810      3820      3830      3840      3850      3860      3870      3880      3890      3900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3801 GGCGGATAAAGTTGCAGGACCACTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATC 3900
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            3910      3920      3930      3940      3950      3960      3970      3980      3990      4000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3901 ATTGCAGCACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTG 4000
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4010      4020      4030      4040      4050      4060      4070      4080      4090      4100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4001 AGATAGGTGCCTCACTGATTAAGCATTGGTAACTGTCAGACCAAGTTTACTCATATATACTTTAGATTGATTTAAAACTTCATTTTTAATTTAAAAGGAT 4100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4110      4120      4130      4140      4150      4160      4170      4180      4190      4200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4101 CTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCT 4200
                                >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                ColE1 origin

            4210      4220      4230      4240      4250      4260      4270      4280      4290      4300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4201 TCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTC 4300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4310      4320      4330      4340      4350      4360      4370      4380      4390      4400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4301 TTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACC 4400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin
```

```
            4410      4420      4430      4440      4450      4460      4470      4480      4490      4500
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4401 GCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGAT 4500
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4510      4520      4530      4540      4550      4560      4570      4580      4590      4600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4501 AAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAG 4600
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4610      4620      4630      4640      4650      4660      4670      4680      4690      4700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4601 AAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGC 4700
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4710      4720      4730      4740      4750      4760      4770      4780      4790      4800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4701 CTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGC 4800
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4810      4820      4830      4840      4850      4860      4870      4880      4890      4900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4801 AACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGCGGTTTTGCTCACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCT 4900
     >>>>>>>>>
     ColE1 origin

            4910      4920      4930      4940      4950      4960      4970      4980      4990      5000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4901 TTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCC 5000

            5010      5020      5030      5040      5050      5060      5070      5080      5090      5100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5001 CGCGCGTTGGCCGATTCATTAATGCAGCTGGCACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTTAGCTCACTCAT 5100

            5110      5120      5130      5140      5150      5160      5170      5180      5190      5200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5101 TAGGCACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTGGAATTGTGAGCGGATAACAATTTCACACAGGAAACAGCTATGACCATGATT 5200
                                                >>>>>>>>>>>>>>>>>>>>>>>>
                                                LacO

            5210      5220      5230      5240      5250      5260      5270      5280      5290      5300
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5201 ACGAATTTAATACGACTCACTATAGGGAATTTCTAGACCTTCCCGTTTCGCTCAAGTTAGTATAAAAAAGCAGGCTTCAACGGAGCTCGTCGACCCGGGT 5300
            >>>>>>>>>>>>>>>>>>>>
            T7

            5310      5320      5330      5340      5350      5360      5370      5380      5390      5400
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5301 ACCgttgaatactcatactcttccttttcaatattattgaagcatttatcagggttattgtctcatgagcggatacatatttgaatgtatttagaaaaa 5400

            5410      5420      5430      5440      5450      5460      5470      5480      5490      5500
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5401 taaacaaaagagtttgtagaaacgcaaaaaggccatccgtcaggatggccttctgcttaatttgatgcctggcagtttatggcgggcgtcctgcccgcca 5500

            5510      5520      5530      5540      5550      5560      5570      5580      5590      5600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5501 ccctccgggccgttgcttcgcaacgttcaaatccgctcccggcggatttgtcctactcaggagagcgttcaccgacaaacaacagataaaacgaaaggcc 5600

            5610      5620      5630      5640      5650      5660      5670      5680
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5601 cagtctttcgactgagcctttcgttttatttgatgcctggcagttccctactctcgcatggggagaccccacactaccatcgg 5683
```

Mon Jun 09, 2014 23:50 -0400
pDL955.gb
Text Map

```
                10        20        30        40        50        60        70        80        90       100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
      1 GAATTCtgcccttcttcagggcttaatttttaagagcgtcaccttcatggtggtcagtgcgtcctgctgatgtgctcagTATCACCGCCAGTGGTAttta 100
                                                                                          >>>>>>>>>>>>>>>>>
                                                                                          OL1

                110       120       130       140       150       160       170       180       190       200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    101 tgtCAACACCGCCAGAGATAattTATCACCGCAGATGGTTatctgtatgtttttatatgaatttatttttgcagggggcattgtttggtaggtgaga 200
           >>>>>>>>>>>>>>>>>>
           OL2
                                >>>>>>>>>>>>>>>>>>
                                OL3

                210       220       230       240       250       260       270       280       290       300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    201 gatctgaattgctatgtttagtgagttgtatctatttatttttcaataaatacaattggttatgtgttttgggggcgatcgtgaggcaaagaaaacccgg 300

                310       320       330       340       350       360       370       380       390       400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    301 cgctgaggccgggttattcttgttctctggtcaaattatatagttggaaaacaaggatgcatatatgaatgaacgatgcagaggcaatgccgatggcgat 400

                410       420       430       440       450       460       470       480       490       500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    401 agtgggtatcatgtagccgcttatgctggaaagaagcaataacccgcagaaaaacaaagctccaagctcaacaaaactaagggcatagacaataactacc 500

                510       520       530       540       550       560       570       580       590       600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    501 gatgtcatatacccatactctctaatcttggccagtcggcgcgttctgcttccgattagaaacgtcaaggcagcaatcaggattgcaatcatggttcctg 600

                610       620       630       640       650       660       670       680       690       700
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    601 catatgatgacaatgtcgccccaagaccatctctatgagctgaaaaagaaacaccaggaatgtagtggcggaaaaggagatagcaaatgcttacgataac 700

                710       720       730       740       750       760       770       780       790       800
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    701 gtaaggaattattactatgtaaacaccaggcatgattctgttccgcataattactcctgataattaatccttaactttgcccacctgccttttaaaacat 800

                810       820       830       840       850       860       870       880       890       900
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    801 tccagtatatcacttttcattcttgcgtagcaatatgccatctcttcagctatctcagcattggtgaccttgttcagaggcgctgagagatggccttttt 900

                910       920       930       940       950       960       970       980       990      1000
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    901 ctgatagataatgttctgttaaaatatctccggcctcatcttttgcccgcaggctaatgtctgaaaattgaggtgacgggttaaaaataatatccttggc 1000

               1010      1020      1030      1040      1050      1060      1070      1080      1090      1100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1001 aacctttttatatccctttaaattttggcttaatgactatatccaatgagtcaaaaagctccccttcaatatctgttgcccctaagacctttaatata 1100

               1110      1120      1130      1140      1150      1160      1170      1180      1190      1200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1101 tcgccaaatacaggtagcttggcttctaccttcaccgttgttcggccgatgaaatgcatatgcataacatcgtctttggtggttcccctcatcagtggct 1200

               1210      1220      1230      1240      1250      1260      1270      1280      1290      1300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1201 ctatctgaacgcgctctccactgcttaatgacattcctttcccgattaaaaaatctgtcagatcggatgtggtcggcccgaaaacagttctggcaaaaCC 1300

               1310      1320      1330      1340      1350      1360      1370      1380      1390      1400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1301 TAGGaaggcgacgtgcgtcctcaagctgctcttgtgttaatggtttctttttgtgctcatacgttaaatcTATCACCGCAAGGGATAaatatcTAACAC 1400
                                                                                                   <<<<<<
                                                                                                   OR2
                                                                                <<<<<<<<<<<<<<<<<<
                                                                                OR3

               1410      1420      1430      1440      1450      1460      1470      1480      1490      1500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1401 CGTGCGTGTTGactatttTACCTCTGGCGGTGATAatggttgcatgtactaaggaggttgtatggaacaacgcataACCGGTGGTAGCGGTTACATTGGA 1500
```

```
                       <<<<<<<<<<<<<<<<<
                       OR1
     <<<<<<<<<<<
     OR2

           1510      1520      1530      1540      1550      1560      1570      1580      1590      1600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1501 AGTCATACCTGTGTGCAATTACTGCAGCAAATAACGTAAAAACCCGCTTCGGCGGGTTTTTTTATGGGGGGAGTTTAGGGATCCGCCTACCTTTCACGAG 1600

           1610      1620      1630      1640      1650      1660      1670      1680      1690      1700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1601 TTGCGCAGTTTGTCTGCAAGACTCTATGAGAAGCAGATAAGCGATAAGTTTGCTCAACATCTTCTCGGGCATAAGTCGGACACCATGGCATCACAGTATC 1700

           1710      1720      1730      1740      1750      1760      1770      1780      1790      1800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1701 GTGATGACAGAGGCAGGGAGTGGGACAAAATTGAAATCAAATAATGATTTTATTTTGACTGATAGTGACCTGTTCGTTGCAACAAATTGATAAGCAATGC 1800

           1810      1820      1830      1840      1850      1860      1870      1880      1890      1900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1801 TTTTTTATAATGCCAACTTAGTATAAAAAAGCTGAACGAGAAACGTAAAATGATATAAATATCAATATATTAAATTAGATTTTGCATAAAAAACAGACTA 1900

           1910      1920      1930      1940      1950      1960      1970      1980      1990      2000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1901 CATAATACTGTAAAACACAACATATGCAGTCACTATGAATCAACTACTTAGATGGTATTAGTGACCTGTAACAGAGCATTAGCGCAAAGCTTGGCACTGG 2000

           2010      2020      2030      2040      2050      2060      2070      2080      2090      2100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2001 CCGTCGTTTTACAACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGA 2100
                                                                                       W  R  N  S  E  E
                                                                                       1
                                                                                       >>>>>>>>>>>>>>>>>
                                                                                       LacZ alpha

           2110      2120      2130      2140      2150      2160      2170      2180      2190      2200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2101 GGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACG 2200
      A  R  T  D  R  P  S  Q  Q  L  R  S  L  N  G  E  W
     7
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     LacZ alpha

           2210      2220      2230      2240      2250      2260      2270      2280      2290      2300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2201 CGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTC 2300

           2310      2320      2330      2340      2350      2360      2370      2380      2390      2400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2301 TAAATCGGGGGCTCCCTTTAGGGTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAGTGGGCCATCGCC 2400

           2410      2420      2430      2440      2450      2460      2470      2480      2490      2500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2401 CCGATAGACGGTTTTTCGCCCTTTGACGCTGGAGTTCACGTTCCTCAATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTAT 2500

           2510      2520      2530      2540      2550      2560      2570      2580      2590      2600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2501 TCTTTTGATTTATAAGGGATTTTTCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTAACGCGAATTTTAACAAAATATTAACGT 2600

           2610      2620      2630      2640      2650      2660      2670      2680      2690      2700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2601 TTATAATTTCAGGTGGCATCTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATA 2700

           2710      2720      2730      2740      2750      2760      2770      2780      2790      2800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2701 ACCCTGATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTATTCCCTTTTTTGCGGCATTTTGCCTTCCT 2800

           2810      2820      2830      2840      2850      2860      2870      2880      2890      2900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2801 GTTTTTGCTCACCCAGAAACGCTGGTGAAAGTAAAAGATGCTGAAGATCAGTTGGGTGCACGAGTGGGTTACATCGAACTGGATCTCAATAGTGGTAAGA 2900

           2910      2920      2930      2940      2950      2960      2970      2980      2990      3000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2901 TCCTTGAGAGTTTTCGCCCCGAAGAACGTTTTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTATTGACGCCGGGCAAGA 3000
```

```
                                           >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                           Amp R (pDL plasmids)

           3010      3020      3030      3040      3050      3060      3070      3080      3090      3100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3001 GCAACTCGGTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTA 3100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3110      3120      3130      3140      3150      3160      3170      3180      3190      3200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3101 TGCAGTGCTGCCATAACCATGAGTGATAACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGG 3200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3210      3220      3230      3240      3250      3260      3270      3280      3290      3300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3201 GGGATCATGTAACTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTGACACCACGATGCCTGTAGTAATGGTAACAAC 3300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3310      3320      3330      3340      3350      3360      3370      3380      3390      3400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3301 GTTGCGCAAACTATTAACTGGCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCACTTCTGCGC 3400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3410      3420      3430      3440      3450      3460      3470      3480      3490      3500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3401 TCGGCCCTTCCGGCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAGATGGTAAGCCCT 3500
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3510      3520      3530      3540      3550      3560      3570      3580      3590      3600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3501 CCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTA 3600
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3610      3620      3630      3640      3650      3660      3670      3680      3690      3700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3601 ACTGTCAGACCAAGTTTACTCATATATACTTTAGATTGATTTAAAACTTCATTTTTAATTTAAAAGGATCTAGGTGAAGATCCTTTTTGATAATCTCATG 3700
                                                                                                    >>>>>
                                                                                                    ColE1 origin

           3710      3720      3730      3740      3750      3760      3770      3780      3790      3800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3701 ACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCT 3800
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           3810      3820      3830      3840      3850      3860      3870      3880      3890      3900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3801 GCTGCTTGCAAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACTGGCTTCAGCAGAGC 3900
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           3910      3920      3930      3940      3950      3960      3970      3980      3990      4000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3901 GCAGATACCAAATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTA 4000
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4010      4020      4030      4040      4050      4060      4070      4080      4090      4100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4001 CCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTT 4100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4110      4120      4130      4140      4150      4160      4170      4180      4190      4200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4101 CGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGC 4200
```

```
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4210      4220      4230      4240      4250      4260      4270      4280      4290      4300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4201 GGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGTTTCGC 4300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4310      4320      4330      4340      4350      4360      4370      4380      4390      4400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4301 CACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTT 4400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4410      4420      4430      4440      4450      4460      4470      4480      4490      4500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4401 GCTGCGGTTTTGCTCACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCG 4500

           4510      4520      4530      4540      4550      4560      4570      4580      4590      4600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4501 AACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCCCGCGCGTTGGCCGATTCATTAATGCAGCTGG 4600

           4610      4620      4630      4640      4650      4660      4670      4680      4690      4700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4601 CACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTTAGCTCACTCATTAGGCACCCCAGGCTTTACACTTTATGCTTC 4700

           4710      4720      4730      4740      4750      4760      4770      4780      4790      4800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4701 CGGCTCGTATGTTGTGTGGAATTGTGAGCGGATAACAATTTCACACAGGAAACAGCTATGACCATGATTACGAATTTAATACGACTCACTATAGGGAATT 4800
                                                                                 >>>>>>>>>>>>>>>>>>>>
                                                                                 T7

                      >>>>>>>>>>>>>>>>>>>>>>>
                      LacO

           4810      4820      4830      4840      4850      4860      4870      4880      4890      4900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4801 TCTAGACCTTCCCGTTTCGCTCAAGTTAGTATAAAAAAGCAGGCTTCAACGGAGCTCGTCGACCCGGGTACCgttgaatactcatactcttcctttttca 4900

           4910      4920      4930      4940      4950      4960      4970      4980      4990      5000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4901 atattattgaagcatttatcagggttattgtctcatgagcggatacatatttgaatgtatttagaaaaataaacaaaagagtttgtagaaacgcaaaaag 5000

           5010      5020      5030      5040      5050      5060      5070      5080      5090      5100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5001 gccatccgtcaggatggccttctgcttaatttgatgcctggcagtttatggcgggcgtcctgcccgccaccctccgggccgttgcttcgcaacgttcaaa 5100

           5110      5120      5130      5140      5150      5160      5170      5180      5190      5200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5101 tccgctcccggcggatttgtcctactcaggagagcgttcaccgacaaacaacagataaaacgaaaggcccagtctttcgactgagcctttcgttttattt 5200

           5210      5220      5230      5240      5250
         *    *    *    *    *    *    *    *    *    *
5201 gatgcctggcagttccctactctcgcatggggagaccccacactaccatcgg 5252
```

Mon Jun 09, 2014 23:54 -0400
pDL1051.gb
Text Map

```
                10        20        30        40        50        60        70        80        90        100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
      1 gaattctgcccttcttcagggcttaatttttaagagcgtcaccttcatggtggtcagtgcgtcctgctgatgtgctcagtatcaccgcccagtggtattta 100
                                                                                                >>>>>>>>>>>>>>>>>
                                                                                                OL1

                110       120       130       140       150       160       170       180       190       200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    101 tgtcaacaccgccagagataatttatcaccgcagatggttatctgtatgtttttatatgaatttatttttgcagggggcattgtttggtaggtgaga 200
           >>>>>>>>>>>>>>>>>>
           OL2
                                >>>>>>>>>>>>>>>>>>
                                OL3

                210       220       230       240       250       260       270       280       290       300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    201 gatctgaattgctatgtttagtgagttgtatctatttatttttcaataaatacaattggttatgtgttttgggggcgatcgtgaggcaaagaaaacccgg 300

                310       320       330       340       350       360       370       380       390       400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    301 cgctgaggccgggttattcttgttctctggtcaaattatatagttggaaaacaaggatgcatatatgaatgaacgatgcagaggcaatgccgatggcgat 400

                410       420       430       440       450       460       470       480       490       500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    401 agtgggtatcatgtagccgcttatgctggaaagaagcaataacccgcagaaaaacaaagctccaagctcaacaaaactaagggcatagacaataactacc 500

                510       520       530       540       550       560       570       580       590       600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    501 gatgtcatatacccatactctctaatcttggccagtcggcgcgttctgcttccgattagaaacgtcaaggcagcaatcaggattgcaatcatggttcctg 600

                610       620       630       640       650       660       670       680       690       700
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    601 catatgatgacaatgtcgccccaagaccatctctatgagctgaaaaagaaacaccaggaatgtagtggcggaaaaggagatagcaaatgcttacgataac 700

                710       720       730       740       750       760       770       780       790       800
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    701 gtaaggaattattactatgtaaacaccaggcatgattctgttccgcataattactcctgataattaatccttaactttgcccacctgccttttaaaacat 800

                810       820       830       840       850       860       870       880       890       900
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    801 tccagtatatcacttttcattcttgcgtagcaatatgccatctcttcagctatctcagcattggtgaccttgttcagaggcgctgagagatggccttttt 900

                910       920       930       940       950       960       970       980       990      1000
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    901 ctgatagataatgttctgttaaaatatctccggcctcatcttttgcccgcaggctaatgtctgaaaacctaggcggcgttataagcatttaatgcattga 1000

               1010      1020      1030      1040      1050      1060      1070      1080      1090      1100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1001 tgccattaaataaagcaccaacgcctgactgccccatccccatcttgtctgcgacagattcctgggataagccaagttcatttttctttttttcataaat 1100

               1110      1120      1130      1140      1150      1160      1170      1180      1190      1200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1101 tgctttaaggcgacgtgcgtcctcaagctgctcttgtgttaatggtttctttttgtgctcatacgttaaatctatcaccgcaagggataaatatctaac 1200
                                                                                                        <<<<
                                                                                                        OR2
                                                                                  <<<<<<<<<<<<<<<<<<
                                                                                  OR3

               1210      1220      1230      1240      1250      1260      1270      1280      1290      1300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1201 accgtgcgtgttgactattttacctctggcggtgataatggttgcatgtactaaggaggttgtatggaacaacgcataaccctgaaagattatgcaatgc 1300
                           <<<<<<<<<<<<<<<<<<
                           OR1
        <<<<<<<<<<<<<
        OR2

               1310      1320      1330      1340      1350      1360      1370      1380      1390      1400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1301 gctttgggcaaaccaagacagctgcagcaaataacgtaaaaaccccgcttcggcgggtttttttatgggggggagtttagggatccgcctacctttcacgag 1400
```

```
           1410      1420      1430      1440      1450      1460      1470      1480      1490      1500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1401 ttgcgcagtttgtctgcaagactctatgagaagcagataagcgataagtttgctcaacatcttctcgggcataagtcggacaccatggcatcacagtatc 1500

           1510      1520      1530      1540      1550      1560      1570      1580      1590      1600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1501 gtgatgacagaggcagggagtgggacaaaattgaaatcaaataatgattttattttgactgatagtgacctgttcgttgcaacaaattgataagcaatgc 1600

           1610      1620      1630      1640      1650      1660      1670      1680      1690      1700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1601 tttttataatgccaacttagtataaaaaagctgaacgagaaacgtaaaatgatataaatatcaatatattaaattagattttgcataaaaaacagacta 1700

           1710      1720      1730      1740      1750      1760      1770      1780      1790      1800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1701 cataatactgtaaaacacaacatatgcagtcactatgaatcaactacttagatggtattagtgacctgtaacagagcattagcgcaaagcttggcactgg 1800
                                                                                                    <<<<<
                                                                                                    M13-fwd

           1810      1820      1830      1840      1850      1860      1870      1880      1890      1900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1801 ccgtcgttttacaacgtcgtgactgggaaaaccctggcgttacccaacttaatcgccttgcagcacatccccctttcgccagctggcgtaataccgaaga 1900
                                                                                    W  R  N  S  E  E
                                                                                    1
     <<<<<<<<<<<<<                                                                  >>>>>>>>>>>>>>>>>
     M13-fwd                                                                        LacZ alpha

           1910      1920      1930      1940      1950      1960      1970      1980      1990      2000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1901 ggcccgcaccgatcgcccttcccaacagttgcgcagcctgaatggcgaatgggacgcgccctgtagcggcgcattaagcgcggcgggtgtggtggttacg 2000
      A  R  T  D  R  P  S  Q  Q  L  R  S  L  N  G  E  W
     7
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     LacZ alpha

           2010      2020      2030      2040      2050      2060      2070      2080      2090      2100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2001 cgcagcgtgaccgctacacttgccagcgccctagcgcccgctcctttcgctttcttcccttcctttctcgccacgttcgccggctttccccgtcaagctc 2100

           2110      2120      2130      2140      2150      2160      2170      2180      2190      2200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2101 taaatcgggggctccctttagggttccgatttagtgctttacggcacctcgaccccaaaaaacttgattagggtgatggttcacgtagtgggccatcgcc 2200

           2210      2220      2230      2240      2250      2260      2270      2280      2290      2300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2201 ccgatagacggtttttcgccctttgacgctggagttcacgttcctcaatagtggactcttgttccaaactggaacaacactcaaccctatctcggtctat 2300

           2310      2320      2330      2340      2350      2360      2370      2380      2390      2400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2301 tcttttgatttataagggattttccgatttcggcctattggttaaaaaatgagctgatttaacaaaaatttaacgcgaattttaacaaaatattaacgt 2400

           2410      2420      2430      2440      2450      2460      2470      2480      2490      2500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2401 ttataatttcaggtggcatctttcggggaaatgtgcgcggaacccctatttgtttatttttctaaatacattcaaatatgtatccgctcatgagacaata 2500

           2510      2520      2530      2540      2550      2560      2570      2580      2590      2600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2501 accctgataaatgcttcaataatattgaaaaaggaagagtatgagtattcaacatttccgtgtcgcccttattcccttttttgcggcattttgccttcct 2600

           2610      2620      2630      2640      2650      2660      2670      2680      2690      2700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2601 gtttttgctcacccagaaacgctggtgaaagtaaaagatgctgaagatcagttgggtgcacgagtgggttacatcgaactggatctcaatagtggtaaga 2700

           2710      2720      2730      2740      2750      2760      2770      2780      2790      2800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2701 tccttgagagttttcgccccgaagaacgttttccaatgatgagcacttttaaagttctgctatgtggcgcggtattatcccgtattgacgccgggcaaga 2800
                                               >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                               Amp R (pDL plasmids)

           2810      2820      2830      2840      2850      2860      2870      2880      2890      2900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2801 gcaactcggtcgccgcatacactattctcagaatgacttggttgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaagagaatta 2900
```

```
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           2910      2920      2930      2940      2950      2960      2970      2980      2990      3000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2901 tgcagtgctgccataaccatgagtgataacactgcggccaacttacttctgacaacgatcggaggaccgaaggagctaaccgcttttttgcacaacatgg 3000
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3010      3020      3030      3040      3050      3060      3070      3080      3090      3100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3001 gggatcatgtaactcgccttgatcgttgggaaccggagctgaatgaagccataccaaacgacgagcgtgacaccacgatgcctgtagtaatggtaacaac 3100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3110      3120      3130      3140      3150      3160      3170      3180      3190      3200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3101 gttgcgcaaactattaactggcgaactacttactctagcttcccggcaacaattaatagactggatggaggcggataaagttgcaggaccacttctgcgc 3200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3210      3220      3230      3240      3250      3260      3270      3280      3290      3300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3201 tcggcccttccggctggctggtttattgctgataaatctggagccggtgagcgtgggtctcgcggtatcattgcagcactggggccagatggtaagccct 3300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3310      3320      3330      3340      3350      3360      3370      3380      3390      3400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3301 cccgtatcgtagttatctacacgacggggagtcaggcaactatggatgaacgaaatagacagatcgctgagataggtgcctcactgattaagcattggta 3400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           3410      3420      3430      3440      3450      3460      3470      3480      3490      3500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3401 actgtcagaccaagtttactcatatatactttagattgatttaaaacttcatttttaatttaaaaggatctaggtgaagatcctttttgataatctcatg 3500
                                                                                                    >>>>>
                                                                                                    ColE1 origin

           3510      3520      3530      3540      3550      3560      3570      3580      3590      3600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3501 accaaaatcccttaacgtgagttttcgttccactgagcgtcagaccccgtagaaaagatcaaaggatcttcttgagatcctttttttctgcgcgtaatct 3600
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           3610      3620      3630      3640      3650      3660      3670      3680      3690      3700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3601 gctgcttgcaaacaaaaaaaccaccgctaccagcggtggtttgtttgccggatcaagagctaccaactctttttccgaaggtaactggcttcagcagagc 3700
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           3710      3720      3730      3740      3750      3760      3770      3780      3790      3800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3701 gcagataccaaatactgtccttctagtgtagccgtagttaggccaccacttcaagaactctgtagcaccgcctacatacctcgctctgctaatcctgtta 3800
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           3810      3820      3830      3840      3850      3860      3870      3880      3890      3900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3801 ccagtggctgctgccagtggcgataagtcgtgtcttaccgggttggactcaagacgatagttaccggataaggcgcagcggtcgggctgaacggggggtt 3900
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           3910      3920      3930      3940      3950      3960      3970      3980      3990      4000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3901 cgtgcacacagcccagcttggagcgaacgacctacaccgaactgagatacctacagcgtgagctatgagaaagcgccacgcttcccgaagggagaaaggc 4000
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4010      4020      4030      4040      4050      4060      4070      4080      4090      4100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4001 ggacaggtatccggtaagcggcagggtcggaacaggagagcgcacgagggagcttccagggggaaacgcctggtatctttatagtcctgtcgggtttcgc 4100
```

```
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4110      4120      4130      4140      4150      4160      4170      4180      4190      4200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4101 cacctctgacttgagcgtcgatttttgtgatgctcgtcaggggggcggagcctatggaaaaacgccagcaacgcggcctttttacggttcctggcctttt 4200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

           4210      4220      4230      4240      4250      4260      4270      4280      4290      4300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4201 gctgcggttttgctcacatgttctttcctgcgttatcccctgattctgtggataaccgtattaccgcctttgagtgagctgataccgctcgccgcagccg 4300

           4310      4320      4330      4340      4350      4360      4370      4380      4390      4400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4301 aacgaccgagcgcagcgagtcagtgagcgaggaagcggaagagcgcccaatacgcaaaccgcctctccccgcgcgttggccgattcattaatgcagctgg 4400

           4410      4420      4430      4440      4450      4460      4470      4480      4490      4500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4401 cacgacaggtttcccgactggaaagcgggcagtgagcgcaacgcaattaatgtgagttagctcactcattaggcaccccaggctttacactttatgcttc 4500

           4510      4520      4530      4540      4550      4560      4570      4580      4590      4600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4501 cggctcgtatgttgtgtggaattgtgagcggataacaatttcacacaggaaacagctatgaccatgattacgaatttaatacgactcactatagggaatt 4600
                                                  >>>>>>>>>>>>>>>>>>>>>          >>>>>>>>>>>>>>>>>>>>
                                                  M13-rev                        T7
                      >>>>>>>>>>>>>>>>>>>>>>>
                      LacO

           4610      4620      4630      4640      4650      4660      4670      4680      4690      4700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4601 tctagaccttcccgtttcgctcaagttagtataaaaaagcaggcttcaacggagctcgtcgacccgggtaccgttgaatactcatactcttcctttttca 4700

           4710      4720      4730      4740      4750      4760      4770      4780      4790      4800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4701 atattattgaagcatttatcagggttattgtctcatgagcggatacatatttgaatgtatttagaaaaataaacaaaagagtttgtagaaacgcaaaaag 4800

           4810      4820      4830      4840      4850      4860      4870      4880      4890      4900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4801 gccatccgtcaggatggccttctgcttaatttgatgcctggcagtttatggcgggcgtcctgcccgccaccctccgggccgttgcttcgcaacgttcaaa 4900

           4910      4920      4930      4940      4950      4960      4970      4980      4990      5000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4901 tccgctcccggcggatttgtcctactcaggagagcgttcaccgacaaacaacagataaaacgaaaggcccagtctttcgactgagcctttcgttttattt 5000

           5010      5020      5030      5040      5050
         *    *    *    *    *    *    *    *    *    *
5001 gatgcctggcagttccctactctcgcatggggagaccccacactaccatcgg 5052
```

Mon Jun 09, 2014 23:57 -0400
pDL2317.gb
Text Map

```
                10        20        30        40        50        60        70        80        90       100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
      1 gaattctgcccttcttcagggcttaatttttaagagcgtcaccttcatggtggtcagtgcgtcctgctgatgtgctcagtatcaccgccagtggtattta 100
                                                                                          >>>>>>>>>>>>>>>>>>
                                                                                          OL1

                110       120       130       140       150       160       170       180       190       200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    101 tgtcaacaccgccagagataatttatcaccgcagatggttatctgtatgttttttatatgaatttatttttgcagggggggcattgtttggtaggtgaga 200
          >>>>>>>>>>>>>>>>>>>
          OL2
                                >>>>>>>>>>>>>>>>>>>
                                OL3

                210       220       230       240       250       260       270       280       290       300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    201 gatctgaattgctatgtttagtgagttgtatctatttatttttcaataaatacaattggttatgtgttttgggggcgatcgtgaggcaaagaaaacccgg 300

                310       320       330       340       350       360       370       380       390       400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    301 cgctgaggccgggttattcttgttctctggtcaaattatatagttggaaaacaaggatgcatatatgaatgaacgatgcagaggcaatgccgatggcgat 400

                410       420       430       440       450       460       470       480       490       500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    401 agtgggtatcatgtagccgcttatgctggaaagaagcaataacccgcagaaaaacaaagctccaagctcaacaaaactaagggcatagacaataactacc 500

                510       520       530       540       550       560       570       580       590       600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    501 gatgtcatatacccatactctctaatcttggccagtcggcgcgttctgcttccgattagaaacgtcaaggcagcaatcaggattgcaatcatggttcctg 600

                610       620       630       640       650       660       670       680       690       700
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    601 catatgatgacaatgtcgccccaagaccatctctatgagctgaaaaagaaacaccaggaatgtagtggcggaaaaggagatagcaaatgcttacgataac 700

                710       720       730       740       750       760       770       780       790       800
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    701 gtaaggaattattactatgtaaacaccaggcatgattctgttccgcataattactcctgataattaatccttaactttgcccacctgccttttaaaacat 800

                810       820       830       840       850       860       870       880       890       900
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    801 tccagtatatcacttttcattcttgcgtagcaatatgccatctcttcagctatctcagcattggtgaccttgttcagaggcgctgagagatggccttttt 900

                910       920       930       940       950       960       970       980       990      1000
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    901 ctgatagataatgttctgttaaaatatctccggcctcatcttttgcccgcaggctaatgtctgaaaattgaggtgacgggttaaaaataatatccttggc 1000

               1010      1020      1030      1040      1050      1060      1070      1080      1090      1100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1001 aaccttttttatatccctttaaattttggcttaatgactatatccaatgagtcaaaaagctccccttcaatatctgttgcccctaagacctttaatata 1100

               1110      1120      1130      1140      1150      1160      1170      1180      1190      1200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1101 tcgccaaatacaggtagcttggcttctaccttcaccgttgttcggccgatgaaatgcatatgcataacatcgtctttggtggttcccctcatcagtggct 1200

               1210      1220      1230      1240      1250      1260      1270      1280      1290      1300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1201 ctatctgaacgcgctctccactgcttaatgacattcctttcccgattaaaaaatctgtcagatcggatgtggtcggcccgaaaacagttctggcaaaacc 1300

               1310      1320      1330      1340      1350      1360      1370      1380      1390      1400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1301 aatggtgtcgccttcaacaaacaaaaaagatgggaatcccaatgattcgtcatctgcgaggctgttcttaatatcttcaactgaagctttagagcgattt 1400

               1410      1420      1430      1440      1450      1460      1470      1480      1490      1500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1401 atcttctgaaccagactcttgtcatttgttttggtaaagagaaaagtttttccatcgattttatgaatatacaaataattggagccaacctgcaggtgat 1500

               1510      1520      1530      1540      1550      1560      1570      1580      1590      1600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1501 gattatcagccagcagagaattaaggaaaacagacaggtttattgagcgcttatctttccctttatttttgctgcggtaagtcgcataaaaaccattctt 1600
```

```
           1610      1620      1630      1640      1650      1660      1670      1680      1690      1700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1601 cataattcaatccatttactatgttatgttctgaggggagtgaaaattcccctaattcgatgaagattcttgctcaattgttatcagctatgcgccgacc 1700

           1710      1720      1730      1740      1750      1760      1770      1780      1790      1800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1701 agaacaccttgccgatcagccaaacgtctcttcaggccactgactagcgataactttccccacaacggaacaactctcattgcatgggatcattgggtac 1800

           1810      1820      1830      1840      1850      1860      1870      1880      1890      1900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1801 tgtgggtttagtggttgtaaaaacacctgaccgctatccctgatcagtttcttgaaggtaaactcatcacccccaagtctggctatgcagaaatcacctg 1900

           1910      1920      1930      1940      1950      1960      1970      1980      1990      2000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1901 gctcaacagcctgctcagggtcaacgagaattaacattccgtcaggaaagcttggcttggagcctgttggtgcggtcatggaattaccttcaacctcaag 2000

           2010      2020      2030      2040      2050      2060      2070      2080      2090      2100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2001 ccagaatgcagaatcactggctttttggttgtgcttacccatctctccgcatcacctttggtaaaggttctaagctcaggtgagaacatccctgcctga 2100

           2110      2120      2130      2140      2150      2160      2170      2180      2190      2200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2101 acatgagaaaaaacagggtactcatactcacttctaagtgacggctgcatactaaccgcttcatacatctcgtagatttctctggcgattgaagggctaa 2200

           2210      2220      2230      2240      2250      2260      2270      2280      2290      2300
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2201 attcttcaacgctaactttgagaatttttgcaacctaggcggcgttataagcatttaatgcattgatgccattaaataaagcaccaacgcctgactgccc 2300

           2310      2320      2330      2340      2350      2360      2370      2380      2390      2400
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2301 catccccatcttgtctgcgacagattcctgggataagccaagttcatttttctttttttcataaattgctttaaggcgacgtgcgtcctcaagctgctct 2400

           2410      2420      2430      2440      2450      2460      2470      2480      2490      2500
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2401 tgtgttaatggtttctttttgtgctcatacgttaaatctatcaccgcaagggataaatatctaacaccgtgcgtgttgactattttacctctggcggtg 2500
                                                                                                <<<<<<<<<<<<<<
                                                                                                OR1
                                                                                  <<<<<<<<<<<<<<<<<<
                                                                                  OR2
                                                  <<<<<<<<<<<<<<<<<<
                                                  OR3

           2510      2520      2530      2540      2550      2560      2570      2580      2590      2600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2501 ataatggttgcatgtactaaggaggttgtatggaacaacgcataaccctgaaagattatgcaatgcgctttgggcaaaccaagacagctgcagcaaataa 2600
     <<<
     OR1

           2610      2620      2630      2640      2650      2660      2670      2680      2690      2700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2601 cgtaaaaacccgcttcggcgggtttttttatgggggagtttagggatccgcctacctttcacgagttgcgcagtttgtctgcaagactctatgagaagc 2700

           2710      2720      2730      2740      2750      2760      2770      2780      2790      2800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2701 agataagcgataagtttgctcaacatcttctcgggcataagtcggacaccatggcatcacagtatcgtgatgacagaggcagggagtgggacaaaattga 2800

           2810      2820      2830      2840      2850      2860      2870      2880      2890      2900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2801 aatcaaataatgattttattttgactgatagtgacctgttcgttgcaacaaattgataagcaatgctttttataatgccaacttagtataaaaaagctg 2900

           2910      2920      2930      2940      2950      2960      2970      2980      2990      3000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2901 aacgagaaacgtaaaatgatataaatatcaatatattaaattagattttgcataaaaaacagactacataatactgtaaaacacaacatatgcagtcact 3000

           3010      3020      3030      3040      3050      3060      3070      3080      3090      3100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3001 atgaatcaactacttagatggtattagtgacctgtaacagagcattagcgcaaagcttggcactggccgtcgttttacaacgtcgtgactgggaaaaccc 3100
                                                                  <<<<<<<<<<<<<<<<<<
                                                                  M13-fwd

           3110      3120      3130      3140      3150      3160      3170      3180      3190      3200
```

```
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3101 tggcgttacccaacttaatcgccttgcagcacatccccctttcgccagctggcgtaatagcgaagaggcccgcaccgatcgcccttcccaacagttgcgc 3200
                                                W  R  N  S  E  E  A  R  T  D  R  P  S  Q  Q  L  R
                                                1
                                                >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                                LacZ alpha

            3210      3220      3230      3240      3250      3260      3270      3280      3290      3300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3201 agcctgaatggcgaatgggacgcgccctgtagcggcgcattaagcgcggcgggtgtggtggttacgcgcagcgtgaccgctacacttgccagcgccctag 3300
     S  L  N  G  E  W
     18
     >>>>>>>>>>>>>>>>>>>
     LacZ alpha

            3310      3320      3330      3340      3350      3360      3370      3380      3390      3400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3301 cgcccgctcctttcgctttcttcccttcctttctcgccacgttcgccggctttccccgtcaagctctaaatcgggggctccctttagggttccgatttag 3400

            3410      3420      3430      3440      3450      3460      3470      3480      3490      3500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3401 tgctttacggcacctcgaccccaaaaaacttgattagggtgatggttcacgtagtgggccatcgccccgatagacggtttttcgccctttgacgctggag 3500

            3510      3520      3530      3540      3550      3560      3570      3580      3590      3600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3501 ttcacgttcctcaatagtggactcttgttccaaactggaacaacactcaaccctatctcggtctattcttttgatttataagggatttttccgatttcgg 3600

            3610      3620      3630      3640      3650      3660      3670      3680      3690      3700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3601 cctattggttaaaaaatgagctgatttaacaaaaatttaacgcgaattttaacaaaatattaacgtttataatttcaggtggcatctttcggggaaatgt 3700

            3710      3720      3730      3740      3750      3760      3770      3780      3790      3800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3701 gcgcggaacccctatttgtttatttttctaaatacattcaaatatgtatccgctcatgagacaataaccctgataaatgcttcaataatattgaaaaagg 3800

            3810      3820      3830      3840      3850      3860      3870      3880      3890      3900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3801 aagagtatgagtattcaacatttccgtgtcgcccttattcccttttttgcggcattttgccttcctgtttttgctcacccagaaacgctggtgaaagtaa 3900

            3910      3920      3930      3940      3950      3960      3970      3980      3990      4000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3901 aagatgctgaagatcagttgggtgcacgagtgggttacatcgaactggatctcaatagtggtaagatccttgagagttttcgccccgaagaacgttttcc 4000

            4010      4020      4030      4040      4050      4060      4070      4080      4090      4100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4001 aatgatgagcacttttaaagttctgctatgtggcgcggtattatcccgtattgacgccgggcaagagcaactcggtcgccgcatacactattctcagaat 4100
          >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
          Amp R (pDL plasmids)

            4110      4120      4130      4140      4150      4160      4170      4180      4190      4200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4101 gacttggttgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaagagaattatgcagtgctgccataaccatgagtgataacactg 4200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4210      4220      4230      4240      4250      4260      4270      4280      4290      4300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4201 cggccaacttacttctgacaacgatcggaggaccgaaggagctaaccgctttttgcacaacatgggggatcatgtaactcgccttgatcgttgggaacc 4300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4310      4320      4330      4340      4350      4360      4370      4380      4390      4400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4301 ggagctgaatgaagccataccaaacgacgagcgtgacaccacgatgcctgtagtaatggtaacaacgttgcgcaaactattaactggcgaactacttact 4400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4410      4420      4430      4440      4450      4460      4470      4480      4490      4500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4401 ctagcttcccggcaacaattaatagactggatggaggcggataaagttgcaggaccacttctgcgctcggcccttccggctggctggtttattgctgata 4500
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)
```

```
            4510      4520      4530      4540      4550      4560      4570      4580      4590      4600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4501 aatctggagccggtgagcgtgggtctcgcggtatcattgcagcactggggccagatggtaagccctcccgtatcgtagttatctacacgacggggagtca 4600
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4610      4620      4630      4640      4650      4660      4670      4680      4690      4700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4601 ggcaactatggatgaacgaaatagacagatcgctgagataggtgcctcactgattaagcattggtaactgtcagaccaagtttactcatatatactttag 4700
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4710      4720      4730      4740      4750      4760      4770      4780      4790      4800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4701 attgatttaaaacttcatttttaatttaaaaggatctaggtgaagatccttttttgataatctcatgaccaaaatcccttaacgtgagttttcgttccact 4800
                                                                  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                                                  ColE1 origin

            4810      4820      4830      4840      4850      4860      4870      4880      4890      4900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4801 gagcgtcagaccccgtagaaaagatcaaaggatcttcttgagatcctttttttctgcgcgtaatctgctgcttgcaaacaaaaaaaccaccgctaccagc 4900
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4910      4920      4930      4940      4950      4960      4970      4980      4990      5000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4901 ggtggtttgtttgccggatcaagagctaccaactctttttccgaaggtaactggcttcagcagagcgcagataccaaatactgtccttctagtgtagccg 5000
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5010      5020      5030      5040      5050      5060      5070      5080      5090      5100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5001 tagttaggccaccacttcaagaactctgtagcaccgcctacatacctcgctctgctaatcctgttaccagtggctgctgccagtggcgataagtcgtgtc 5100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5110      5120      5130      5140      5150      5160      5170      5180      5190      5200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5101 ttaccgggttggactcaagacgatagttaccggataaggcgcagcggtcgggctgaacgggggggttcgtgcacacagcccagcttggagcgaacgaccta 5200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5210      5220      5230      5240      5250      5260      5270      5280      5290      5300
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5201 caccgaactgagatacctacagcgtgagctatgagaaagcgccacgcttcccgaagggagaaaggcggacaggtatccggtaagcggcagggtcggaaca 5300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5310      5320      5330      5340      5350      5360      5370      5380      5390      5400
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5301 ggagagcgcacgagggagcttccagggggaaacgcctggtatctttatagtcctgtcgggtttcgccacctctgacttgagcgtcgatttttgtgatgct 5400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5410      5420      5430      5440      5450      5460      5470      5480      5490      5500
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5401 cgtcaggggggcggagcctatggaaaaacgccagcaacgcggcctttttacggttcctggccttttgctgcggttttgctcacatgttctttcctgcgtt 5500
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5510      5520      5530      5540      5550      5560      5570      5580      5590      5600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5501 atcccctgattctgtggataaccgtattaccgcctttgagtgagctgataccgctcgccgcagccgaacgaccgagcgcagcgagtcagtgagcgaggaa 5600

            5610      5620      5630      5640      5650      5660      5670      5680      5690      5700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5601 gcggaagagcgcccaatacgcaaaccgcctctccccgcgcgttggccgattcattaatgcagctggcacgacaggtttcccgactggaaagcgggcagtg 5700

            5710      5720      5730      5740      5750      5760      5770      5780      5790      5800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5701 agcgcaacgcaattaatgtgagttagctcactcattaggcaccccaggctttacactttatgcttccggctcgtatgttgtgtggaattgtgagcggata 5800
```

```
           5810      5820      5830      5840      5850      5860      5870      5880      5890      5900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5801 acaatttcacacaggaaacagctatgaccatgattacgaatttaatacgactcactatagggaatttctagaccttcccgtttcgctcaagttagtataa 5900
               >>>>>>>>>>>>>>>>>>>>>>          >>>>>>>>>>>>>>>>>>>>>>
               M13-rev                        T7

           5910      5920      5930      5940      5950      5960      5970      5980      5990      6000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5901 aaaagcaggcttcaacggagctcgtcgacccgggtaccgttgaatactcatactcttccttttcaatattattgaagcatttatcagggttattgtctc 6000

           6010      6020      6030      6040      6050      6060      6070      6080      6090      6100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
6001 atgagcggatacatatttgaatgtatttagaaaaataaacaaaagagtttgtagaaacgcaaaaaggccatccgtcaggatggccttctgcttaatttga 6100

           6110      6120      6130      6140      6150      6160      6170      6180      6190      6200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
6101 tgcctggcagtttatggcgggcgtcctgcccgccaccctccgggccgttgcttcgcaacgttcaaatccgctcccggcggatttgtcctactcaggagag 6200

           6210      6220      6230      6240      6250      6260      6270      6280      6290      6300
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
6201 cgttcaccgacaaacaacagataaaacgaaaggcccagtctttcgactgagcctttcgttttatttgatgcctggcagttccctactctcgcatggggag 6300

           6310
        *    *    *
6301 accccacactaccatcgg 6318
```

Mon Jun 09, 2014 23:55 -0400
pZDX139.gb
Text Map

```
                10        20        30        40        50        60        70        80        90       100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
      1 GAATTCTGCCCTTCTTCAGGGCTTAATTTTTAAGAGCGTCACCTTCATGGTGGTCAGTGCGTCCTGCTGATGTGCTCAGTATCACCGCCAGTGGTATTTA 100
                                                                                          >>>>>>>>>>>>>>>>>
                                                                                          OL1

                110       120       130       140       150       160       170       180       190       200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    101 TGTCAACACCGCCAGAGATAATTTATCACCGCAGATGGTTATCTGTATGTTTTTTATATGAATTTATTTTTTGCAGGGGGGCATTGTTTGGTAGGTGAGA 200
           >>>>>>>>>>>>>>>>>>
           OL2
                                >>>>>>>>>>>>>>>>>>
                                OL3

                210       220       230       240       250       260       270       280       290       300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    201 GATCTGACGGCAGTTATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCTCGTTGCTGCATAAACCGACTACACAAATCAGCGA 300

                310       320       330       340       350       360       370       380       390       400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    301 TTTCCATGTTGCCACTCGCTTTAATGATGATTTCAGCCGCGCTGTACTGGAGGCTGAAGTTCAGATGTGCGGCGAGTTGCGTGACTACCTACGGGTAACA 400

                410       420       430       440       450       460       470       480       490       500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    401 GTTTCTTTATGGCAGGGTGAAACGCAGGTCGCCAGCGGCACCGCGCCTTTCGGCGGTGAAATTATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACAC 500

                510       520       530       540       550       560       570       580       590       600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    501 TACGTCTGAACGTCGAAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCGGTGGTTGAACTGCACACCGCCGACGGCACGCTGATTGA 600

                610       620       630       640       650       660       670       680       690       700
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    601 AGCAGAAGCCTGCGATGTCGGTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGCTGAACGGCAAGCCGTTGCTGATTCGAGGCGTTAACCGTCAC 700

                710       720       730       740       750       760       770       780       790       800
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    701 GAGCATCATCCTCTGCATGGTCAGGTCATGGATGAGCAGACGATGGTGCAGGATATCCTGCTGATGAAGCAGAACAACTTTAACGCCGTGCGCTGTTCGC 800

                810       820       830       840       850       860       870       880       890       900
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    801 ATTATCCGAACCATCCGCTGTGGTACACGCTGTGCGACCGCTACGGCCTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTGCCAATGAA 900

                910       920       930       940       950       960       970       980       990      1000
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
    901 TCGTCTGACCGATGATCCGCGCTGGCTACCGGCGATGAGCGAACGCGTAACGCGAATGGTGCAGCGCGATCGTAATCACCCGAGTGTGATCATCTGGTCG 1000

               1010      1020      1030      1040      1050      1060      1070      1080      1090      1100
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1001 CTGGGGAATGAATCAGGCCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTCGATCCTTCCCGCCCGGTGCAGTATGAAGGCGGCGGAG 1100

               1110      1120      1130      1140      1150      1160      1170      1180      1190      1200
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1101 CCGACACCACGGCCACCGATATTATTTGCCCGATGTACGCGCGCGTGGATGAAGACCAGCCCTTCCCGGCTGTGCCGAAATGGTCCATCAAAAAATGGCT 1200

               1210      1220      1230      1240      1250      1260      1270      1280      1290      1300
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1201 TTCGCTACCTGGAGAGACGCGCCCGCTGATCCTTTGCGAATACGCCCACGCGATGGGTAACAGTCTTGGCGGTTTCGCTAAATACTGGCAGGCGTTTCGT 1300

               1310      1320      1330      1340      1350      1360      1370      1380      1390      1400
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1301 CAGTATCCCCGTTTACAGGGCGGCTTCGTCTGGGACTGGGTGGATCAGTCGCTGATTAAATATGATGAAAACGGCAACCCGTGGTCGGCTTACGGCGGTG 1400

               1410      1420      1430      1440      1450      1460      1470      1480      1490      1500
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1401 ATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTGCCGACCGCACGCCGCATCCAGCGCTGACGGAAGCAAAACACCAGCA 1500

               1510      1520      1530      1540      1550      1560      1570      1580      1590      1600
            *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
   1501 GCAGTTTTTCCAGTTCCGTTTATCCGGGCAAACCATCGAAGTGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCG 1600
```

```
           1610      1620      1630      1640      1650      1660      1670      1680      1690      1700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1601 CTGGATGGTAAGCCGCTGGCAAGCGGTGAAGTGCCTCTGGATGTCGCTCCACAAGGTAAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAGCG 1700

           1710      1720      1730      1740      1750      1760      1770      1780      1790      1800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1701 CCGGGCAACTCTGGCTCACAGTACGCGTAGTGCAACCGAACGCGACCGCATGGTCAGAAGCCGGGCACATCAGCGCCTGGCAGCAGTGGCGTCTGGCGGA 1800

           1810      1820      1830      1840      1850      1860      1870      1880      1890      1900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1801 AAACCTCAGTGTGACGCTCCCCGCCGCGTCCCACGCCATCCCGCATCTGACCACCAGCGAAATGGATTTTTGCATCGAGCTGGGTAATAAGCGTTGGCAA 1900

           1910      1920      1930      1940      1950      1960      1970      1980      1990      2000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1901 TTTAACCGCCAGTCAGGCTTTCTTTCACAGATGTGGATTGGCGATAAAAAACAACTGCTGACGCCGCTGCGCGATCAGTTCACCCGTGCACCGCTGGATA 2000

           2010      2020      2030      2040      2050      2060      2070      2080      2090      2100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2001 ACGACATTGGCGTAAGTGAAGCGACCCGCATTGACCCTAACGCCTGGGTCGAACGCTGGAAGGCGGCGGGCCATTACCAGGCCGAAGCAGCGTTGTTGCA 2100

           2110      2120      2130      2140      2150      2160      2170      2180      2190      2200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2101 GTGCACGGCAGATACACTTGCTGATGCGGTGCTGATTACGACCGCTCACGCGTGGCAGCATCAGGGGAAAACCTTATTTATCAGCCGGAAAACCTACCGG 2200

           2210      2220      2230      2240      2250      2260      2270      2280      2290      2300
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2201 ATTGATGGTAGTGGTCAAATGGCGATTACCTAGGCGGCGTTATAAGCATTTAATGCATTGATGCCATTAAATAAAGCACCAACGCCTGACTGCCCCATCC 2300

           2310      2320      2330      2340      2350      2360      2370      2380      2390      2400
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2301 CCATCTTGTCTGCGACAGATTCCTGGGATAAGCCAAGTTCATTTTTCTTTTTTTCATAAATTGCTTTAAGGCGACGTGCGTCCTCAAGCTGCTCTTGTGT 2400

           2410      2420      2430      2440      2450      2460      2470      2480      2490      2500
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2401 TAATGGTTTCTTTTTTGTGCTCATACGTTAAATCTATCACCGCAAGGGATAAATATCTAACACCGTGCGTGTTGACTATTTTACCTCTGGCGGTGATAAT 2500
                                                                                        <<<<<<<<<<<<<<<<<<
                                                                                        OR1
                                                                  <<<<<<<<<<<<<<<<<<
                                                                  OR2
                                          <<<<<<<<<<<<<<<<<<
                                          OR3

           2510      2520      2530      2540      2550      2560      2570      2580      2590      2600
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2501 GGTTGCATGTACTAAGGAGGTTGTATGGAACAACGCATAACCCTGAAAGATTATGCAATGCGCTTTGGGCAAACCAAGACAGCTGCAGCAAATAACGTAA 2600

           2610      2620      2630      2640      2650      2660      2670      2680      2690      2700
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2601 AAACCCGCTTCGGCGGGTTTTTTTATGGGGGGAGTTTAGGGATCCGCCTCGAGTTCCTCAGCGTCGGACACCATGGCATCACAGTATCGTGATGACAGAG 2700

           2710      2720      2730      2740      2750      2760      2770      2780      2790      2800
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2701 GCAGGGAGTGGGACAAAATTGAAATCAAATAATGATTTTATTTTGACTGATAGTGACCTGTTCGTTGCAACAAATTGATAAGCAATGCTTTTTTATAATG 2800

           2810      2820      2830      2840      2850      2860      2870      2880      2890      2900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2801 CCAACTTAGTATAAAAAAGCTGAACGAGAAACGTAAAATGATATAAATATCAATATATTAAATTAGATTTTGCATAAAAAACAGACTACATAATACTGTA 2900

           2910      2920      2930      2940      2950      2960      2970      2980      2990      3000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
2901 AAACACAACATATGCAGTCACTATGAATCAACTACTTAGATGGTATTAGTGACCTGTAACAGAGCATTAGCGCAAAGCTTGGCACTGGCCGTCGTTTTAC 3000

           3010      3020      3030      3040      3050      3060      3070      3080      3090      3100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3001 AACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGA 3100
                                                                                W  R  N  S  E  E  A  R  T  D
                                                                                1
                                                                                >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                                                                LacZ alpha

           3110      3120      3130      3140      3150      3160      3170      3180      3190      3200
```

```
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3101 TCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCGCAGCGTGACC 3200
      R  P  S  Q  Q  L  R  S  L  N  G  E  W
     11
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     LacZ alpha

           3210      3220      3230      3240      3250      3260      3270      3280      3290      3300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3201 GCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGC 3300

           3310      3320      3330      3340      3350      3360      3370      3380      3390      3400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3301 TCCCTTTAGGGTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAGTGGGCCATCGCCCCGATAGACGGT 3400

           3410      3420      3430      3440      3450      3460      3470      3480      3490      3500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3401 TTTTCGCCCTTTGACGCTGGAGTTCACGTTCCTCAATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA 3500

           3510      3520      3530      3540      3550      3560      3570      3580      3590      3600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3501 TAAGGGATTTTTCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTAACGCGAATTTTAACAAAATATTAACGTTTATAATTTCAG 3600

           3610      3620      3630      3640      3650      3660      3670      3680      3690      3700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3601 GTGGCATCTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGATAAAT 3700

           3710      3720      3730      3740      3750      3760      3770      3780      3790      3800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3701 GCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTATTCCCTTTTTTGCGGCATTTTGCCTTCCTGTTTTTGCTCAC 3800

           3810      3820      3830      3840      3850      3860      3870      3880      3890      3900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3801 CCAGAAACGCTGGTGAAAGTAAAAGATGCTGAAGATCAGTTGGGTGCACGAGTGGGTTACATCGAACTGGATCTCAATAGTGGTAAGATCCTTGAGAGTT 3900

           3910      3920      3930      3940      3950      3960      3970      3980      3990      4000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
3901 TTCGCCCCGAAGAACGTTTTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTATTGACGCCGGGCAAGAGCAACTCGGTCG 4000
                                >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                                Amp R (pDL plasmids)

           4010      4020      4030      4040      4050      4060      4070      4080      4090      4100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4001 CCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCC 4100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           4110      4120      4130      4140      4150      4160      4170      4180      4190      4200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4101 ATAACCATGAGTGATAACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATGTAA 4200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           4210      4220      4230      4240      4250      4260      4270      4280      4290      4300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4201 CTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTGACACCACGATGCCTGTAGTAATGGTAACAACGTTGCGCAAACT 4300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           4310      4320      4330      4340      4350      4360      4370      4380      4390      4400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4301 ATTAACTGGCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCACTTCTGCGCTCGGCCCTTCCG 4400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           4410      4420      4430      4440      4450      4460      4470      4480      4490      4500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4401 GCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAG 4500
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

           4510      4520      4530      4540      4550      4560      4570      4580      4590      4600
```

```
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4501 TTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAACTGTCAGACCA 4600
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     Amp R (pDL plasmids)

            4610      4620      4630      4640      4650      4660      4670      4680      4690      4700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4601 AGTTTACTCATATATACTTTAGATTGATTTAAAACTTCATTTTTAATTTAAAAGGATCTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAAATCCCT 4700
                                                                                          >>>>>>>>>>>>>>>>>>
                                                                                          ColE1 origin

            4710      4720      4730      4740      4750      4760      4770      4780      4790      4800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4701 TAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAA 4800
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4810      4820      4830      4840      4850      4860      4870      4880      4890      4900
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4801 CAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAA 4900
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            4910      4920      4930      4940      4950      4960      4970      4980      4990      5000
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
4901 TACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCT 5000
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5010      5020      5030      5040      5050      5060      5070      5080      5090      5100
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5001 GCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGC 5100
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5110      5120      5130      5140      5150      5160      5170      5180      5190      5200
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5101 CCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCC 5200
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5210      5220      5230      5240      5250      5260      5270      5280      5290      5300
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5201 GGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACCTCTGACTT 5300
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5310      5320      5330      5340      5350      5360      5370      5380      5390      5400
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5301 GAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGCGGTTTTG 5400
     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
     ColE1 origin

            5410      5420      5430      5440      5450      5460      5470      5480      5490      5500
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5401 CTCACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGCG 5500

            5510      5520      5530      5540      5550      5560      5570      5580      5590      5600
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5501 CAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCCCGCGCGTTGGCCGATTCATTAATGCAGCTGGCACGACAGGTTT 5600

            5610      5620      5630      5640      5650      5660      5670      5680      5690      5700
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5601 CCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTTAGCTCACTCATTAGGCACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGT 5700

            5710      5720      5730      5740      5750      5760      5770      5780      5790      5800
         *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5701 TGTGTGGAATTGTGAGCGGATAACAATTTCACACAGGAAACAGCTATGACCATGATTACGAATTTAATACGACTCACTATAGGGAATTTCTAGACCTTCC 5800
                                                                          >>>>>>>>>>>>>>>>>>>>>
                                                                          T7

          >>>>>>>>>>>>>>>>>>>>>>>>
          LacO
```

```
           5810      5820      5830      5840      5850      5860      5870      5880      5890      5900
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5801 CGTTTCGCTCAAGTTAGTATAAAAAAGCAGGCTTCAACGGAGCTCGTCGACCCGGGTACCGTTGAATACTCATACTCTTCCTTTTTCAATATTATTGAAG 5900

           5910      5920      5930      5940      5950      5960      5970      5980      5990      6000
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
5901 CATTTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAAAGAGTTTGTAGAAACGCAAAAAGGCCATCCGTCAG 6000

           6010      6020      6030      6040      6050      6060      6070      6080      6090      6100
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
6001 GATGGCCTTCTGCTTAATTTGATGCCTGGCAGTTTATGGCGGGCGTCCTGCCCGCCACCCTCCGGGCCGTTGCTTCGCAACGTTCAAATCCGCTCCCGGC 6100

           6110      6120      6130      6140      6150      6160      6170      6180      6190      6200
        *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
6101 GGATTTGTCCTACTCAGGAGAGCGTTCACCGACAAACAACAGATAAAACGAAAGGCCCAGTCTTTCGACTGAGCCTTTCGTTTTATTTGATGCCTGGCAG 6200

           6210      6220      6230      6240
        *    *    *    *    *    *    *    *
6201 TTCCCTACTCTCGCATGGGGAGACCCCACACTACCATCGG 6240
```